Rosemont Copper Company
5255 East Williams Circle
Suite 1065
Tucson, Arizona
USA 85711
Tel. 520 450 3500
hudbay.com

Memo

To:	David Krizek – Environmental Manager
Cc:	
From:	Matthew Taylor / Isabel Felipe
Title:	Executive Director Metallurgy / Environmental Engineer
Doc #:	015/22 - 15.5.1.8
Date:	July 18, 2022
Subject:	Hazardous and Industrial Materials – Aquifer Application Permit – Copper World Project

This Technical Memorandum (memo) presents a preliminary list of the potential substances, reagents, laboratory and industrial chemicals, fuels, and lubricants that will be on-site during the operation of the Copper World Project (The Project). **Attachment A** provides the Safety Data Sheets (SDS) for major reagents, chemicals, and fuels where available.

Operational Area

Potential reagents, fuels and lubricants used in the Copper World process facilities are identified in **Table 1** with the expected consumption rate and storage quantities. The specific storage locations for the materials will be determined according to the requirements for hazardous materials storage. A preliminary location is described below. All reagents are listed without regard to the determination of their hazard classification.

Reagents used in the Solvent Extraction / Electrowinning Process, that are received in dry form, will be stored in the main receiving warehouse and transferred to the Solvent Extraction Tank Farm for mixing and metering into the process. The copper solvent extractant (Acorga M5774) received in drums on pallets at the main receiving warehouse will be transferred to the Solvent Extraction area for addition to the process. Sulfuric acid and diluent (kerosene) will be received by a tank truck and unloaded directly to storage tanks near the Solvent Extraction Plant.

Reagents for use in the sulfide plant are all received in drums (liquid) or bags (dry) and stored at the reagent storage and mixing facility located adjacent to the flotation plant. The reagents will be mixed at the facility and metered into the process. Pebble lime will be received in bulk and stored in a silo adjacent to the reagent mixing facility. The pebble lime is slaked to milk of lime (MOL) for metering into the process.

Fuels and lubricants will be received in bulk by truck and stored in individual storage tanks at the mine truck shop.

Ammonium nitrate used for blasting in the mine will be received in bulk by truck and stored in silos near the mine truck shop. Powder and blasting caps will be received and stored at the powder magazines located in a secure compound.

Table 1 – Operational Reagents and Fuels

Reagent	Received or Shipped	Usage	Storage
Oxide Plant			
Sulfuric Acid (93%)	Liquid by Tank Truck	55,000 stpy[1]	Storage tanks
Sulphur	Liquid by Tank Truck	30,000 stpy	Storage tanks
Diluent (Kerosene)	Liquid by Tank Truck	1,600 stpy	Storage tank
Extractant (Acorga M5774)	Liquid by Drums	100 stpy	Drums on pallets in the warehouse
Cobalt Sulfate	Dry Crystals in Bags or Super Sacks	40 stpy	Bags on pallets in the warehouse
Guar	Dry Powder in Bags or Super Sacks	11,000 stpy	Bags on pallets in the warehouse
Mist Suppressor (FC-1100)	Liquid in Drums	50 stpy	Drums on pallets in the warehouse
Diatomaceous Earth	Dry Powder in Bags or Super Sacks	100 stpy	Bags on pallets in the warehouse
Zinc Dust	Dry Powder in Bags or Super Sacks	450 stpy	Bags on pallets in the warehouse
Clay	Dry Powder in Bags or Super Sacks	stpy	Bags on pallets in the warehouse
Sulfide Plant			
Allyl Alkyl Thionocarbamate (Aero 8944, Promoter)	Liquid in Drums	500 stpy	Drums on pallets in the reagent storage
Alkyl Hydroxamates	Mixtures	4,400 stpy	Drums on pallets in the reagent storage
Sodium Isobutyl Xanthate (SIBX, Collector)	Dry in Drums	2,000 stpy	Bags or sacks on pallets in the reagent storage
Dowfroth 250 (Frother)	Liquid in Drums	4,000 stpy	Drums on pallets in the reagent storage
Methyl Isobutyl Carbinol (MIBC, Frother)	Liquid in Drums	4,000 stpy	Drums on pallets in the reagent storage
Pebble Lime (CaO, pH Modifier)	Bulk by Truck	100,000 stpy	Dry in silo & as Milk of Lime (Reagent Storage)

Note: [1] stpy refers to short tons per year

Table 1 – Operational Reagents and Fuels – Continued

Reagent	Received or Shipped	Usage	Storage
Sodium Met-Silicate (Dispersant)	Dry Powder in Bags or Super Sacks	2,000 stpy	Bags or sacks on pallets in the reagent storage
No. 2 Diesel Fuel (Collector)	Liquid - Drums	1,100 stpy	Drums on pallets in the reagent storage
Sodium Hydrosulfide (NaHS, Copper Depressant)	Dry Powder in Bags or Super Sacks	15,000 stpy	Bags or sacks on pallets in the reagent storage
Flomin D-910 (Copper Depressant)	Liquid in Drums	100 stpy	Drums on pallets in the reagent storage
Flocculent	Dry Powder in Bags or Super Sacks	1,500 stpy	Bags or sacks on pallets in the reagent storage
Precious Metals Circuit			
Cyanide (Sodium Cyanide)	Solid Briquettes by Tank Truck	500 stpy	Boxes in the reagent storage
Mine			
Ammonium Nitrate	Bulk by Truck	20,100 stpy	Storage silos (By mine truck shop)
Blasting Powder	Dry in Boxes	1,170 stpy	Boxes in the powder magazine
Miscellaneous			
Diesel Fuel - Mine use	Liquid by Tank Truck	9,000,000 gal/yr[2]	In tanks near mine truck shop
Diesel Fuel - Light Vehicles	Liquid by Tank Truck	100,000 gal/yr	In tanks by mine truck shop
Gasoline	Liquid by Tank Truck	100,000 gal/yr	In tanks by mine truck shop
Antifreeze – Mine Truck Shop	Liquid by Tank Truck	10,000 gal/yr	In tanks at the truck wash and Lube facility at mine truck shop
Engine Oils - Mine Truck Shop	Bulk by Truck	30,000 gal/yr	In a tank at the truck wash and Lube facility at mine truck shop
Gear Oil – Mine Truck Shop	Bulk by Truck	20,000 gal/yr	In a tank at the truck wash and Lube facility at mine truck shop
Automatic Transmission Fluid - Mine Truck Shop	Bulk by Truck	20,000 gal/yr	In a tank at the truck wash and Lube facility at mine truck shop
Hydraulic Fluid - Mine Truck Shop	Bulk by Truck	20,000 gal/yr	In a tank at the truck wash and Lube facility at mine truck shop
Waste Oil Storage - Mine Truck Shop	Liquid by Tank Truck	30,000 gal/yr	In a tank at the truck wash and Lube facility at mine truck shop
Waste Antifreeze - Mine Truck Shop	Liquid by Tank Truck	10,000 gal/yr	In a tank at the truck wash and Lube facility at mine truck shop
Waste Oil Storage - Light Vehicle Shop	Liquid by Tank Truck	1,000 gal/yr	In a tank at the mine truck shop
Waste Antifreeze – Light Vehicle Shop	Liquid by Tank Truck	1,000 gal/yr	In a tank at the mine truck shop

Note: [2] gal/yr refers to gallons per year

Laboratory

The potential chemicals that will be used in the on-site laboratory are presented in **Table 2**. The anticipated container size and the amount will be open at any one time is dependent upon the availability of the chemical for delivery and the number of analyses that are performed daily. The total amount of chemicals in the lab may vary from one container to 10 times that amount. However, these materials will all be in a controlled environment, used in laboratory quantities, and managed specifically to ensure there is no outside contact with personnel or the environment. Depending upon the material, it will be returned to the process, returned to the manufacturer, or disposed of by a hazardous waste disposal company. SDS information for the specific laboratory chemicals is included in **Attachment B**.

Table 2 – Laboratory Chemicals

Chemical	CAS Number	Container Size
Pregnant Leach Solution (process solution)	NA	NA
Raffinate (process solution)	NA	NA
Organic (process solution)	NA	NA
Lixivant (process reagent)	NA	NA
Copper concentrate (product)	NA	NA
Copper flotation metallurgical samples	NA	NA
Copper cathode (product)	NA	NA
Flotation chemicals for metallurgical tests	NA	NA
Ore samples	NA	NA
1,1,2,2 Tetrabromoethane	79-27-6	250 g
Acetic Acid (reagent grade)	64-19-7	5 L
Acetone	67-64-1	16 L
Acetylene	74-86-2	Cylinder
Alcohol (GR)	67-56-1 67-63-0	1 L
Ammonium Bifluoride	1341-49-7	500 g
Ammonium Nitrate	6484-52-2	500 g
Ammonium Hydroxide	1336-21-6	1 L
Antimony and Antimony Standard	7647-01-0 10025-91-9 7440-36-0	500 ml 500g
Argon (compressed gas)	7440-37-1	Cylinder
Arsenic Standard	1327-53-3	500 mL
Ascarite	81133-20-2	500 g
Barium Chloride	10326-27-9	200 g
Bismuth Standard	7440-69-9 7697-37-2	500 ml
Buffer Solutions (various, pH 1-10)	Various	500 ml each
Cadmium Standard	7440-43-9	500 ml

Table 2 – Laboratory Chemicals – Continued

Chemical	CAS Number	Container Size
Can of Air (instrument cleaning)	68476-86-8	3.75 oz
Chloride Standards	7647-14-5	500 ml
Chromium Standard	7778-50-9	500 ml
Cobalt Standard	7440-48-4 7697-37-2	500 ml
Cobalt Sulfate Heptahydrate	10026-24-1	500 g
Conductivity Standards (10 – 10,000 µS)	Mixture	500 ml
Copper Standard	7697-37-2 7440-50-8	500 ml
Cupric Sulfate (anhydrous)	7758-98-7	500 g
Electrode Filling Solutions (1M KNO_3 & 0.2M (KCl w/AG and 3M KCl, and Ag/AgCl)	Various	500 ml
Electrode Storage Solution	877-24-7 7447-40-7	2760 ml
Ferric Chloride (anhydrous)	7705-08-0	500 g
Ferric Sulfate	10028-22-5	500 g
Ferrous Ammonium Sulfate (0.5N and crystals)	7783-85-9 7664-93-9	1200 mL 500 g
Ferrous Sulfate (heptahydrate)	7782-63-0	500 ml
Glycerol	56-81-5	1 L
Gold Chloride	13453-07-1	500 mg
Hexane	110-54-3	500 ml
Hexone	108-10-1	1 L
Hydrochloric Acid	7647-01-0	500 ml
Hydrofluoric Acid (48%)	7664-39-3	1 lb
Hydrogen Peroxide (30%)	7722-84-1	500 ml
Iron Standard	7439-89-6	500 ml
Lanthanum Oxide	1312-81-8	250 g
Lead Oxide and Lead Standard	1317-36-8 10099-74-8	2.5 kg 500 ml
Light's Solution (ORP)	Mixture	500 ml
Manganese Standard	7439-96-5	500 ml
Manganese Sulfate (crystal)	10034-96-5	500 g
Methanol	67-56-1	4 L
Molybdenum (powder)	7439-98-7	100 g
Nickel Standard	7440-02-0	500 ml
Nitric Acid (90%)	7697-37-2	500 ml

Table 2 – Laboratory Chemicals – Continued

Chemical	CAS Number	Container Size
Oxalic Acid (crystals)	6153-56-6	500 g
Phenolphthalein, Methyl Orange, or similar	77-09-8	1 L
Phosphorous AA Standard	7723-14-0	500 ml
Potassium Chloride	7447-40-7	500 g
Potassium Iodine	7681-11-0	500ml
Potassium Oxalate Monohydrate	6487-48-5	250 g
Potassium Permanganate (0.1N)	7722-64-7	1 L
Potassium Sulfate (powder)	7778-80-5	500 g
Potassium Thiocyanate (crystal)	333-20-0	100 g
Propane	74-98-6	Cylinder
Quinhydrone (ORP)	106-34-3	500 g
Reference Fill Solution (0.1 KNO_3; 2m KCl; Saturated Ag)	Various	Various
Selenium Standard	7782-49-2	500 ml
Silicon Standard	7440-21-3	100 ml
Silver and Silver Standard	7440-22-4	500 ml
Silver Chloride Electrode Solution	Mixture	120 ml
Silver Nitrate (0.1N Solution and crystals)	7761-88-8	500 ml / 500 g
Sodium Carbonate (anhydrous)	497-19-8	500 g
Sodium Cyanide (NaCN)	143-33-9	500 ml / 1L
Sodium Hydroxide (0.1 N; 2.04 N; 2.50 N; 4.00 N; solid; and pellets)	1310-73-2	1 L
Sodium Hypochlorite (5%)	7681-52-9	1 L
Sodium Oxalate	62-76-0	500 g
Sodium Sulfate (crystals)	7727-73-3	500 g
Sodium Thiosulfate (0.1 N solution)	7772-98-7	1 L
Stannous Chloride	10025-69-1	500 g
Starch Indicator	9005-25-8	1 L
Sulfur Standard	Mixture	500 ml
Sulfuric Acid (5%)	7664-93-9	1L
Tellurium Standard	Mixture	500 ml
Thiourea	62-56-6	500 g
Tin and Tin Standard	7647-01-0	500 ml
Urea	57-13-6	500 g
Yttrium Standard	7697-37-2	500 ml
Zinc and Zinc Standard	7440-66-6 7697-37-2	500 ml
Zobell's Solution (ORP)	Mixture	500 ml

The table above may not be an exhaustive list of the chemicals needed to run the laboratory. For instance, the standards listed above are for Atomic Adsorption (AA) analysis only and do not include standards that may be necessary for Inductively Coupled Plasma (ICP) analysis. While the standards will be similar, the MSDS information may be slightly different.

There may also be a situation in which the lab may wish to become certified by the Arizona Department of Health Services (ADHS) to perform analysis that meets Environmental Protection Agency (EPA) standards. If this is the situation, then there may be additional equipment or laboratory materials that will be necessary to maintain the certifications.

This list also does not include any cleaning supplies, maintenance, or other supply materials that would be classified as hazardous and used in the laboratory. The Safety Data Sheets (SDS) for each product listed above excluding the process materials are attached.

HUDBAY

ATTACHMENT A

SDS – Operational Reagents and Fuels

A.1 Oxide Plant SDS

A.2 Sulfide Plant SDS

A.3 Mine & Miscellaneous SDS

A.1 OXIDE PLANT SDS

SDS: 0014834
Date Prepared: 02/05/2017

SAFETY DATA SHEET

1. IDENTIFICATION

Product Name:	**ACORGA® M5774 Solvent Extraction Reagent**
Product Description:	Salicylaldoxime derivative in solvent mixture
Synonyms:	None
Chemical Family:	Salicylaldoxime derivative
Molecular Formula:	Mixture
Molecular Weight:	Mixture
Intended/Recommended Use:	Mining chemical

CYTEC INDUSTRIES INC., 504 CARNEGIE CENTER, PRINCETON, NEW JERSEY 08540, USA
For Product and all Non-Emergency Information call 1-800/652-6013. Outside the USA and Canada call 1-973/357-3193.

EMERGENCY PHONE (24 hours/day) - For emergency only involving spill, leak, fire, exposure or accident call:
Asia Pacific:
Australia - +61 2 8014 4558 (Carechem24)
China (PRC) - +86 0532 83889090 (NRCC) +86 512 8090 3042 (Carechem24)
New Guinea - +61 2 8014 4558 (Carechem24)
New Zealand - +64 9 929 1483 (Carechem24)
India, Japan, Korea, Malaysia, Thailand - +65 3158 1074 (Carechem24 Singapore)
India (Hindi Speaking Only) - +65 3158 1198 or 000800 100 7479 (Carechem24 Singapore)
Canada: 800 424 9300 (Within US,Canada) +1 (703) 527-3887 (International) (CHEMTREC)
Europe/Africa/Middle East (Carechem24 UK):
Europe, Middle East, Africa, Israel - +44 1235 239 670
(Arabic speaking countries) - +44 1235 239 671
Latin America:
Brazil - +55 11 3197 5891 (Carechem24)
Chile - +56 2 2582 9336 (Carechem24)
All Others - +44 1235 239 670 (Carechem24 UK)
USA: 800 424 9300 (Within US,Canada) +1 (703) 527-3887 (International) (CHEMTREC)

The ® indicates a Registered Trademark in the United States and the ™ indicates a trademark in the United States. The mark may also be registered, subject of an application for registration, or a trademark in other countries.

2. HAZARDS IDENTIFICATION

GHS Classification
Reproductive Toxicant Category 2
Skin Corrosion / Irritation Hazard Category 2
Serious Eye Damage / Eye Irritation Hazard Category 2A
Skin Sensitizer Hazard Category 1B
Aquatic Environment Acute Hazard Category 1
Aquatic Environment Chronic Hazard Category 1

LABEL ELEMENTS

Signal Word
Warning

Hazard Statements
Suspected of damaging fertility or the unborn child
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
Very toxic to aquatic life with long lasting effects

Precautionary Statements
Obtain special instructions before use.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash face, hands and any exposed skin thoroughly after handling.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Contaminated work clothing should not be allowed out of the workplace.
Avoid release to the environment.
IF exposed or concerned: Get medical advice/attention.
IF ON SKIN: Wash with plenty of soap and water.
Specific treatment (see supplemental first aid instructions on this label).
Take off all contaminated clothing and wash it before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If skin irritation or rash occurs: Get medical advice/attention.
Collect spillage.
Store locked up.
Dispose of contents/container in accordance with local and national regulations.

Hazards Not Otherwise Classified (HNOC), Other Hazards
Not applicable

---

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance, Mixture or Article? Mixture

HAZARDOUS INGREDIENTS

Component / CAS No.	%	GHS Classification	Carcinogen
Petroleum distillate hydrotreated light 64742-47-8	7 - 13	Flam. Liq. 4 (H227) Skin Irrit. 3 (H316) Eye Irrit. 2B (H320) Asp. Tox. 1 (H304)	-
Alkyl Salicaldehyde -	0.1 - 1.4	Skin Sens. 1B (H317)	-

Component / CAS No.	%	GHS Classification	Carcinogen
Aromatic aldehyde derivative -	0.1 - 1.4	Acute Tox. 4 (H302) Acute Tox. 4 (H312) Acute Tox. 4 (H332) Skin Corr. 1B (H314) Eye Dam. 1 (H318) Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)	-
5-Nonyl-2-hydroxy-benzaldoxime 174333-80-3	30 - 60	Acute Tox. 4 (H302) Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)	-
4-Nonyl-phenol, (branched) 84852-15-3	0.5 - 1.1	Repr. 2 (H361) Acute Tox. 4 (H302) Skin Corr. 1B (H314) Eye Dam. 1 (H318) Aquatic Acute 1 (H400) Aquatic Chronic 1 (H410)	-

The specific chemical identity and/or exact percentage of composition for one or more ingredients has been withheld as a trade secret.

Additional GHS classification or other information may be included in this section but has not been adopted by OSHA. See Section 16 for full text of H phrases.

---

4. FIRST AID MEASURES

DESCRIPTION OF FIRST AID MEASURES

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes. Obtain medical advice if there are persistent symptoms.

Skin Contact:
Wash immediately with plenty of water and soap. Remove contaminated clothing and shoes without delay. Obtain medical attention. Do not reuse contaminated clothing without laundering. Destroy or thoroughly clean shoes before reuse.

Ingestion:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

None known

INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS

Not applicable

---

5. FIRE-FIGHTING MEASURES

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray or fog, carbon dioxide or dry chemical.

Extinguishing Media to Avoid:
full water jet

Protective Equipment:
Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. See MSDS Section 8 (Exposure Controls/Personal Protection).

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

---

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Where exposure level is known, wear approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

Methods For Cleaning Up:
Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush spill area with water.

References to other sections:
See Sections 8 and 13 for additional information.

---

7. HANDLING AND STORAGE

HANDLING

Precautions: Avoid release to the environment. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves and eye/face protection.

Special Handling Statements: None

STORAGE
Store in accordance with local, state, and federal regulations.

Storage Temperature: Room temperature
Reason: Quality.

---

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure when spraying or curing at elevated temperatures.

Respiratory Protection:
Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure. A full facepiece respirator also provides eye and face protection.

Eye Protection:
Wear eye/face protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure.

Skin Protection:
Avoid skin contact. Wear impermeable gloves and suitable protective clothing. Barrier creams may be used in conjunction with the gloves to provide additional skin protection.

Hand Protection:
Nitrile or fluorinated rubber gloves. Consider the porosity and elasticity data of the glove manufacturer and the specific conditons in the work place. Replace gloves immediately when torn or any change in appearance (dimension, colour, flexibility etc) is noticed. Barrier creams may help to protect the exposed areas of the skin, they should however not be applied once exposure has occurred.

Additional Advice:
Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. It is recommended that a shower be taken after completion of workshift especially if significant contact has occurred. Work clothing should then be laundered prior to reuse. Street clothing should be stored separately from work clothing and protective equipment. Work clothing and shoes should not be taken home.

Exposure Limit(s)

The below constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

64742-47-8 Petroleum distillate hydrotreated light

OSHA (PEL):	165 ppm (1200 mg/m^3) (Supplier)
ACGIH (TLV):	Not established
Other Value:	1200 mg/m^3 (Supplier)
	165 ppm (Supplier)

---

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	clear amber	
Appearance:	liquid	
Odor:	none	
Boiling Point:	Not available	
Melting Point:	Not available	
Vapor Pressure:	Not available	
Specific Gravity/Density:	0.96 - 0.98@ 25°C	
Vapor Density:	Not available	
Percent Volatile (% by wt.):	Not available	
pH:	Not available	
Saturation In Air (% By Vol.):	Not available	
Evaporation Rate:	Not available	
Solubility In Water:	Insoluble	
Volatile Organic Content:	Not available	
Flash Point:	115 °C 239 °F	Pensky-Martens Closed Cup
Flammability (solid, gas):	Not available	
Flammable Limits (% By Vol):	Not available	
Autoignition (Self) Temperature:	Not available	
Decomposition Temperature:	Not available	
Partition coefficient (n-octanol/water):	Not available	
Odor Threshold:	Not available	
Viscosity (Kinematic):	59.1 mm2/s @ 40	

DUST HAZARD INFORMATION

Particle Size (microns):	Not applicable
Kst (bar-m/sec):	Not applicable
Maximum Explosion Pressure (Pmax):	Not applicable
Dust Class:	Not applicable
Minimum Ignition Energy (MIE) (mJ):	Not applicable
Minimum Ignition Temperature (MIT) (°C):	Not applicable
Minimum Explosive Concentration (MEC) (g/m^3):	Not applicable
Limiting Oxygen Concentration (LOC) (%):	Not applicable

10. STABILITY AND REACTIVITY

Reactivity:	No information available
Stability:	Stable
Conditions To Avoid:	None known
Polymerization:	Will not occur
Conditions To Avoid:	None known
Materials To Avoid:	Strong oxidizing agents. oxygen
Hazardous Decomposition Products:	oxides of carbon and nitrogen, ammonia

11. TOXICOLOGICAL INFORMATION

PRODUCT TOXICITY INFORMATION

Likely Routes of Exposure: Skin, Eyes, Oral.

ACUTE TOXICITY DATA

oral (gavage)	rat	Acute LD50	>2000 mg/kg
dermal	rabbit	Acute LD50	>2000 mg/kg
inhalation	rat	Acute LC50 4 hr	>5 mg/l (Dust/Mist)

LOCAL EFFECTS ON SKIN AND EYE

Acute Irritation	skin	Irritating
Acute Irritation	eye	Irritating

ALLERGIC SENSITIZATION

Sensitization	skin	Sensitizing
Sensitization	respiratory	No data

GENOTOXICITY

Assays for Gene Mutations

Ames Salmonella Assay	No data

OTHER INFORMATION

The product toxicity information above has been estimated.

HAZARDOUS INGREDIENT TOXICITY DATA

Petroleum distillates, hydrotreated light (CAS# 64742-47-8) has acute oral (rat) and dermal (rabbit) LD50 values of >5 g/kg and >3.16 g/kg, respectively. Prolonged or repeated skin contact tends to remove skin oils, possibly leading to irritation and dermatitis. Direct contact may cause eye irritation. Overexposure to high vapor concentrations, >~700 ppm, are irritating to the eyes and respiratory tract and may cause headaches, dizziness, drowsiness, and other central nervous system effects, including death. Aspiration of minute amounts during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death. In a 90-day oral gavage (rats) study at 100, 500, or 1000 mg/kg, no treatment-related mortalities were observed. There were no significant changes in body weights or food consumption in any dose groups. Increased liver weights were observed in male and female rats a 500 and 1000 mg/kg. Increased kidney weights were observed only in male rats at 500 and 1000 mg/kg. Testes weights were significantly elevated in male rats at 1000 mg/kg. Kidney effects, indicative of light hydrocarbon nephropathy, occured in male rat kidneys at all dose levels. Histological findings of hepatocellular hypertrophy were seeen in the livers of male rats at 1000 mg/kg and in female rats at 500 and 1000 mg/kg. All treatment-related effects were reversible within the 4-week recovery period. Observed kidney effects (including light hydrocarbon nephropathy and increased kidney weight) are a unique response by male rats to chronic hydrocarbon exposure, which th U.S. EPA has declared `not relevant to humans`. High-dose liver effects (including hepatocellular hypertrophy, or enlarged liver cells) are a direct consequence of the sustained high-fat `hydrocarbon diet`. The No Observed Adverse Effect Level (NOAEL) for this study was 1000 mg/kg.

The toxicological properties of Alkyl salicaldehyde have not been fully investigated. It is expected to be a mild eye and skin irritant, but may produce an allergic skin reaction.

Based on toxicity information for structurally similar compounds, the oral LD50 (rat) for Aromatic aldehyde derivative will be approximately 500 mg/Kg. It is expected to be corrosive to eyes, skin and all mucous membranes. Inhalation or ingestion will likely cause chemical burns to the tracheal and bronchial epithelium, and higher concentrations can ulcerate or necrotize tissue, with death due to laryngeal spasm, bronchopneumonia or pulmonary edema likely. Eye or skin contact is likely to cause severe irritation or burns, with possible permanent vision impairment, ulceration, or tissue necrosis.

5-Nonyl-2-hydroxy-benzaldoxime has an oral LD50 (rat) of 1.25 to 5 mL/kg, a dermal LD50 (rat) of > 2.5 mL/kg, and an inhalation LC50 (rat) of > 1.6 mg/L/1 hr./70 °C. Rat skin testing indicates it is a moderate dermal irritant, and rabbit eye testing indicated a slight potential for irritation. Guinea pig dermal sensitization tests were negative. It is expected to be irritating to eyes, skin, and all mucous membranes. Ingestion of 5-Nonyl-2-hydroxy-benzaldoxime is expected to cause moderate to severe gastrointestinal irritation. Symptoms of inhalation exposure may include coughing, choking, pain and moderate to severe irritation of mucous membranes. Depending on quantity and duration of exposure, contact will likely cause moderate skin and eye irritation. In a 14-day subacute feeding study in rats, doses of 0.1 ml/kg did not produce any adverse effects. Overexposure (based on aromatic oxime) can cause central nervous system (CNS) depression, with symptoms ranging from headache and confusion to coma and respiratory failure.

4-Nonyl phenol, branched has an acute oral (rat) LD50 value of 1882 mg/kg and a dermal (rabbit) LD50 value of 3160 mg/kg. This material is severely irritating to eyes and skin. It is not expected to be a dermal sensitizer. 4-nonyl phenol vapors may cause respiratory tract irritation. 4-Nonyl phenol was negative in the Ames and Mouse Micronucleus assays. In 28-day and 90-day, repeat oral dose feeding studies in rats, the NOAEL was 100 mg/kg/day and 50 mg/kg/day, respectively. In a developmental toxicity study in rats, no teratogenic effects were noted up to doses of 300 mg/kg/day. A three generation reproductive study in rats yielded a NOAEL for systemic and reproductive toxicity of ~15 mg/kg/day.

California Proposition 65 Warning (applicable in California only) - This product contains (a) chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

---

12. ECOLOGICAL INFORMATION

TOXICITY, PERSISTENCE AND DEGRADABILITY, BIOACCUMULATIVE POTENTIAL, MOBILITY IN SOIL, OTHER ADVERSE EFFECTS

The ecological assessment for this material is based on an evaluation of its components.

RESULTS OF PBT AND vPvB ASSESSMENT
Not determined

HAZARDOUS INGREDIENT TOXICITY DATA

Component / CAS No.	Toxicity to Algae	Toxicity to Fish	Toxicity to Water Flea
Petroleum distillate hydrotreated light 64742-47-8	Not available	LC50 = 2.2 mg/L - Lepomis macrochirus (96h) static LC50 = 2.4 mg/L - Oncorhynchus mykiss (96h) static LC50 = 45 mg/L - Pimephales promelas (96h) flow-through	Not available
Alkyl Salicaldehyde -	Not available	Not available	Not available
Aromatic aldehyde derivative -	Not available	Not available	Not available
5-Nonyl-2-hydroxy-benzaldoxime 174333-80-3	Not available	Not available	Not available
4-Nonyl-phenol, (branched) 84852-15-3	EC50 0.16 - 0.72 mg/L - Pseudokirchneriella subcapitata (72h) EC50 0.36 - 0.48 mg/L - Pseudokirchneriella subcapitata (96h) EC50 = 1.3 mg/L - Desmodesmus subspicatus (72h)	LC50 = 0.135 mg/L - Pimephales promelas (96h) LC50 = 0.1351 mg/L - Lepomis macrochirus (96h)	EC50 = 0.14 mg/L - Daphnia magna (48h)

13. DISPOSAL CONSIDERATIONS

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 9 of this MSDS (flash point). For Corrosivity, see Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 3 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. The Company encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. The Company recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. The Company has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

---

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

US DOT

Dangerous Goods? X
- Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s.
- Hazard Class: 9
- Packing Group: III
- UN/ID Number: UN3082
- Transport Label Required: Miscellaneous; Marine Pollutant
- Marine Pollutant
- Technical Name (N.O.S.): Salicylaldoxime derivative
- Comments: Marine Pollutants - DOT requirements specific to Marine Pollutants do not apply to non-bulk packagings transported by motor vehicles, rail cars or aircraft.

TRANSPORT CANADA

Dangerous Goods? X
- Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s.
- Hazard Class: 9
- Packing Group: III
- UN Number: UN3082
- Transport Label Required: Miscellaneous; Marine Pollutant
- Marine Pollutant
- Technical Name (N.O.S.): Salicylaldoxime derivative

ICAO / IATA

Dangerous Goods? X
- Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s.
- Hazard Class: 9
- Packing Group: III
- UN Number: UN3082

Transport Label Required: Miscellaneous
Marine Pollutant
Technical Name (N.O.S.): Salicylaldoxime derivative

Comments: Marine Pollutants-IATA Special Provision A197 when transported in single or combination packagings containing a net quantity per single or inner packaging of 5L or less for liquids or 5 kg for solids, are not subject to any provisions of these regulations. Note if the material also meets the criteria under additional hazard classes then all requirements continue to apply for those hazards.

IMO

Dangerous Goods? X
Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s.
Hazard Class: 9
UN Number: UN3082
Packing Group: III
Transport Label Required: Miscellaneous
Marine Pollutant
Marine Pollutant
Technical Name (N.O.S.): Salicylaldoxime derivative

Comments: Marine Pollutants -IMDG 2.10.2.7 when packaged in single or combination packagings, containing a net quantity per single or inner packaging of 5L or less for liquids or 5 kg for solids are not subject to any other provisions of this code. Note if the material also meets the criteria under additional hazard classes then all requirements continue to apply for those hazards.

---

15. REGULATORY INFORMATION

Inventory Information

United States (USA): All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.
This product contains a chemical substance that is subject to export notification under Section 12 (b) of the Toxic Substances Control Act, 15 U. S. C. 2601 et. seq. (This requirement applies to exports from the United States only.)

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

European Economic Area (including EU): When purchased from a Cytec legal entity based in the EU, this product is compliant with the registration of the REACH Regulation (EC) No. 1907/2006 as all its components are either excluded, exempt, pre-registered and/or registered.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or are not required to be listed on AICS.

China: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.

Japan: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese inventory.

Korea: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory.

Philippines: One or more components of this product are NOT included on the Philippine (PICCS) inventory.

OTHER ENVIRONMENTAL INFORMATION
The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

Component / CAS No.	%	TPQ (lbs)	RQ(lbs)	S313	TSCA 12B
5-Nonyl-2-hydroxy-benzaldoxime 174333-80-3	30 - 60	None		No	Yes
4-Nonyl-phenol, (branched) 84852-15-3	0.5 - 1.1	None		Yes	Yes

PRODUCT HAZARD CLASSIFICATION UNDER SECTION 311 OF SARA
- Acute
- Chronic

---

16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire: 1 - Materials that must be preheated before ignition can occur.

Instability: 0 - Materials that in themselves are normally stable, even under fire exposure conditions.

Reasons For Issue: Revised Section 1

Date Prepared: 02/05/2017
Date of last significant revision: 02/01/2017

Component Hazard Phrases
Petroleum distillate hydrotreated light
- H227 - Combustible liquid.
- H316 - Causes mild skin irritation.
- H320 - Causes eye irritation.
- H304 - May be fatal if swallowed and enters airways.

Alkyl Salicaldehyde
- H317 - May cause an allergic skin reaction.

Aromatic aldehyde derivative
- H302 - Harmful if swallowed.
- H312 - Harmful in contact with skin.
- H314 - Causes severe skin burns and eye damage.
- H332 - Harmful if inhaled.
- H400 - Very toxic to aquatic life.
- H410 - Very toxic to aquatic life with long lasting effects.

5-Nonyl-2-hydroxy-benzaldoxime
- H302 - Harmful if swallowed.
- H315 - Causes skin irritation.
- H319 - Causes serious eye irritation.
- H400 - Very toxic to aquatic life.
- H410 - Very toxic to aquatic life with long lasting effects.

4-Nonyl-phenol, (branched)

H302 - Harmful if swallowed.
H314 - Causes severe skin burns and eye damage.
H400 - Very toxic to aquatic life.
H410 - Very toxic to aquatic life with long lasting effects.
H361fd - Suspected of damaging fertility. Suspected of damaging the unborn child.

Prepared By: Legal & Compliance Services; E-mail: custinfo@solvay.com

---

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

Safety Data Sheet (SDS)

GHS - United States

Section 1 - Identification

Product Name	**MB Stoneware with Grog Clay**
Common Names	Pottery Clay, Dry Clay, Moist Clay
Company/Manufacturer	Minnesota Clay Co. USA 2960 Niagara Ln N Plymouth, MN 55447 (763) 432-0875 fax (763) 432-7675 info@mnclay.com
Emergency Number	911
Product Use	Non-exhaustive list: pottery, artware, ceramic building materials
Restrictions on Use	None applicable

Section 2 - Hazardous Identification

Contains Crytalline Silica ≥ 1% Respirable

GHS label elements/ Hazard pictograms

Singal Word: Danger

OSHA/HCS status	Clay mixture in dry form is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)
Classification of the substance or mixture	Carcinogenicity (inhalation) - Category 1A and Specific organ toxicity (Repeated Exposure) (Respiratory tract through inhalation) - Category 1
Hazard Statment	(H350) Cancer Hazard. Contains quartz (crystalline silica) which may cause cancer. Risk of cancer depends upon duration and level of exposure to the dust. Not an acute hazard. (H332) Prolonged inhalation of dust may cause lung injury. Inhalation of high concentrations of dust may cause mechanical irritation and discomfort of the respiratory tract. Repeated exposure may have chronic effects. (H316 + H320 + H335) Can cause skin, respiratory, and eye irritation.
Precautionary Statements	(P261) Avoid breathing dust. (P280) Wear protective gloves, eye, and respiratory protection.

RCC-CW000523

Section 3 - Composition / Information on Ingredients

Substances/Mixtures *Mixture - A trade secret claim is made for this item.*

Component	CAS#	Approx % by Wt.
Kaolin	1332-58-7	45-75%
Crystalline Silica - quartz	14808-60-7	15-40%
Pyrophyllite	12269-78-2	5-15%
Titanium Dioxide	13463-67-7	<5%
Cristobalite	14464-46-1	<2%

Section 4 - First Aid Measures

First-Aid Measures

Eye Contact If eye contact occurs, rinse immediately with plenty of water. If irritation persists, seek medical attention.

Skin Contact If irritation occurs, wash thoroughly with water. If it persists, seek medical attention.

Inhalation Move victim to fresh air in well ventilated area. If coughing or irritation persists, seek medical attention.

Ingestion Consult physician and/or obtain competent medical assistance.

Symptoms and Effects, both Acute and Delayed

Eye Contact Prolonged contact with large amounts of dust may cause mechanical irritation.

Skin Contact Prolonged contact with large amounts of dust may cause mechanical irritation.

Inhalation Inhalation of high concentrations of dry clay dust may cause mechanical irritation and discomfort. Long term exposure may cause chronic effects (see section 11).

Ingestion Large quantities ingested may cause gastrointestinal irritation.

Chronic Symptoms Repeated or prolonged exposure to respirable crystalline silica dust may cause lung damage in the form of silicosis. Symptoms will include shortness of breath, fever fatigue, loss of appetite, chest pain, dry non-productive cough.

RCC-CW000524

Section 5 - Fire Fighting Measures

General Fire Hazards	Clay mixture in dry or moist form is not flammable and does not support fire. The paper bags or plastic bags and cardboard boxes containing the mixture are flammable.
Extinguishing Media	Use appropriate extinguishing media for surrounding fire.
Chemical Hazards from Fire	Clay mixture does not contain hazardous decomposition products.
Protective actions and equipment for fire-fighters	Clay mixture and packaging can become slippery when wet. Fire-fighters should wear appropriate protective equipment.

Section 6 - Accidental Release Measures

Clean-up Methods	If appropriate, use gentle water spray to wet down and minimize dust generation.
Personal Precautions and Personal Protective Equipment	Wear appropriate protective equipment and clothing during clean-up. When dry sweeping use NIOSH approved respirators when dust levels exceed exposure limits.
Environmental Precautions	Clay is a natural mineral product mixture and will not cause adverse effects to the water system other than turbidity from suspended particles.
Emergency Procedures & Methods of Containment	There are no emergency procedures required for this mixture. Place dry clay dust in a sealed container for re-use or proper disposal.

Section 7 - Handling & Storage

Precautions for Safe Handling	Use proper lifting techniques to avoid physical injury.
Recommendations on the conditions for safe storage	No special storage considerations. Do not store moist clay mixture below freezing point (< 0 °C or<32°F).

RCC-CW000525

Section 8 - Exposure Counts/Personal Protection

Airborne Exposure Limits

Hazardous Ingredient	Wt. % Approx.	CAS#	OSHA PEL* / ACGIH TLV*
Kaolin	45-75%	1332-58-7	5mg/m3 / 2mg/m3 respirable 15mg/m3 total dust
Crystalline Silica - quartz	15-40%	14808-60-7	0.1mg/m3 / 0.025mg/m3respirable
Pyrophyllite	5-15%	12269-78-2	15 mg/m3 total dust 5 mg/m3 respirable dust
Titanium Dioxide	<5%	13463-67-7	15mg/m3 / 10mg/m3 total dust
Cristobalite	<2%	14464-46-1	0.05mg/m3 / 0.025mg/m3 respirable

Engineering Measures

Clay mixture in moist form poses no inhalation health risk. Once clay mixture has dried, there may be dust generated by cleaning and working processes. In the event that dust is generated, use local exhaust ventilation or other engineering controls as required to maintain exposures below applicable occupational exposure limits (TLV).

Personal Protective Equipment (PPE)

Respiratory

Dust is generated when working with dry clay mixture. To minimize exposure to dust and/or crystalline silica, cutting or sanding dry clay products should be conducted with sufficient ventilation. Respirable dust and quartz levels should be monitored regularly. Dust and quartz levels in excess of appropriate exposure limits should be reduced by feasible engineering controls, including (but not limited to) wet sanding, wet suppression, ventilation, and process enclosure. When such controls are not feasible, NIOSH/MSHA approved respirators must be worn in accordance with a respiratory protection program which meets OSHA requirements as set forth at 29 CFR1910.134 and ANSI Z88.2-1080 "Practices for Respiratory Protection". In most cases, a disposable N-95 Particulate Respirator is sufficient.

Eyes

Use of NIOSH/OSHA approved safety glasses with side shields is recommended. Face shields should also be used when dry sawing clay products. Wear tight fitting dust goggles when excessively (visible) dusty conditions are present or are anticipated. NIOSH recommends that contact lenses not be worn when working with crystalline silica dust.

Skin and Body

Protective Clothing is not essential. Use gloves and/or protective clothing if abrasion or allergic reactions are experienced.

Section 9 - Physical & Chemical Properties

Apperance	Lump/dry powder or moist mud brick	**Evaporation**	No data available
		Soulubility in water at 100 C	None
Color	White, red, brown	**Decomposition temperature**	Not Applicable
Physical state	Solid	**Viscosity**	Not Applicable
pH	6-8	**Flashpoint**	Not Applicable
Odor	Earthly odor	**Boiling Point**	Not Applicable
Odor threshold	Not Applicable	**Flammability**	Not Applicable
Melting Point	> 1200 °C (>2150°F)	**Vapor Pressure (mm HG)**	Not Applicable
Freezing Point	< 0 °C (<32°F)	**Vapor Density**	Not Applicable
Realtive density/Specific Gravity	~2.6 gm/cc	**Partition coefficent**	Not Applicable
		Auto-ignition temp	Not Applicable

RCC-CW000526

Section 10 - Stability & Reactivity

Reactivity	No dangerous reactions are known under normal conditions of use
Chemical Stability	Stable at standard temperature and pressure. No stabilizers required to maintain chemical stability. Safety issues - Mold may form in plastic bag (moist clay mixture) after several months of shelf life.
Possibility of Hazardous Reactions and Conditions to Avoid	None known
Incompatibility / Hazardous decomposition products	None known

Section 11 - Toxiclogical Information

Primary Route of Exposure: Skin, Eye Contact, Inhalation and Ingestion

Specific Organ Toxicity - Single Exposure
Target organs include ears, skin, respiratory system, and gastrointestinal tract.

Specific Organ Toxicity - Repeated Exposure
Causes damage to eyes, skin, respiratory system, and gastrointestinal tract through prolonged or repeated exposure.

Acute Short-Term Exposure Effects
May cause eye irritation, skin irritation, respiratory tract irritation, and gastrointestinal tract irritation. Inhalation of high concentrations of dry clay dust may cause mechanical irritation and discomfort. Long term exposure may cause chronic effects.

Chronic Long Term Exposure Effects
Silica has been classified by OSHA as a human lung carcinogen. Repeated or prolonged exposure of respirable crystalline silica dust may cause lung damage in the form of silicosis.

Effects of silicosis include bronchitis/chronic obstructive pulmonary disorder, increased susceptibility to tuberculosis, scleroderma (a disease affecting skin, blood vessels, joints and skeletal muscles), and possible renal disease. Acute silicosis can be fatal.

Related Symptoms
Symptoms will include shortness of breath, fever, fatigue, loss of appetite, chest pain, dry non-productive cough.

Medical Conditions Aggravated by Exposure:
Individuals with pre-existing allergies, eye disorders, skin disorders, respiratory disorders and/or gastrointestinal disorders may have increased susceptibility to the effects of exposure.

OSHA, IARC, and NTP Carcinogen Classifications

Chemicals with Carcinogen Potential	CAS#	OSHA	IARC	NTP
Crystaline Silica - quartz	14808-60-7	YES	YES - 1	YES
Titanium Dioxide	13463-67-7	NO	YES - 2B	NO
Cristobalite	14464-46-1	YES	YES - 1	YES

IARC - International Agency for Research on Cancer
1 = Carcinogenic to humans
2A = Probably carcinogenic to humans
2B = Possibly carcinogenic to humans

OSHA - Occupational Safety & Health Administration
NTP - National Toxicology Program

RCC-CW000527

Section 12 - Ecological Information

Ecotoxicity	None Known
Biochemical oxygen demand (BOD5)	None Known
Chemical oxygen demand (COD)	None Known
Products of Biodegradation	None Known
Toxicity of the products of Biodegradation	None Known
Bioaccumulation Potential	None Known
Potential to move from soil to groundwater	None Known
Other adverse effects	None Known

Section 13 - Disposal Configurations (non-mandatory)

Personal protection appropriate	Refer to section 8 for proper PPE when disposing of waste material.
Disposal containers appropriate	Standard waste disposal containers - no special requirements.
Disposal methods	Disposal of this product should comply with the requirements of environmental protection and waste disposal legislation and any regional or local authority requirements.
Physical and chemical properties that may affect disposal	Dry clay dust should be placed in a sealed container or in a manner that reduces or eliminates the release of the product. Moist clay has no special requirements.
Sewage disposal	Do not dispose of into sinks or toilets. Never dispose of this product into a sewer system.
Special precautions for landfills or incineration activities	There are no special precautions for disposal in a landfill. This product is non-combustible and is not suitable for incineration.

Section 14 - Transportation Information (non-mandatory)

Regulatory Information	UN Number	UN Proper Shipping Name	Transport Hazard Class	Packing Group Number	Bulk Transport Guidance	Special Precautions
DOT Classification	Not regulated	———	———	———	———	———
TDG Classification	Not regulated	———	———	———	———	———
ADR/RID Class	Not regulated	———	———	———	———	———
IMDG Class	Not regulated	———	———	———	———	———
IATA-DGR Class	Not regulated	———	———	———	———	———

RCC-CW000528

Section 15 - Regulatory Information (non-mandatory)

TSCA - Toxic Substances Control Act - EPA

Quartz and other chemicals are listed in the TSCA Chemical Substance Inventory.

California Prop. 65 WARNING

This product contains a chemical known to the State of California to cause cancer. (Prop. 65 - California Health and Safety Code Section 2549 Et Seq).

SARA/Title III (Emergency Planning & Community Right-to-Know Act

This mixture contains no substances at or above the reporting threshold under section 313, based on available data.

Section 16 - Other Information (non-mandatory)

Definitions

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstract Service
CAL-OSHA	California Occupational Safety & Health Administration
IARC	International Agency for Research on Cancer
OSHA	Occupational Safety & Health Administration
MSHA	Mine Safety and Health Administration
NIOSH	National Institute of Occupational Safety and Health
NTP	National Toxicology Program

HCS	Hazardous communication standard
OSHA PEL	OSHA permissible exposure limit
STEL	Short-term exposure limit
TLV	Threshold limit value
TWA	Time weighted average

Three types of TLVs for chemical substances as defined by the **ACGIH** are:

TLV-TWA	Time weighted average - average exposure on the basis of an 8h/day, 40h/week work schedule.
TLV-STEL	Short-term exposure limit - spot exposure for a duration of 15 minutes, that cannot be repeated more than 4 times per day, with at least 60 minutes between exposure periods.
TLV-C	Ceiling limit - absolute exposure limit that should not be exceeded at any time.

This SDS is in compliance with The Globally Harmonized System of Classification and Labeling of Chemicals (GHS), and is subject to revision at any time without notice. Its current revision date is : 6/7/2016

Information presented herein has been compiled from sources considered to be dependable and is accurate and reliable to the best of our knowledge and belief but is not guaranteed to be so. Nothing herein is to be construed as recommending any practice or any product in violation of any patent or in violation of any law or regulation. It is the user's responsibility to determine for himself the suitability of any material for a specific purpose and to adopt such safety precautions as may be necessary. We make no warranty as to the results to be obtained in using any material and, since conditions of use are not under our control, we must necessarily disclaim all liability with respect to the use of any material supplied by us.

RCC-CW000529

SAFETY DATA SHEET

HEALTHY ANIMALS. HEALTHY FOOD. HEALTHY WORLD.®

Cobalt Sulfate Monohydrate

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

GHS Product Information

Product Name: Cobalt Sulfate Monohydrate
Business Unit Prince Agri
Other means of identification: Not available

Safety data sheet number: 5005-500 -US-E

Recommended use of the chemical and restrictions on use

Recommended use: Animal Feed Supplement.

Uses advised against: No information available

Details of the supplier of the safety data sheet

Supplier:
Phibro Animal Health Corporation
Glenpointe Centre East, 3rd FL
300 Frank W. Burr Blvd., Ste 21
Teaneck, NJ 07666-6712
Tel: (201) 329-7300
Toll free: (888) 475-7355
Fax: (201) 329-7070

Manufacturer:
Prince Agri Products, Inc
229 Radio Road
Quincy, IL 62305
Tel: 217-222-8854
Fax: 217-222-5098
Toll Free: 800-677-4623
Email: prince@princeagri.com

SDS Contact (email of responsible person): phibroehs@pahc.com

24 Hour Emergency Phone Number: Chemtrec 1-800-424-9300 (CCN17224)

International: International Number: +1 703-527-3887

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute toxicity - Oral	Category 4
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Germ cell mutagenicity	Category 2
Carcinogenicity	Category 1B
Reproductive toxicity	Category 1B

Label elements

Emergency Overview

Danger

Hazard statements
Harmful if swallowed
May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction
Suspected of causing genetic defects
May cause cancer
May damage fertility or the unborn child

Appearance powder **Physical state** Solid **Odor** No information available

Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves

Precautionary Statements - Response
IF exposed or concerned: Get medical advice/attention
IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth

Precautionary Statements - Storage
Store locked up

Precautionary Statements - Disposal
Dispose of contents/ container to an approved landfill

Hazards not otherwise classified (HNOC)

Other Information

Interactions with Other Chemicals Irritants Sensitizers Epoxies

Other hazards
• Very toxic to aquatic life with long lasting effects
• Very toxic to aquatic life

3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance/mixture Mixture

Chemical Name	CAS No.	Weight-%	Trade Secret
Cobalt sulfate	10124-43-3	60 - 100	*

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

First aid measures

General advice: Call 911 or emergency medical service. Remove and isolate contaminated clothing and shoes.

Eye contact: In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

Inhalation: Move victim to fresh air. If breathing is irregular or stopped, administer artificial respiration. Administer oxygen if breathing is difficult.

Skin Contact: Immediate medical attention is required. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

Ingestion: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Call a physician immediately.

Self-protection of the first aider: Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Most important symptoms and effects, both acute and delayed

Symptoms: No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians: May cause sensitization of susceptible persons.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media: Dry chemical, CO2, water spray or regular foam. Water spray, fog or regular foam. Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal.

Unsuitable extinguishing media: Do not scatter spilled material with high pressure water streams.

Specific hazards arising from the chemical: Some may burn but none ignite readily. Those substances designated with a "P" may polymerize explosively when heated or involved in a fire. Some may be transported hot.

Explosion data

Sensitivity to Mechanical Impact: None.

Sensitivity to Static Discharge: None.

Protective equipment and precautions for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions: Do not touch or walk through spilled material. Stop leak if you can do it without risk.

For emergency responders: Use personal protection recommended in Section 8. Use personal protective equipment as required.

Environmental Precautions: Prevent entry into waterways, sewers, basements or confined areas. See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment: Prevent dust cloud.

Methods for cleaning up: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area. Take up with sand or other non-combustible absorbent material and place into containers for later disposal. Cover liquid spill with sand, earth or other non-combustible absorbent material. Cover powder spill with plastic sheet or tarp to minimize spreading.

Personal precautions, protective equipment and emergency procedures

Personal precautions: Do not touch or walk through spilled material. Stop leak if you can do it without risk.

For emergency responders: Use personal protection recommended in Section 8. Use personal protective equipment as required.

Environmental Precautions: Prevent entry into waterways, sewers, basements or confined areas. See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment: Prevent dust cloud.

Methods for cleaning up: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area. Take up with sand or other non-combustible absorbent material and place into containers for later disposal. Cover liquid spill with sand, earth or other non-combustible absorbent material. Cover powder spill with plastic sheet or tarp to minimize spreading.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling: Avoid contact with skin, eyes or clothing. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Use personal protective equipment as required. Do not breathe dust/fume/gas/mist/vapors/spray. Use with local exhaust ventilation.

Conditions for safe storage, including any incompatibilities

Storage Conditions: Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children. Keep containers tightly closed in a cool, well-ventilated place. Keep in properly labeled containers.

Incompatible materials: None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines .

Component	CAS No.	ACGIH TLV	OSHA PEL	NIOSH IDLH

Cobalt sulfate 10124-43-3 (60 - 100)	10124-43-3	TWA: 0.02 mg/m³ Co	-	-

NIOSH IDLH Immediately Dangerous to Life or Health

Other Information: Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Appropriate engineering controls

Engineering Controls: Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

General Hygiene Considerations: When using do not eat, drink or smoke. Regular cleaning of equipment, work area and clothing is recommended. Avoid contact with skin, eyes or clothing. Wash hands thoroughly after handling. Keep away from food, drink and animal feeding stuffs.

Eye/face protection: Tight sealing safety goggles.

Skin and body protection: No special technical protective measures are necessary.

Respiratory protection: If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Solid		
Appearance	powder	**Odor**	No information available
Color	pink	**Odor threshold**	No information available

Property	**Values**	**Remarks • Method**
pH	No information available	
Melting Point / Freezing Point	No information available	
Boiling point / boiling range	No information available	
Flash point °F		
Evaporation rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Specific Gravity	1.04	
Water solubility	No information available	
Solubility in other solvents		
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point No information available

Molecular weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk density	No information available
Percent Volatile	No information available

10. STABILITY AND REACTIVITY

Reactivity
No data available

Chemical stability
Stable under recommended storage conditions.

Possibility of Hazardous Reactions
None under normal processing.

Conditions to avoid
Extremes of temperature and direct sunlight.

Incompatible materials
None known based on information supplied.

Hazardous Decomposition Products
None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information: No data available

Inhalation: No data available.

Eye contact: No data available.

Skin Contact: No data available.

Ingestion: No data available.

Component Information

Chemical Name	CAS No.	Oral LD50	Dermal LD50	Inhalation LC50
Cobalt sulfate	10124-43-3	= 424 mg/kg (Rat)	-	-

Information on toxicological effects

Symptoms: No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization: No information available.
Germ cell mutagenicity: No information available.
Carcinogenicity: The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	CAS No.	ACGIH	IARC	NTP	OSHA
Cobalt sulfate	10124-43-3	A3	Group 2B	Reasonably Anticipated	X

ACGIH (American Conference of Governmental Industrial Hygienists)
A3 - Animal Carcinogen
IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans
NTP (National Toxicology Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
X - Present

Reproductive toxicity: No information available.
STOT - single exposure: No information available.
STOT - repeated exposure: No information available.
Chronic toxicity: Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure.
Target Organ Effects: lungs, Nasal Cavities, Skin.
Aspiration hazard: No information available.

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document .
ATEmix (oral) 424 mg/kg 424

12. ECOLOGICAL INFORMATION

Ecotoxicity

Very toxic to aquatic life with long lasting effects

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Chemical Name	CAS No.	Algae/aquatic plants	Fish	Crustacea
Cobalt sulfate	10124-43-3	0.4 - 72: 72 h Pseudokirchneriella subcapitata mg/L EC50	-	-

Persistence and degradability
No information available.

Bioaccumulation
No information available.

Mobility
No information available.

Other adverse effects: No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes: Refer to all federal, state and local regulations prior to disposal of container and unused contents by reuse, recycle or disposal. Disposal should be in accordance with applicable regional, national and local laws and regulations. Avoid runoff to waterways and sewers. Recover or recycle if possible. Send to a licensed recycler, reclaimer or incinerator.

Disposal methods: Do not reuse container.

14. TRANSPORT INFORMATION

Note: Store in a closed container. Keep container upright.

DOT
UN/ID no UN3077

Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt sulfate)
Hazard Class	9
Packing Group	III
Special Provisions	146, 335, A112, B54, B120, IB8, IP3, N20, T1, TP33, 8
Description	UN3077, Environmentally hazardous substance, solid, n.o.s. (Cobalt sulfate), 9, III
Emergency Response Guide Number	171

IATA

UN/ID no	UN3077
Proper shipping name	Environmentally hazardous substance, solid, n.o.s. (Cobalt sulfate)
Hazard Class	9
Packing Group	III
ERG Code	9L
Special Provisions	A158, A179, A97
Description	UN3077, Environmentally hazardous substance, solid, n.o.s. (Cobalt sulfate), 9, III

IMDG

UN/ID no	UN3077
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt sulfate)
Hazard Class	9
Packing Group	III
EmS-No	F-A, S-F
Special Provisions	274, 335, 966, 967
Description	UN3077, Environmentally hazardous substance, solid, n.o.s. (Cobalt sulfate), 9, III

TDG

UN/ID no	UN3077
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Cobalt sulfate) Cobalt sulfate
Hazard Class	9
Packing Group	III
Description	UN3077, Environmentally hazardous substance, solid, n.o.s. (Cobalt sulfate), 9, III

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
NDSL	Complies
EINECS/ELINCS:	Complies
ENCS:	Complies
IECSC:	Complies
KECL:	Complies
PICCS:	Complies
AICS:	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS No.	SARA 313 - Threshold Values %
Cobalt sulfate	10124-43-3	0.1

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

FIFRA

Not applicable

US State Regulations

WARNING! This product contains a chemical known in the State of California to cause cancer This product can expose you to chemicals including those listed below, which is [are] known to the State of California to cause cancer, birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Chemical Name	California Proposition 65
Cobalt sulfate - 10124-43-3	Carcinogen

U.S. State Right-to-Know Regulations

No information available

Chemical Name	CAS No.	New Jersey	Massachusetts	Pennsylvania
Cobalt sulfate	10124-43-3	X	-	X

Canada

No information available

WHMIS Hazard Class D2A - Very toxic materials D1B - Toxic materials D2B - Toxic materials

16. OTHER INFORMATION

NFPA	**Health hazards** 2	**Flammability** 0	**Instability** 0	**Physical & Chemical Properties** 0
HMIS	**Health hazards** *2	**Flammability** 0	**Physical hazards** 0	**Personal protection** X

Document Review

Revision Number: 10

Revision Note: No information available

Key or legend to abbreviations and acronyms used in the safety data sheet:

Bioconcentration factor (BCF)
International Air Transport Association (IATA)
Globally Harmonized System (GHS)
International Maritime Dangerous Goods (IMDG)

Disclaimer

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

The information contained in this Safety Data Sheet (“SDS”) is provided solely to comply with the requirements of federal, state and other applicable law. The information contained herein applies only to the actual product of Phibro Animal Health Corporation and its affiliates ("PAHC") identified and described herein. This information is not intended to address, nor does it address the use or application of the identified PAHC product either alone or in combination with any material, product or process. All of the information set forth herein is based on technical data regarding the identified product that PAHC believes to be reliable as of the date hereof. Prior to each use of any PAHC product, the user must always read and follow the warnings and instructions on the product's current Technical Data Sheet product label and Safety Data Sheet for each PAHC product, which are available by telephone number listed in Section 1 of this SDS.

PAHC MAKES NO WARRANTIES EXPRESS OR IMPLIED AND ASSUMES NO LIABILITY ARISING FROM THIS INFORMATION OR ITS USE OR APPLICATION. PAHC SHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES AND SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER WHICH INFRINGES ANY PATENT OR ANY OTHER INTELLECTUALPROPERTY RIGHTS HELD BY ANY PARTY.

All sales of PAHC products are subject to its current terms and conditions of sale.

End of Safety Data Sheet

SAFETY DATA SHEET

Version 8.2
Revision Date 14.09.2020
Print Date 19.02.2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Diatomaceous earth

Product Number : D5384
Brand : Sigma-Aldrich
CAS-No. : 61790-53-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : SIGMA-ALDRICH CANADA CO.
2149 WINSTON PARK DRIVE
OAKVILLE ON L6H 6J8
CANADA

Telephone : +1 905 829-9500
Fax : +1 905 829-9292

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

- none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Diatomaceous silica

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Kieselguhr

CAS-No. : 61790-53-2

Component	Classification	Concentration *
Kieselguhr, non-respirable		
		<= 100 %
* Weight %		

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Nature of decomposition products not known.
Not combustible.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapors, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions

No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Kieselguhr, non-respirable	61790-53-2	TWA	1.5 mg/m3	Canada. British Columbia OEL
		TWA	4 mg/m3	Canada. British Columbia OEL
		TWAEV	6 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants

8.2 Exposure controls

Appropriate engineering controls

General industrial hygiene practice.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	insoluble
o)	Partition coefficient:	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	n-octanol/water	
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Hydrogen fluoride

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

SECTION 16: Other information

Further information
Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.2 Revision Date: 14.09.2020 Print Date: 19.02.2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Safety Data Sheet

Copyright,2019,3M Company.
All rights reserved. Copying and/or downloading of this information for the purpose of properly utilizing 3M products is allowed provided that: (1) the information is copied in full with no changes unless prior written agreement is obtained from 3M, and (2) neither the copy nor the original is resold or otherwise distributed with the intention of earning a profit thereon.

Document Group:	29-6427-8	**Version Number:**	3.01
Issue Date:	07/09/19	**Supercedes Date:**	09/03/14

SECTION 1: Identification

1.1. Product identifier
3M™ Acid Mist Suppressant FC-1100

Product Identification Numbers
98-0212-2882-4, 98-0212-3180-2, 98-0212-3181-0, 98-0212-3182-8
7000059298, 7100049979, 7100149991

1.2. Recommended use and restrictions on use

Recommended use
Surfactant

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Advanced Materials Division
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number
1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification
Not classified as hazardous according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

2.2. Label elements
Signal word
Not applicable.

Symbols
Not applicable.

Pictograms
Not applicable.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
Fluoroalkyl Acrylate Adduct (NJTS No. 04499600-5965P)	Trade Secret*	48 - 52
Water	7732-18-5	45 - 50

NJTS or NJTSRN: New Jersey Trade Secret Registry Number.

*The specific chemical identity and/or exact percentage (concentration) of this composition has been withheld as a trade secret.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:
Remove person to fresh air. If you feel unwell, get medical attention.

Skin Contact:
Wash with soap and water. If signs/symptoms develop, get medical attention.

Eye Contact:
Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

If Swallowed:
Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed
See Section 11.1. Information on toxicological effects.

4.3. Indication of any immediate medical attention and special treatment required
Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media
Material will not burn. Use a fire fighting agent suitable for the surrounding fire.

5.2. Special hazards arising from the substance or mixture
Exposure to extreme heat can give rise to thermal decomposition.

Hazardous Decomposition or By-Products

Substance	Condition
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Hydrogen Fluoride	During Combustion
Toxic Vapor, Gas, Particulate	During Combustion

5.3. Special protective actions for fire-fighters
When fire fighting conditions are severe and total thermal decomposition of the product is possible, wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants,

RCC-CW000548

bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures
Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Observe precautions from other sections.

6.2. Environmental precautions
Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

6.3. Methods and material for containment and cleaning up
Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with water. Seal the container. Dispose of collected material as soon as possible in accordance with applicable local/regional/national/international regulations.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Avoid eye contact. Do not breathe thermal decomposition products. Avoid skin contact. Avoid breathing dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Avoid release to the environment.

7.2. Conditions for safe storage including any incompatibilities
Store away from heat. Store away from strong bases.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits
No occupational exposure limit values exist for any of the components listed in Section 3 of this SDS.

8.2. Exposure controls

8.2.1. Engineering controls
Provide appropriate local exhaust when product is heated. Do not remain in area where available oxygen may be reduced. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

8.2.2. Personal protective equipment (PPE)

Eye/face protection

Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
Safety Glasses with side shields

Skin/hand protection
Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the

RCC-CW000549

results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and other use conditions. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity.
Gloves made from the following material(s) are recommended: Polymer laminate

Respiratory protection

An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure:
During heating:

Use a positive pressure supplied-air respirator if there is a potential for over exposure from an uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection.

Half facepiece or full facepiece air-purifying respirator suitable for organic vapors and particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General Physical Form:	Liquid
Odor, Color, Grade:	Amber liquid with slight ammonia smell.
Odor threshold	*No Data Available*
pH	3 - 6
Melting point	*Not Applicable*
Boiling Point	220 ºF
Flash Point	No flash point
Evaporation rate	*No Data Available*
Flammability (solid, gas)	Not Applicable
Flammable Limits(LEL)	*Not Applicable*
Flammable Limits(UEL)	*Not Applicable*
Vapor Pressure	<=17.5 mmHg [@ 68 ºF]
Vapor Density	*No Data Available*
Density	1.18 g/ml
Specific Gravity	1.18 [*Ref Std:*WATER=1]
Solubility In Water	100 %
Solubility- non-water	*No Data Available*
Partition coefficient: n-octanol/ water	*No Data Available*
Autoignition temperature	*No Data Available*
Decomposition temperature	*No Data Available*
Viscosity	5 centipoise - 20 centipoise [@ 25 ºC]
Percent volatile	50 %
Flash Point as text	No flash point

SECTION 10: Stability and reactivity

10.1. Reactivity
This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.

10.2. Chemical stability
Stable.

RCC-CW000550

10.3. Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4. Conditions to avoid
Heat
Sparks and/or flames

10.5. Incompatible materials
Reducing agents
Strong bases

10.6. Hazardous decomposition products

Substance	Condition
None known.	

Refer to section 5.2 for hazardous decomposition products during combustion.

Extreme heat arising from situations such as misuse or equipment failure can generate hydrogen fluoride as a decomposition product.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:
No information available.

Skin Contact:
No information available.

Eye Contact:
No information available.

Ingestion:
No information available.

Additional Information:
The health hazards of this material are not completely known. Conservative safe handling measures should be followed (as described in sections 7 and 8), and appropriate first aid measures (as described in section 4) should be taken if exposure occurs.
Toxicological Data
If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

RCC-CW000551

Acute Toxicity

Name	Route	Species	Value
Overall product	Ingestion		No data available; calculated ATE >5,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation
For the component/components, either no data are currently available or the data are not sufficient for classification.

Serious Eye Damage/Irritation
For the component/components, either no data are currently available or the data are not sufficient for classification.

Skin Sensitization
For the component/components, either no data are currently available or the data are not sufficient for classification.

Respiratory Sensitization
For the component/components, either no data are currently available or the data are not sufficient for classification.

Germ Cell Mutagenicity
For the component/components, either no data are currently available or the data are not sufficient for classification.

Carcinogenicity
For the component/components, either no data are currently available or the data are not sufficient for classification.

Reproductive Toxicity

Reproductive and/or Developmental Effects
For the component/components, either no data are currently available or the data are not sufficient for classification.

Target Organ(s)

Specific Target Organ Toxicity - single exposure
For the component/components, either no data are currently available or the data are not sufficient for classification.

Specific Target Organ Toxicity - repeated exposure
For the component/components, either no data are currently available or the data are not sufficient for classification.

Aspiration Hazard
For the component/components, either no data are currently available or the data are not sufficient for classification.

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

Ecotoxicological information

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations

RCC-CW000552

13.1. Disposal methods
Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Prior to disposal, consult all applicable authorities and regulations to insure proper classification. Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. Combustion products will include HF. Facility must be capable of handling halogenated materials. Empty and clean product containers may be disposed as non-hazardous waste. Consult your specific regulations and service providers to determine available options and requirements.

EPA Hazardous Waste Number (RCRA): Not regulated

SECTION 14: Transport Information

For Transport Information, please visit http://3M.com/Transportinfo or call 1-800-364-3577 or 651-737-6501.

SECTION 15: Regulatory information

15.1. US Federal Regulations
Contact 3M for more information.

EPCRA 311/312 Hazard Classifications:

Physical Hazards
Not applicable

Health Hazards
Not applicable

15.2. State Regulations
Contact 3M for more information.

15.3. Chemical Inventories
The components of this product are in compliance with the chemical notification requirements of TSCA. All required components of this product are listed on the active portion of the TSCA Inventory.

Contact 3M for more information.

15.4. International Regulations
Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information

NFPA Hazard Classification
Health: 3 **Flammability:** 1 **Instability:** 0 **Special Hazards:** None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include

RCC-CW000553

the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

The NFPA Health code of 3 is due to emergency situations where the material may thermally decompose and release Hydrogen Fluoride. During normal use conditions, please reference Section 2 and Section 11 of the SDS for additional health hazard information.

HMIS Hazard Classification

Health: 0 **Flammability:** 1 **Physical Hazard:** 0 **Personal Protection:** X - See PPE section.

Hazardous Material Identification System (HMIS® IV) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® IV ratings are to be used with a fully implemented HMIS® IV program. HMIS® is a registered mark of the American Coatings Association (ACA).

Document Group:	29-6427-8	**Version Number:**	3.01
Issue Date:	07/09/19	**Supercedes Date:**	09/03/14

DISCLAIMER: The information in this Safety Data Sheet (SDS) is believed to be correct as of the date issued.3MMAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE.User is responsible for determining whether the3Mproduct is fit for a particular purpose and suitable for user's method of use or application.Given the variety of factors that can affect the use and application of a3Mproduct, some of which are uniquely within the user's knowledge and control,it is essential that the user evaluate the3Mproduct to determine whether it is fit for a particular purpose and suitable for user's method of use or application.

3Mprovides information in electronic form as a service to its customers. Due to the remote possibility that electronic transfer may have resulted in errors, omissions or alterations in this information,3Mmakes no representations as to its completeness or accuracy. In addition, information obtained from a database may not be as current as the information in the SDS available directly from3M

3M USA SDSs are available at www.3M.com

RCC-CW000554

Guar gum CAS No 9000-30-0	MATERIAL SAFETY DATA SHEET SDS/MSDS

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : **Guar gum**

CAS-No. : 9000-30-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Industrial & for professional use only.

1.3 Details of the supplier of the safety data sheet

Company : Central Drug House (P) Ltd
7/28 Vardaan House
Ansari Road Daryaganj
New Delhi-110002
INDIA

Telephone : +91 11 49404040
Email : care@cdhfinechemical.com

1.4 Emergency telephone number

Emergency Phone # : +91 11 49404040 (9:00am - 6:00 pm) [Office hours]

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2 Label elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Gum guar

CAS-No. : 9000-30-0
EC-No. : 232-536-8

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available

m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 6.770 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 218 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Central Drug House (P) Ltd and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.cdhfinechemical.com for additional terms and conditions of sale.

1. IDENTIFICATION

Product Identifier: Kerosene

Synonyms: Kero, Kerosine Motor Fuel, Ultra Low Sulfur Kero, ULSK , Dyed Kerosene Dye, K1, K2, Fuel Oil No 1, JP-4, JP-5, JP-8 Jet Fuels, Coal-oil, Range-oil, Pesticide Code 063501, SRK Solvent, Low Aromatic Feedstock, Artic Grade Oil (DFA)

Intended use of the product: Fuel

Contact:
Global Companies LLC
Water Mill Center
800 South St.
Waltham, MA 02454-9161
www.globalp.com

Contact Information: EMERGENCY TELEPHONE NUMBER (24 hrs): CHEMTREC (800) 424-9300
COMPANY CONTACT (business hours): 800-542-0778

2. HAZARD IDENTIFICATION

According to OSHA 29 CFR 1910.1200 HCS

Classification of the Substance or Mixture

Classification (GHS-US):

Flam. Liquid	Category 3	H226
Skin Corrosion/Irritation	Category 2	H315
Aspiration Hazard	Category 1	H304
STOT SE	Category 3	H336
Aquatic Chronic	Category 2	H411

Labeling Elements

Signal Word (GHS-US): **Danger**

Hazard Statements (GHS-US)
H226 – Flammable liquid and vapor.
H315 – Causes Skin irritation.
H304 – May be fatal if swallowed and enters airways.
H336 – May cause drowsiness or dizziness.
H411 – Toxic to aquatic life with long lasting effects.

Precautionary Statements (GHS-US):
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 - Keep container tightly closed.
P240 – Ground/bond container and receiving equipment.
P241 – Use explosion-proof electrical/ventilating/lighting equipment pursuant to applicable electrical code.
P242 – Use only non-sparking tools.
P243 – Take precautionary measures against static discharge.
P261 – Avoid breathing dust/fume/gas/mist/vapors/spray.
P264 – Wash skin thoroughly after handling.

P271 – Use only outdoors or in a well-ventilated area.
P273 – Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P303+361+353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse with water/shower.
P308+311 - If exposed or concerned: Get medical advice/attention.
P301+310 - If swallowed: Immediately call a poison center/doctor/…
P331 - Do NOT induce vomiting.
P370+P378 – In case of fire use firefighting foam or other appropriate media for Class B fires to extinguish.
P403+235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 – Dispose of contents/container in accordance with local/regional/national/international regulation.

Other information:

NFPA 704
Health: 2
Fire: 2
Reactivity: 0

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Composition Information
Mixture

Name	Product Identifier (CAS#)	% (w/w)	Classification
Kerosene	8008-20-6	100	Flam Gas 3, H226; Skin Irrit. 2, H315; Aspiration 1, H304; STOT SE 3, H336; Aquatic Chronic H411
Naphthalene	91-20-3	0.04	Carc. 2, H351; Acute Tox. 4, H302; Aquatic Acute 1, H400; Aquatic Chronic 1, H410

Additional Formulation Information
A complex combination of hydrocarbons including naphthenes, paraffins, and aromatics.

4. FIRST AID MEASURES

Response

Route	Measures
Inhalation	Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.
Ingestion	Aspiration Hazard: DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.
Eye Contact	In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention. In case of contact lenses, remove immediately.

RCC-CW000563

Route	Measures
Skin Contact	Remove contaminated clothing and shoes. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and of the area of the body burned.

Most Important Symptoms
Contact with eyes and face may cause irritation. Long-term exposure may cause dermatitis (itching, irritation, pain and swelling). Kerosene has shown to augment the toxicity of skin sensitizing agents.

Inhalation may cause irritation and significant or long term exposure could cause respiratory insufficiency and pulmonary edema.

Immediate Medical Attention and Special Treatment
For contact with skin or eyes, immediately wash or flush contaminated eyes with gently flowing water. If possible, irrigate each eye continuously with 0.9% saline (NS). If ingested, rinse mouth and administer 5 m/kg up to 200 ml of water of dilution if the patient can swallow. Do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

If inhaled, administer oxygen or establish a patent airway if breathing is labored. Suction if necessary. Monitor closely, anticipate seizures. Consider orotracheal or nostracheal intubation of airway control if patient is unconscious or is in severe respiratory distress.

Discard any clothing or shoes contaminated as they may be flammable.

5. FIRE-FIGHTING MEASURES

Extinguishing Media
Foam, carbon dioxide, dry chemical are most suitable

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, C02, water spray, firefighting foam, or Halon. Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other firefighting equipment.

LARGE FIRES: Foam, carbon dioxide, dry chemical. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, fuel oil may contain additional additives. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 'Low Expansion Foam -1994 Edition."

Specific Hazards / Products of Combustion
Moderate fire hazard when exposed to heat or flame with a very low flash point. Flammable and easily ignited when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Combustion may produce smoke, carbon monoxide and other products of incomplete combustion.

Special Precautions and Protective Equipment for Firefighters
Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied firefighting foam.

Fighting Equipment/Instructions
Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH- approved pressure-demand self-contained breathing apparatus with full face piece and protective clothing.

Refer to Section 9 for fire properties of this chemical including flash point, auto ignition temperature, and explosive limits.

RCC-CW000564

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPCC, SPILL CONTINGENCY or EMERGENCY PLAN.

Personal Precautions
Due to high vapor density, flammable / toxic vapors may be present in low lying areas, dikes, pits, drains, or trenches. Vapors may accumulate in low lying areas and reach ignitable concentrations. Ventilate the area. Use of non-sparking tools and intrinsically safe equipment is recommended. Potential for flammable atmosphere should be monitored using a combustible gas indicator positioned downwind of the spill area. Refer to Sections 2 and 7 for further hazard warnings and handling instructions.

Use appropriate personal protective equipment to prevent eye/skin contact and absorption. Use NIOSH approved respiratory protection, if warranted, to prevent exposures above permissible limits. Refer to Section 8. Contaminated clothing should not be near sources of ignition.

Emergency Measures
As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. Consider wind direction. Secure all ignition sources (flame, spark, hot work, hot metal, etc.) from area. Evaluate the direction of product travel, diking sewers, etc. to confirm spill areas. Do not touch or walk-through spilled material. For large spills, isolate initial action distance downwind 1,000 ft. (300 m).

Environmental Precautions
Stop the spill to prevent environmental release if it can be done safely. Product is toxic to aquatic life. Take action to isolate environmental receptors including drains, storm sewers and natural water bodies. Keep on impervious surface if at all possible. Use water sparingly to prevent product from spreading. Foam and absorbents may be used to reduce / prevent airborne release.

Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Follow federal, state or local requirements for reporting environmental release where necessary. Refer to Section 15 for further information.

Containment and Clean-Up Methods
Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of firefighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with dry earth, sand or other non-combustible, inert oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container with clean, non-sparking tools for reclamation or disposal. Response and cleanup crews must be properly trained and must utilize proper protective equipment. Refer to Section 8 for appropriate protective equipment.

7. HANDLING AND STORAGE

USE ONLY AS A FUEL.
DO NOT SIPHON BY MOUTH.

Handling Precautions
Handle as a combustible liquid. Keep away from heat, sparks, and open flame. No smoking. Electrical equipment should be approved for classified area. Bond and ground containers during product transfer pursuant to NFPA 70 and API RP 2003 to reduce the possibility of static-initiated fire or explosion. Follow precautions to prevent static initiated fire.

Use good personal hygiene practices. Use only with protective equipment specified in Section 8. Avoid repeated and/or prolonged skin exposure. Use only outdoors or in well ventilated areas. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves. Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when

RCC-CW000565

higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API RP 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage

Large quantities of kerosene are stored in cylindrical floating-roof or fixed-roof tanks at an ambient storage temperature. Separate from incompatible chemicals (Refer to Section 10) by distance or secondary containment. Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers that are clearly labeled. Label all secondary containers that this material is transferred into with the chemical name and associated hazard(s). Empty product containers or vessels may contain flammable vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Storage tanks should have a venting system. If stored in small containers, the area should be well ventilated and protected from potential damage or vehicular traffic. Post “No Smoking” signs in product storage areas. This storage area should comply with NFPA 30 “Flammable and Combustible Liquid Code” or applicable building code. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 “Cleaning Mobile Tanks in Flammable and Combustible Liquid Service” and API RP 2015 “Safe Entry and Cleaning of Petroleum Storage Tanks”.

Incompatibles

Keep away from strong oxidizers, ignition sources and heat.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits

Component	CAS #	List	Value
Kerosene	8008-20-6	ACGIH TLV-TWA	200 mg/m3*
Naphthalene	91-20-3	ACGIH TLV-TWA OSHA PEL ACGIH STEL	10 ppm 10 ppm 15 ppm

*Critical effects; Skin & Upper Respiratory Tract irritant; CNS impairment.

Engineering Controls

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Intrinsically safe equipment and non-sparking tools shall be used in circumstances where concentrations may exceed lower flammable limits. Grounding and bonding shall be used to prevent accumulation and discharge of static electricity. Emergency shower and eyewash should be provided in proximity to handling areas in the event of exposure to decontaminate.

Personal Protective Equipment

Exposure	Equipment
Eye / Face	Wear appropriate chemical protective glasses or goggles or face shields to prevent skin and eye contact especially caused from splashing.
Skin	Wear appropriate personal protective clothing to prevent skin contact. Gloves constructed of nitrile, neoprene or PVC are recommended when handling this material. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure.
Respiratory	A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations. Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.
Thermal	Product is stored at ambient temperature. No thermal protection is required except for emergency operations involving actual or potential for fire. Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

RCC-CW000566

9. PHYSICAL AND CHEMICAL PROPERTIES

Property	Value	
Appearance	Pale yellow to water-white. May be dyed red.	
Odor	Strong characteristic petroleum distillate odor.	
Odor Threshold	1 ppm	
pH	Not available	
Melting Point	-4 ˚F (-20 ˚C)	
Boiling Point Range	300 to 580 ˚F (149 to 304 ˚C)	
Flash Point	100.4 – 125.6 ˚F (38 -52 ˚C)	
Evaporation Rate	Slow, varies with conditions	
Flammability	Flammable liquid	
Flammable Limits	0.7 % - 5.0%	
Vapor Pressure	0.480 mm Hg @ 20 ˚C	
Vapor Density	4.5	(air=1)
Specific Gravity	0.80 to <1.0	(water=1)
Solubility	Insol in water; miscible with other petroleum solvents.	
Partition Coefficient (N-octanol/water)	Log Kow range of 3.3 to >.6.0	
Autoignition Temperature	410 ˚F (210 ˚C)	
Decomposition Temperature	When heated it emits acrid smoke and irritating vapors.	
Viscosity	1.39 – 1.50 mm2/x (40C)	
Percent Volatiles	100	

10. STABILITY AND REACTIVITY

Stability
This is a stable material that is flammable liquid (OSHA/GHS hazard category 3). Stable during transport.

Reactivity
Material is not self-reacting. Flammable concentrations may be present in air. Compound can react with oxidizing materials.

Possibility of Hazardous Reactions
Hazardous polymerization will not occur.

Incompatibility
Keep away from strong oxidizers such as nitric and sulfuric acids.

Conditions to Avoid
Avoid high temperatures, open flames, sparks, static electricity, welding, smoking and other ignition sources.

Hazardous Decomposition Products
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:
Acute Toxicity (Inhalation LC50)
Kerosene (8008-20-6)
LC50 Inhalation Rat >5.28 mg/l/4h

Acute Toxicity (Dermal LC50)
Kerosene (8008-20-6)
LD50 Dermal Rabbit >2000 mg/kg

Acute Toxicity (Oral LC50)
Kerosene (8008-20-6)
LD50 Dermal Rabbit >5000 mg/kg

Skin Corrosion/Irritation: Prolonged and repeated contact may cause skin irritation leading to dermatitis. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: OSHA: NO IARC: NO NTP: NO ACGIH: No

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Specific Target Organ Toxicity (Single Exposure): Inhalation exposure may cause drowsiness or dizziness by inhalation exposure.

Aspiration Hazard: The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Potential Health Effects: Vapor irritating to skin, eyes, nose, and throat. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

WARNING: The burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

12. ECOLOGICAL INFORMATION

Toxicity:
This material is expected to be toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

Data for Component: Kerosene (8008-20-6)

> Material is toxic to aquatic organisms based on an acute basis (LC50/EC50 >1 but ≤ 10 mg/L in the most sensitive species tested).
>
> Material is a long-term aquatic hazard based on a chronic basis (LC50/EC50 >1 but ≤ 10 mg/L in the most sensitive species tested).

Persistence and Degradation: This material is not expected to be readily biodegradable.

Bioaccumulative Potential: Not available

Mobility In Soil: Not available

Other Adverse Effects: None known

Other Information: Avoid release to the environment.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options. May be considered a hazardous waste if disposed. Direct solid waste (landfill) or incineration at a solid waste facility is not permissible. Do not discharge to sanitary or storm sewer. Personnel handling waste containers should follow precautions provided in this document.

Shipping containers must be DOT authorized packages. Follow licensure and regulations for transport of hazardous material and hazardous waste as applicable.

14. TRANSPORT INFORMATION

US DOT

UN Identification Number	UN 1223
Proper Shipping Name	Kerosene
Hazard Class and Packing Group	3, PGIII
Shipping Label	Flammable liquid
Placard / Bulk Package	Flammable liquid, 1223
Emergency Response Guidebook Guide Number	128

IATA Information

UN Identification Number	UN 1223
Proper Shipping Name	Kerosene
Hazard Class and Packing Group	3, PGIII
ICAO Label	3
Packing Instructions Cargo	366, Y344
Max Quantity Per Package Cargo	220L
Packing Instructions Passenger	366, Y355
Max Quantity per Package	60L

ICAO

UN Identification Number	UN 1223
Shipping Name / Description	Kerosene
Hazard Class and Packing Group	3, PG III
IMDG Label	3

IMDG

UN Identification Number	UN1223
Shipping Name / Description	Kerosene
Hazard Class and Packing Group	3, PGIII
IMDG Label	3
EmS Number	F-E-S-E
Marine Pollutant	Yes

15. REGULATORY INFORMATION

U.S. Federal, State, and Local Regulatory Information

Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	Yes
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

RCC-CW000569

Clean Water Act (Oil Spills)
Any spill or release of this product to "navigable waters" (Essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA Section 103 and SARA Section 304 (Release to the Environment)
The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts this material. This product does not contain any chemicals subject to the reporting requirements of CERCLA Section 103 or SARA 304.

SARA Section 313- Supplier Notification
This product does not contain any chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.

Pennsylvania Right to Know Hazardous Substance list:
The following product components are cited in the Pennsylvania Special Hazardous Substance List, and are present at levels which require reporting.

Component	CAS	Amount
Kerosene	8008-20-6	100%

New Jersey Right to Know Hazardous Substance list:
The following product components are cited in the New Jersey Right to Know Hazardous Substance List, and are present at levels which require reporting.

Component	CAS	Amount
Kerosene	8008-20-6	100%

California Proposition 65
WARNING: This product contains chemicals known to the State of California to cause Cancer or Reproductive Toxicity.

Component	CAS	Amount
Naphthalene	91-20-3	0.04%

U.S. Toxic Substances Control Act
All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30.

CEPA - Domestic Substances List (DSL)
All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

Canadian Regulatory Information (WHMIS)
Class B3 – Combustible Liquid
Class D2B – Materials causing other toxic effects. Toxic material.

16. OTHER INFORMATION

Version	3
Issue Date	May 20, 2016
Prior Issue Date	February 10, 2015

Description of Revisions
Revised to meet Globally Harmonized System for chemical hazard communication requirements pursuant to OSHA regulatory revisions 77 FR 17884, March 26, 2012.

Abbreviations

˚F	Degrees Fahrenheit (temperature)
<	Less than
=	Equal to
>	Greater than
AP	Approximately
C	Centigrade (temperature)
kg	Kilogram
L	Liter
mg	Milligrams
mL	Milliliter
mm^2	Square millimeters
mmHg	Millimeters of mercury (pressure)
N/A	Not applicable
N/D	Not determined
ppm	Parts per million
sec	Second
ug	Micrograms

Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
AL	Action Level
ANSI	American National Standards Institute
API	American Petroleum Institute
CAS	Chemical Abstract Service
CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation
EC50	Ecological concentration 50%
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
GHS	Global Harmonized System
HMIS	Hazardous Materials Information System
IARC	International Agency for Research On Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
Koc	Soil Organic Carbon
LC50	Lethal concentration 50%
LD50	Lethal dose 50%
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act Reauthorization Act of 1986 Title III
REL	Recommended Exposure Limit (NIOSH)
RVP	Reid Vapor Pressure
SARA	Superfund Amendments and
SCBA	Self Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
UN	United Nations
UNECE	United Nations Economic Commission for Europe
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Canadian Workplace Hazardous Materials Information System

Disclaimer of Expressed and Implied Warranties

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

** End of Safety Data Sheet **

RCC-CW000571

SULPHUR
SAFETY DATA SHEET

SECTION 1. IDENTIFICATION

Product Identity: Molten Sulphur.

Trade Names and Synonyms: Sulfur, flowers of sulfur, brimstone.

Manufacturer:
Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8
Emergency Telephone: 250-364-4214

Supplier:
Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8

Preparer:
Teck Metals Ltd.
Suite 3300 – 550 Burrard Street
Vancouver, British Columbia
V6C 0B3

Date of Last Review: December 7, 2018.

Date of Last Edit: December 7, 2018.

Product Use: Raw material used in the manufacture of sulphuric acid and sulphur dioxide.

Restrictions on Use: None identified to date.

Note: Although this SDS was prepared to address the hazards of molten sulphur, Teck Metals Ltd. recognizes that the product transforms into a solid rapidly upon cooling. Sections 2, 4, 5, 6, 7, 8, 9, and 11 address the hazards of the dry, as well as the molten, state of sulphur.

SECTION 2. HAZARDS IDENTIFICATION

CLASSIFICATION:

Health		Physical	Environmental
Acute Toxicity (Oral, Inhalation)	– Does not meet criteria	**Flammable Solids – Category 2**	Aquatic Toxicity –
Skin Corrosion/Irritation	– Does not meet criteria	**Combustible Dust – Category 1**	Short Term/Long Term
Eye Damage/Eye Irritation	– Does not meet criteria		Does not meet criteria
Respiratory or Skin Sensitization	– Does not meet criteria		
Mutagenicity	– Does not meet criteria		
Carcinogenicity	– Does not meet criteria		
Reproductive Toxicity	– Does not meet criteria		
Specific Target Organ Toxicity			
Acute Exposure	– Does not meet criteria		
Chronic Exposure	– Does not meet criteria		

LABEL:

Symbols:

Signal Word:

WARNING

Hazard Statements	**Precautionary Statements:**
WARNING! Flammable Liquid/Solid. May form combustible dust concentrations in air.	Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. Ground and bond container and receiving equipment. Use explosion-proof equipment if dust cloud can occur. Wear protective gloves, clothing and eye protection (and face protection where appropriate). IN CASE OF FIRE: Use dry sand, etc. on small fires. Use water spray, fog or foam on larger fires.

Emergency Overview: An amber-to-yellow liquid or a bright yellow powder. Sulphur is relatively non-toxic and poses little immediate health hazard to the environment or emergency response personnel unless it is involved in a fire. Both solid and liquid

sulphur are combustible and generate large quantities of toxic and irritating sulphur dioxide gas on burning. Molten sulphur is hot enough to cause serious thermal burns to unprotected skin. Wear full protective clothing and positive pressure self-contained breathing apparatus in emergency situations involving burning sulphur.

Potential Health Effects: Sulphur is relatively non-toxic to humans, causing only mild local irritation to the eyes, nose, throat and upper airways. However, under certain circumstances it may release toxic hydrogen sulphide and/or sulphur dioxide gases. Sulphur is not listed as a carcinogen by OSHA, NTP, IARC or ACGIH (see Toxicological Information, Section 11).

Potential Environmental Effects: This product has the potential to pose ecological risks to organisms in both aquatic and terrestrial environments. Discharge of the product to soil and water should be prevented (see Ecological Information, Section 12).

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	CAS Registry No.	CONCENTRATION (% wt./wt.)
Sulphur	7704-34-9	99.5%

Note: See Section 8 for Occupational Exposure Guidelines.

SECTION 4. FIRST AID MEASURES

Eye Contact: *Symptoms:* Mild eye irritation, redness: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, obtain medical advice/attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: *Symptoms:* Mild irritation, dryness, thermal burn from molten sulphur. *Dry sulphur*: No health effects expected. If irritation does occur, wash with mild soap under lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice/attention. *Molten sulphur:* Flush contact area to solidify and cool but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: *Symptoms:* Coughing, irritation in heavy dust clouds. Remove source of contamination or move victim from exposure area to fresh air. Obtain medical advice/attention if you are concerned or feel unwell.

Ingestion: *Symptoms:* Throat dryness, sulphur taste. If swallowed, no specific intervention is indicated as this material is not likely to be hazardous by ingestion. However, if irritation or discomfort occurs or you are concerned, obtain medical advice/attention.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Both molten and solid forms are combustible and will ignite at high temperatures (>200°C), burning with a pale blue flame that may be difficult to see in daylight. Sulphur dust suspended in air ignites easily and can cause explosions in confined spaces. Sulphur dust clouds can be ignited by friction, static electricity, heat, sparks or flames. Traces of hydrogen sulphide and sulphur vapor may present an explosion hazard if evolved into a confined space or enclosed space, particularly from molten sulphur. The LEL of hydrogen sulphide (4.3% by volume in air) may be exceeded in enclosed spaces above molten sulphur.

Extinguishing Media: Use water spray, fog or foam. Do not use direct water streams as the burning sulphur may float and further spread the fire. Sand, dry chemical or fine earth/finely crushed stone may be used for small fires. Steam or inert gases are excellent extinguishers for use in containers that can be tightly closed.

Fire Fighting: Evacuate non-essential personnel from the fire area immediately. Toxic fumes of sulphur dioxide will result from combustion. Fire fighters must be fully-trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask. Do not spray water directly into containers of molten sulphur due to the danger of boil over. Also avoid spraying direct streams of water that may scatter burning sulphur and spread the fire or create sulphur dust clouds and cause an explosion. For large fires, consider evacuation of an area downwind of fire if necessary. Fire will rekindle until mass has been cooled to below approximately 150°C. Cool surrounding area and containers until well after the fire is out to prevent re-ignition.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible to do so safely. Contain spill, isolate area, and deny entry to unauthorized personnel. Remove all potential ignition sources. Ventilate area. Prevent spread of liquid by diking or ditching and allowing material to cool and solidify. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection and using methods which will minimize dust generation (e.g., dampen material and shovel or wet sweep using natural

fiber brooms and aluminum shovels to prevent sparks). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labeled containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements. If molten sulphur is accidentally released into a confined or enclosed space, monitor for hydrogen sulphide and sulphur dioxide build-up in the vapor space above the spill.

Personal Precautions: Protective clothing, gloves, and an acid gas/particulate respirator are recommended for persons responding to an accidental release. Close-fitting safety goggles may also be necessary in some circumstances to prevent eye contact with sulphur dust.

Environmental Precautions: This product has the potential to pose ecological risks to organisms in both aquatic and terrestrial environments. Discharge of the product to soil and water should be prevented. Prevent spillage from entering sewers or natural watercourses.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling: Hydrogen sulphide gas may accumulate in storage tanks and bulk transport compartments containing this material, particularly when molten, so always exercise caution when working around or opening bulk containers. Closed tanks or pits should be vented to the atmosphere using steam jacketed vent lines. Head space above molten sulphur may contain high concentrations of hydrogen sulphide or sulphur dioxide in the toxic and explosive range. Ventilate thoroughly before permitting entry. Avoid generating dust and the release of dust into the workplace as this creates a potential explosion hazard. Since dry sulphur may accumulate static charge build-up, which could become an ignition source, transfer using proper grounding procedures. See the latest edition of NFPA Standard 655 – Prevention of Sulphur Fires and Explosions for specific guidance on dust explosion prevention.

Conditions for Safe Storage: Keep container closed and store in a dry, cool, covered, and well-ventilated area, away from flammable materials, sources of ignition and oxidizing agents.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines: *(Time-Weighted Average (TWA) concentration over 8 hrs. unless otherwise indicated)*

Component	ACGIH TLV	OSHA PEL	NIOSH REL
Sulphur	None established*	None established*	None established*

NOTE: OEGs for individual jurisdictions may differ from those given above. Check with local authorities for the applicable OEGs in your jurisdiction.
ACGIH - American Conference of Governmental Industrial Hygienists; OSHA - Occupational Safety and Health Administration; NIOSH - National Institute for Occupational Safety and Health. TLV – Threshold Limit Value, PEL – Permissible Exposure Limit, REL – Recommended Exposure Limit.

* - NOTE: While there are no established OELs for elemental sulphur as such, there are OELs for the sulphur dioxide gas which will be formed during any combustion processes. The OSHA PEL for SO_2 is a time-weighted average concentration (TWA) of 5 ppm, the ACGIH TLV is a short term exposure limit (STEL) of 0.25 ppm and the NIOSH REL is a TWA of 2 ppm and a STEL of 5 ppm.

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Ventilation: Use adequate local or general ventilation to maintain the concentration of sulphur dioxide and hydrogen sulphide in the working environment well below recommended occupational exposure limits. Use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Locate dust collectors outdoors if possible and provide dust collectors with explosion vents. Supply sufficient replacement air to make up for air removed by the exhaust system. Ventilation systems may need to be designed using steam tracing or other means to prevent plugging with sublimed sulphur.

Protective Clothing: Gloves and coveralls, shop coat or other work clothing with long sleeves are recommended to prevent direct skin contact, particularly when handling molten sulphur. Eye protection should be worn where fume or dust is generated. Chemical splash goggles and full face shield should be worn where any possibility exists that eye or face contact with liquid sulphur may occur. Respiratory protection may be required where fume or dust is generated. Workers should wear insulated gloves and heat- and chemical-resistant clothing when handling molten sulphur. Safety type boots are recommended.

Respirators: Where dust or sulphur dioxide is generated and cannot be controlled to within acceptable levels, use appropriate NIOSH-approved respiratory protection equipment (a combination of a 42CFR84 Class N, R or P-95 or 100 particulate filter and an acid gas cartridge). Where hydrogen sulphide is present or possibly present in confined spaces at hazardous levels a NIOSH-approved supplied air respirator or self-contained breathing apparatus (SCBA) is necessary.

General Hygiene Considerations: Precautions should be taken to minimize skin and eye contact with material. Refrain from eating or drinking in work areas. Smoking should not be permitted in any sulphur storage or handling areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate designated areas.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Amber to Yellow Liquid/Solid	**Odour:** Odourless or faint rotten egg odour	**Odour Threshold:** H_2S – <0.01 ppm	**pH:** Not Applicable
Vapour Pressure: <0.001 mm Hg @ 20°C 0.11 mm Hg @140°C	**Vapour Density:** Not Applicable	**Melting Point/Range:** 112-120°C	**Boiling Point/Range:** 444.6°C
Relative Density (Water = 1)**:** 1.92 - 2.07 Solid Sulphur 1.811 Molten Sulphur	**Evaporation Rate:** Not Available	**Coefficient of Water/Oil Distribution:** Not Available	**Solubility:** Insoluble
Bulk Density:	Liquid 1.811 kg/L (113 lb/ft^3)	Lumps 1201-1842 kg/m^3 (75 – 115 lb/ft^3)	Powder 528-1281 kg/m^3 (33 – 80 lb/ft^3)
Flash Point: 160°C (Closed Cup)	**Flammable Limits (LEL/UEL):** 35 g/m^3 / 1400 g/m^3 (Dust)	**Auto-ignition Temperature:** 232°C	**Decomposition Temperature:** Thermally stable

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Sulphur is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Incompatibilities: Oxidizing agents, alkali metals, hydrogen, chlorine, fluorine. Sulphur may form explosive mixtures with powerful oxidizing agents such as chlorates, perchlorates and/or nitrates. Damp sulphur is corrosive to steel, particularly in the presence of chlorides.

Hazardous Decomposition Products: Burning sulphur liberates large volumes of sulphur dioxide which will be extremely irritating to eyes and breathing passages. Hydrogen sulphide gas may be released from molten sulphur under certain storage conditions and can accumulate to toxic and potentially explosive concentrations in the vapor space of molten sulphur storage or transportation systems.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Sulphur itself is essentially non-toxic. Molten sulphur is a hazardous material because of its high temperature (>122°C). Under certain conditions both heated and dry sulphur may evolve toxic hydrogen sulphide and/or sulphur dioxide gases. At increasing concentration levels, these gases can cause eye and respiratory irritation. Breathing failure, unconsciousness and death may result from exposure to high concentrations of hydrogen sulphide, without any warning odour being sensed.

Acute:
Skin/Eye: *Molten:* Skin contact with molten material will cause thermal burns. Molten sulphur in the eye will cause burns and permanent damage. Exposure to sulphur vapours may be irritating to the eyes. *Dry:* Eye contact with dusts may be irritating.

Inhalation: Dusts may be irritating to the throat and lungs. Inhalation of low levels of vapours containing hydrogen sulphide or sulphur dioxide can produce respiratory tract irritation characterized by sneezing, coughing, sore throat and chest pain. At increasing concentrations exposure to hydrogen sulphide and sulphur dioxide can result in pulmonary edema, dizziness, nausea, respiratory paralysis, unconsciousness and death. Asthmatics may be more susceptible to sulphur dioxide exposures.

Ingestion: Ingestion of dry sulphur may cause irritation of the mouth and sore throat.

Chronic: Repeated or prolonged contact with dry sulphur powder may be irritating to the eyes and skin in some individuals, leading to dermatitis, eczema, skin ulcers, and allergic reactions. Repeated inhalation exposure to dust may cause bronchitis and irritation to mucous membranes and the respiratory tract. Prolonged exposure to low levels of sulphur dioxide has produced respiratory problems in animals. Sulphur is not considered a human carcinogen by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the American Conference of Governmental Industrial Hygienists (ACGIH) or the International Agency for Research on Cancer (IARC).

RCC-CW000575

Animal Toxicity:

Hazardous Ingredient:	Acute Oral Toxicity:	Acute Dermal Toxicity:	Acute Inhalation Toxicity:
Sulphur	>8437 mg/kg†	>2000 mg/kg*	>5.43 mg/L‡

† LD_{50}, Rat, Oral, * LD_{50}, Rat, Dermal ‡ LC_{50}, Rat, Inhalation, 4 hour

SECTION 12. ECOLOGICAL INFORMATION

There is minimal immediate ecological risk from spills of this product. However, over long-term exposure under aerobic conditions, sulphur can oxidize, yielding acidic runoff (water) or acidic conditions in soils; the oxidized form, due to its acid nature, has the potential to adversely affect aquatic and terrestrial organisms. In addition, under anaerobic conditions, elemental sulphur can be biochemically reduced to forms such as sulphide ion or hydrogen sulphide, which have the potential to pose ecological risks.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of in accordance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

Proper Shipping Name U.S. DOT and Transport Canada..... Sulfur, molten
Transport Canada and U.S. DOT Hazard Classification ..... Class 4.1, Packing Group III
Transport Canada and U.S. DOT Product Identification Number..... UN2448
Marine Pollutant ..... No
IMO Classification ..... Class 4.1
**Product is transported in a molten state.*

SECTION 15. REGULATORY INFORMATION

U.S.
Ingredient Listed on TSCA Inventory ..... Yes
Hazardous Under Hazard Communication Standard ..... Yes
CERCLA Section 103 Hazardous Substances..... No
EPCRA Section 302 Extremely Hazardous Substance..... No
EPCRA Section 311/312 Hazard Categories ..... Physical Hazard - Flammable Solid
EPCRA Section 313 Toxic Release Inventory: ..... This product does not contain toxic chemicals subject to Toxic Release Inventory reporting requirements.

Canada:
Listed on Domestic Substances List ..... Yes

SECTION 16. OTHER INFORMATION

Date of Original Issue: December 18, 1998 **Version:** 01 *(First edition)*

Date of Latest Revision: December 7, 2018 **Version:** 12

The information in this Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, 7th Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2018, Guide to Occupational Exposure Values.
- American Conference of Governmental Industrial Hygienists, 2018, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urben, Ed), 1995.
- Commission de la santé et la sécurité du travail, Service du répertoire toxicologique, Soufre, 2008-03.
- Extoxnet Pesticide Information Profile – Sulfur (Revised 9/95), National Pesticide Information Centre, Oregon State University.
- Health Canada, Hazardous Products Regulations SOR/2015-17, 11 February 2015.
- International Labour Office (WHO/ILO) Encyclopedia of Occupational Health & Safety 4th Ed. CD-ROM Version (1998).
- European Chemical Agency (ECHA) - Registered Substances Database - Sulfur (last accessed 26 November 2018).
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank. (on-line version).
- New Zealand Department of Labour, Approved Code of Practice for the Prevention of Sulphur Fires and Explosions, Sept 1993.

RCC-CW000576

- Patty's Toxicology, Fifth Edition, 2001: E. Bingham, B. Cohrssen & C.H. Powell, Ed.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances (RTECS) CCOHS Web Access subscription *(last accessed 26 November 2018)*.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.1000 and 1910:1200.
-
- Acronyms not spelled out elsewhere in the SDS:
-
- CAS: Chemical Abstracts Service
- CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
- DOT: Department of Transport
- EPCRA: Emergency Planning and Community Right-to-Know Act
- IMO: International Maritime Organization
- LD50 LC50: Lethal Dose 50%, Lethal Concentration 50%
- TSCA: Toxic Substances Control Act
- Wt.: Weight

Notice to Reader

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Teck Metals Ltd. extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations. Therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

ERCO Worldwide

SAFETY DATA SHEET

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

1. Identification

Product identifier	**Sulphuric Acid**
Other means of identification	Sulphuric Acid Solution, 45-100%, H_2SO_4
Recommended use	Water treatment, metal pickling, petroleum processing, manufacture of fertilizers, explosives and other acids.
Recommended restrictions	Professional Use Only

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name	ERCO Worldwide
Address	335 Carlingview Drive Unit 1 Etobicoke, M9W 5G8 Canada
Telephone	Information #: (416) 239-7111 (Monday – Friday 8:00 am – 5:00pm EST)
Website	http://www.ercoworldwide.com
E-mail	productinfo@ercoworldwide.com
Emergency phone number	Canada & USA: 1-800-424-9300 (CHEMTREC)
Supplier	Refer to Manufacturer

2. Hazard(s) Identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, inhalation	Category 2
	Skin corrosion	Category 1A
	Serious eye damage	Category 1
	Carcinogenicity	Category 1A
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation

Environmental hazards Not currently regulated by OSHA, refer to Section 12 for additional information.

OSHA defined hazards This mixture does not meet the classification criteria according to OSHA HazCom 2012.

Label elements

Signal word	Danger
Hazard statement	May be corrosive to metals. Fatal if inhaled. Causes severe skin burns and eye damage. May cause cancer. May cause respiratory irritation.
Precautionary statement	
Prevention	Keep only in original container. Do not breathe dust, fume, gas, mist, vapors, spray. Use only outdoors or in a well-ventilated area. Wear respiratory protection. Wash hands and face thoroughly after handling. Wear protective gloves, protective clothing, eye protection, face protection. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
Response	Immediately call a POISON CENTER or doctor/physician. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (OR HAIR): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Absorb spillage to prevent material damage.
Storage	Store in corrosive resistant container with a resistant inner liner. Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	No OSHA defined hazard classes. Other hazards which do not result in classification: Contact with most metals will generate flammable hydrogen gas. Reacts violently with water with evolution of heat. Reacts violently with a wide variety of organic and inorganic chemicals including alcohol, carbides, chlorates, picrates, nitrates and metals. In extreme cases, tooth erosion could result. Chronic skin contact with low concentrations may cause dermatitis.
Supplemental information	Ventilate the area. Keep away from heat. Remove sources of ignition. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Keep away from metals and other incompatibles. When preparing or diluting solution, always add to water, slowly and with stirring. When diluting, always add the product to water. Never add water to the product. Label containers appropriately

In case of fire: Use media suitable to the surrounding fire such as water fog or fine spray, alcohol foams, carbon dioxide and dry chemical. Use water with caution. Contact with water will generate considerable heat. Use chemical extinguishing agents with caution. Some chemical extinguishing agents may react with this material.

In case of spills or leaks: Contact the proper local authorities.

3. Composition/Information on Ingredients

Chemical name	Common name and synonyms	CAS number	Conc. % By Weight
Sulfuric Acid	Hydrogen Sulfate, Oil of Vitriol	7664-93-9	45 - < 100 w/w%
Dihydrogen Oxide	Water	7732-18-5	Balance

Chemical name of impurities, stabilizing solvents and/or additives: None

4. First-Aid Measures

Inhalation

Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, trained personnel should give oxygen. If breathing stops, provide artificial respiration. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Give Cardiopulmonary Resuscitation (CPR) if there is no pulse AND no breathing. Call a physician or poison control center immediately.

Skin Contact

Take off immediately all contaminated clothing. Immediately flush skin with running water for at least 20 minutes. If irritation persists, repeat flushing. Cover wound with sterile dressing. Do not rub area of contact. Wash contaminated clothing before reuse. Discard heavily contaminated clothing and shoes in a manner that limits further exposure. Leather and shoes that have been contaminated with the solution may need to be destroyed. Call a physician or poison control center immediately. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport. While the patient is being transported to a medical facility, apply compresses of iced water. If medical treatment must be delayed, immerse the affected area in iced water. Do not apply ointments unless directed by a physician. If immersion is not practical, compresses of iced water can be applied. Avoid freezing tissues.

Eye Contact

Rinse cautiously with water for a minimum of 20 minutes. Hold eye lids open during flushing. If irritation persists, repeat flushing. Remove contact lenses, if present and easy to do. Continue rinsing. Take care not to rinse contaminated water into the unaffected eye or onto the face. Call a physician or poison control center immediately. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.

Ingestion	Do not induce vomiting. Rinse mouth. Never give anything by mouth to a victim who is unconscious or is having convulsions. If victim is alert and not convulsing, rinse mouth and give 1/2 to I glass of water to dilute material. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. Call a physician or poison control center immediately.
Most important symptoms/effects, acute and delayed	May be fatal if inhaled. Can cause severe respiratory irritation. Symptoms may include coughing, choking and wheezing. Inhalation could result in pulmonary edema (fluid accumulation). Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed. May result in unconsciousness and possibly death. Direct skin contact may cause corrosive skin burns, deep ulcerations and possibly permanent scarring. Corrosive to the eyes and may cause severe damage including blindness. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause severe irritation and corrosive damage in the mouth, throat and stomach. Symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death.
Indication of immediate medical attention and special treatment needed	Immediate medical attention is required. Causes chemical burns. May be fatal if inhaled. Symptoms may be delayed.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-Fighting Measures

Suitable extinguishing media	Use media suitable to the surrounding fire such as water fog or fine spray, alcohol foams, carbon dioxide and dry chemical. Use water with caution. Contact with water will generate considerable heat.
Unsuitable extinguishing media	Use chemical extinguishing agents with caution. Some chemical extinguishing agents may react with this material.
Specific hazards arising from the chemical	Not considered flammable. Vapors are heavier than air and may spread along floors. Contact with most metals will generate flammable hydrogen gas. Reacts violently with water with evolution of heat. Contact with combustible material may cause fire. Reacts violently with a wide variety of organic and inorganic chemicals including alcohol, carbides, chlorates, picrates, nitrates and metals. Toxic fumes, gases or vapours may evolve on burning.

Special protective equipment and precautions for firefighters	Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive pressure mode. A full-body chemical resistant suit should be worn.
Firefighting equipment/instructions	Fight fire with normal precautions from a reasonable distance. Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Evacuate the area promptly. Move containers from fire area if you can do it without risk. Use water spray to cool unopened containers. Fight fire from upwind to avoid exposure to combustion products. Do not allow run-off from fire-fighting to enter drains or water courses. Dike for water control.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
Hazardous combustion products	Toxic fumes, gases or vapours may evolve on burning. Sulphur oxides.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures	Immediately evacuate personnel to safe areas. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Ventilate the area. Remove sources of ignition. Stop leak if you can do so without risk. Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Small Spills: Contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g. sand). Dilute acid with water and neutralize with Sodium Carbonate (soda ash) or lime. Clean surface thoroughly to remove residual contamination. Large Spills: Prevent entry into waterways, sewer, basements or confined areas. Restrict access to area until completion of clean up. Ventilate area. Following product recovery, flush area with water. Do not flush into surface water or sanitary sewer system. If not recoverable, dilute with water or flush to holding area and neutralize. Remove with vacuum trucks or pump to storage/salvage vessels. Place recovered materials into suitable corrosion resistant labelled containers. Ensure adequate decontamination of tools and equipment following clean up. Never return spills to original containers for re-use. Contaminated absorbent material may pose the same hazards as the spilled product. For waste disposal, see section 13 of the SDS.

Environmental precautions	Avoid discharge into drains, water courses or onto the ground. Contact local authorities in case of spillage to drain/aquatic environment.

7. Handling and Storage

Precautions for safe handling

Use only outdoors or in a well-ventilated area. Wear chemically resistant protective equipment during handling. Do not breathe mist. Do not taste or swallow. Avoid contact with eyes, skin and clothing. Keep away from heat. Keep away from metals and other incompatibles. When preparing or diluting solution, always add to water, slowly and with stirring. Never add water to the product. Label containers appropriately. Wash thoroughly after handling. When using, do not eat, drink or smoke. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities

Store in a cool, dry place out of direct sunlight. Store in a well-ventilated place. Store locked up. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Store away from incompatible materials (see Section 10 of the SDS). Store in original tightly closed container. Store in corrosive resistant container with a resistant inner liner.

Suitable container and packaging materials for safe storage: The resistance of metal alloys to sulphuric acid corrosion increases with increasing chromium, molybdenum, copper and silicon content. Contact product supplier for specific packaging recommendations when handling Sulphuric acid at strengths less than 77%.

CAUTION: Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside drums, or inside most types of metal containers or tanks upon storage. Metal and, specifically, carbon steel, storage tanks must be vented due to hydrogen release as noted above.

8. Exposure Controls/Personal Protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Sulfuric Acid (CAS 7664-93-9)	PEL	1 mg/m^3

US. ACGIH Threshold Limit Values

Components	Type	Value
Sulfuric Acid (CAS 7664-93-9)	TWA	0.2 mg/m^3
	STEL	3.0 mg/m^3, 15 minutes

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Sulfuric Acid (CAS 7664-93-9)	TWA	1 mg/m^3

Biological limit values No biological exposure limits noted for the ingredient(s).

Exposure guidelines The NIOSH IDLH concentration for Sulphuric acid is 15 mg/m^3. The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory protection equipment. In the event of failure of respiratory protection equipment every effort should be made to exit immediately.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available proximate to the work-station location when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Chemical goggles and face shield are recommended. Eye wash fountain is recommended.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.
Wear as appropriate: Butyl rubber, Natural rubber, Neoprene, Polyvinyl chloride (PVC), Viton™ rubber (fluor rubber).
Unsuitable material: Polyvinyl alcohol (PVA). Advice should be sought from glove suppliers.

Other Where contact is likely, wear chemical-resistant gloves, a chemical suit, rubber boots, and chemical safety goggles plus a face shield. A chemical protective full-body encapsulating suit may be required in some operations. Eye wash facilities and emergency shower must be available when handling this product.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Respirators should be selected based on the form and concentration of contaminants in air, and in accordance with OSHA (29 CFR 1910.134). Advice should be sought from respiratory protection specialists.

NIOSH RECOMMENDATIONS for Sulphuric acid CONCENTRATIONS IN AIR: Up to 15 mg/m^3:
SAR operated in a continuous-flow mode or powered air-purifying respirator with acid gas cartridge(s) and a high-efficiency particulate filter. Full-face piece chemical cartridge respirator with acid gas cartridge(s) and a high-efficiency particulate filter or gas mask with acid gas canister and high-efficiency particulate filter or full-face piece SCBA or full-face piece SAR.

EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH
CONDITIONS: Positive pressure, full-face piece SCBA or positive pressure, full-face piece SAR with an auxiliary positive pressure SCBA.
ESCAPE: Gas mask with acid gas canister and high-efficiency particulate filter; or escape-type SCBA.
Air-purifying respirators do not protect against oxygen-deficient atmospheres.

Thermal Hazards Not applicable.

General hygiene considerations Do not breathe mist. Avoid contact with eyes, skin and clothing. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Remove soiled clothing and wash it thoroughly before reuse. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

Appearance	
Physical state	Liquid
Form	Oily liquid
Color	Clear. Amber to Brown.
Odor	Odorless.
Odor threshold	Not Applicable
pH	0.3 – 2.1 (at high acid concentration in water, pH scale is not applicable)
Melting point/Freezing point	- 40 to 30°F (- 40 to - 1°C)
Initial boiling point and boiling range	302 - 572 °F (150 - 300 °C)
Flash point	Not Applicable (Does not burn)
Evaporation rate	Not Available
Flammability (solid, gas)	Not Applicable
Upper/lower flammability or explosive limits	
Flammability limit – lower (%)	Not Applicable
Flammability limit – upper (%)	Not Applicable
Explosive limit – lower (%)	Not Available
Explosive limit – upper (%)	Not Available
Vapor pressure	0.2 to 0.0003 kPa (1.2 to 0.002 mmHg) (at 20°C)

Vapor density	3.4 (Air = 1)
Relative density	1.706 - 1.844 g/cm³
Solubility (ies)	
Solubility (water)	Soluble in all proportions
Solubility (other)	Decomposes in Ethanol.
Partition coefficient (n-octanol/water)	Not Available
Auto-ignition temperature	Not Available
Decomposition temperature	644 °F (340 °C)
Viscosity	13.6 mm²/s (100%)
Viscosity temperature	77 °F (25 °C)
Other information	
Critical temperature	Mineral acid
Molecular formula	H_2SO_4
Molecular weight	98.08
Percent volatile	15 % estimated
Specific gravity	1.30 - 1.84
Surface tension	49.6 dynes/cm at 30°C (100%)

10. Stability and Reactivity

Reactivity	Reacts violently with water with evolution of heat. Contact with most metals will generate flammable hydrogen gas. Will react violently with alkalis. The concentrated acid oxidizes, dehydrates, or sulfonates most organic compounds.
Chemical stability	Material is stable under normal conditions. Decomposes at ~ 340°C to form sulphur trioxide.
Possibility of hazardous reactions	Reacts violently with a wide variety of organic and inorganic chemicals including alcohol, carbides, chlorates, picrates, nitrates and metals. Acetaldehyde and allyl chloride may polymerize violently in the presence of sulfuric acid. Hazardous gases, such as hydrogen cyanide, hydrogen sulfide and acetylene, are evolved on contact with chemicals such as cyanides, sulfides and carbides.
Conditions to Avoid	Avoid high temperatures. Contact with incompatible materials. Do not use in areas without adequate ventilation.
Incompatible materials	Metals. Bases. Water. Strong oxidizing agents. Reducing agents. Strong acids. Alcohols. Carbides. Picrates. Chlorates. Nitrates. Acrylonitrile. Fulminates. Perchlorates. Permanganates. Epichlorohydrin. Aniline. Ethylenediamine. Cyclopentadiene. Nitromethane. 4-nitrotoluene. Phosphorus (III) oxide. Potassium. Sodium. Ethylene glycol. Isoprene. Styrene. Acetaldehyde and allyl chloride may polymerize violently in the presence of sulfuric acid. Sulfuric acid attacks plastics.
Hazardous decomposition products	None known, refer to hazardous combustion products in Section 5. The following may be released during a fire: Sulphur oxides.

11.Toxicological Information

Information on likely routes of exposure

Inhalation Fatal if inhaled. Sulphuric acid is not very volatile, and therefore workplace exposures are primarily to mists or aerosols. Sulphuric acid is corrosive and can cause severe irritation or corrosive damage if inhaled. Sulphuric acid can cause severe lung damage with a life-threatening accumulation of fluid (pulmonary edema).

Skin contact Causes severe skin burns deep ulcerations and possibly permanent scarring. Not expected to be absorbed through the skin. Extensive acid burns can result in death.

Eye contact Corrosive to the eyes and may cause severe damage including blindness. Sulphuric acid mists and aerosols are expected to be irritating.

Ingestion Symptoms may include coughing, choking and wheezing. Inhalation could result in pulmonary edema (fluid accumulation). May result in unconsciousness and possibly death. Direct skin contact symptoms may include stinging, tearing, redness, swelling, and blurred vision. Ingestion symptoms may include abdominal pain, vomiting, burns, perforations, bleeding and eventually death. May cause cancer.

Delayed and immediate effects, and chronic effects from short-term and long-term exposure

Effects of short-term (acute) exposure Very hazardous in case of skin contact (corrosive, irritant). Skin contact may produce burns. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Very hazardous in case of eye contact (irritant, corrosive). Inflammation of the eye is characterized by redness, watering, and itching. Immediate pain, severe burns and corneal damage. Inhalation of the mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Very hazardous in case of ingestion. May cause burns to mouth, throat and stomach.

Effects of long-term (chronic) exposure Symptoms of pulmonary edema (chest pain, shortness of breath) may be delayed. High mist or aerosol concentrations may cause redness, irritation and burns to the skin if contact is prolonged. Can cause permanent eye damage, including blindness. Skin irritation may be aggravated in individuals with existing skin lesions. Breathing of vapours may aggravate acute or chronic asthma and chronic pulmonary disease such as emphysema and bronchitis. Over-exposure by inhalation may cause respiratory irritation. May be fatal if inhaled or swallowed.

Information on toxicological effects

Acute toxicity May be fatal if inhaled. The below product data is the calculated ATE values for this mixture. Individual ingredient component data appears below the product mixture ATE values.

Product	Species	Test Results
Sulphuric Acid (CAS 7664-93-9)		
Acute		
Inhalation		
LC_{50}	Rat	0.375 - 0.536 mg/l, 4 hours (mist)
Oral		
LD_{50}	Rat	2140 - 3058 mg/kg

Components	Species	Test Results
Sulphuric Acid (CAS 7664-93-9)		
Acute		
Dermal		No Data in Literature
Inhalation		
LC_{50}	Rat	0.375 mg/l, 4 hours (mist)
Oral		
LD_{50}	Rat	2140 mg/kg
Water (CAS 7732-18-5)		
Acute		
Dermal		
LD_{50}	Rabbit	Not available.
Inhalation		
LC_{50}	Rat	Not available.
Oral		
LD_{50}	Rat	> 89840 mg/kg

Skin corrosion Hazardous by OSHA criteria.
Category 1A. Causes severe skin burns and eye damage.

Serious eye damage Hazardous by OSHA criteria.
Category 1. Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Not expected to be a respiratory sensitizer.

Skin sensitizer This product is not expected to be a skin sensitizer.

Germ cell mutagenicity Not expected to be mutagenic in humans.

Carcinogenicity Hazardous by OSHA criteria.
Category 1A. May cause cancer. This product may form mists.
Occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to humans. The information located is insufficient to conclude that sulfuric acid itself is a carcinogen. IARC has concluded there is sufficient evidence that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to humans (Group 1). ACGIH has designated strong inorganic acid mists containing sulfuric acid as A2 (suspected human carcinogen). US NTP has listed

	strong inorganic acid mists containing sulfuric acid as a known human carcinogen. These classifications are for inorganic acid mists containing sulfuric acid and does not apply to sulfuric acid or sulfuric acid solutions. Ingredients are present on the following lists.
IARC Monographs. Overall Evaluation of Carcinogenicity	Sulfuric Acid (CAS 7664-93-9) 1 Carcinogenic to humans.
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	Not listed.
US. National Toxicology Program (NTP) Report on Carcinogens	Sulfuric Acid (CAS 7664-93-9) Known to be human carcinogen.
Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Hazardous by OSHA criteria. The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation. May cause respiratory irritation.
Specific target organ toxicity - repeated exposure	Not classified as a specific target organ toxicity -repeated exposure.
Aspiration toxicity	Not expected to be an aspiration hazard.
Chronic effects	Chronic skin contact with low concentrations may cause dermatitis. In extreme cases, tooth erosion could result.

12. Ecological Information

Ecotoxicity

Because of the low pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems. However, may be neutralized by naturally occurring alkalinity in the environment. The ingredient ecotoxicity data appearing above is expected to be primarily associated with pH.

Components		Species	Test Results
Sulfuric Acid (CAS 7664-93-9)			
Aquatic			
Acute			
Algae	EC_{50}	Green Algae (*Pseudokirchneriella subcapitata*)	> 100 mg/l, 72 hours
Crustacea	EC_{50}	Water flea (*Daphnia magna*)	29 mg/l, 24 hours
Fish	LC_{50}	Bluegill (*Lepomis macrochirus*)	16 - 28 mg/l, 96 hours

Persistence and degradability

Biodegradation is not applicable to inorganic substances.

Bioaccumulative potential

No accumulation in living organisms is expected due to high solubility and dissociation properties.

Mobility in soil

High water solubility indicates a high mobility in soil.

Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal Considerations

Disposal instructions

Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Dispose in accordance with all applicable regulations.

Local disposal regulations

Dispose in accordance with all applicable regulations.

Hazardous waste code

The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal.
Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport Information

DOT

UN number	UN1830
UN proper shipping name	Sulphuric Acid
Transport hazard class(es)	
Class	8
Subsidiary risk	None
Label(s)	8
Packing group	II
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling. US CERCLA Reportable Quantity (RQ): 1000 lbs / 454 kg
Special provisions	A3, A7, B3, B83, B84, IB2, N34, T8, TP2
Packaging exceptions	154
Packaging non bulk	202
Packaging bulk	242

IATA

UN number	UN1830
UN proper shipping name	Sulphuric Acid
Transport hazard class(es)	
Class	8
Subsidiary risk	None
Packing group	II
Environmental hazards	No
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling. Refer to the appropriate Packing Instruction, prior to shipping this material. Review all State and Operator Variations, prior to shipping this material.
Other information	
Passenger and cargo aircraft	Allowed
Cargo aircraft only	Allowed

IMDG

UN number	UN1830
UN proper shipping name	Sulphuric Acid
Transport hazard class(es)	
Class	8
Subsidiary risk	None
Packing group	II
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B

Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	This substance/mixture is not intended to be transported in bulk.

DOT

IATA; IMDG

15. Regulatory Information

US federal regulations	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.	
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)	Not regulated.	
CERCLA Hazardous Substance List (40 CFR 302.4)	Sulfuric Acid (CAS 7664-93-9)	Listed.
SARA 304 Emergency release notification	Sulfuric Acid (CAS 7664-93-9)	1000 LBS
OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	Not listed.	

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard – Yes

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity	Threshold planning quantity	Threshold planning quantity, lower value	Threshold planning quantity, upper value
Sulfuric Acid	7664-93-9	1000	1000 lbs		

SARA 311/312 Hazardous chemical

No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Sulfuric Acid	7664-93-9	70 - < 100

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Sulfuric Acid (CAS 7664-93-9)

Safe Drinking Water Act (SDWA)

Not regulated.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

Sulfuric Acid (CAS 7664-93-9) 6552

Drug Enforcement Administration (DEA). List 1 & 2

Sulfuric Acid (CAS 7664-93-9) 20 % WV

Exempt Chemical Mixtures (21 CFR 1310.12(c))		
DEA Exempt Chemical Mixtures Code Number	Sulfuric Acid (CAS 7664-93-9)	6552

US state regulations

US. Massachusetts RTK - Substance List	Sulfuric Acid (CAS 7664-93-9)	
US. New Jersey Worker and Community Right-to-Know Act	Sulfuric Acid (CAS 7664-93-9)	
US. Pennsylvania Worker and Community Right-to-Know Law	Sulfuric Acid (CAS 7664-93-9)	
US. Rhode Island RTK	Sulfuric Acid (CAS 7664-93-9)	
US. California Proposition 65	California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.	
US - California Proposition 65 - CRT: Listed date/Carcinogenic substance	Sulfuric Acid (CAS 7664-93-9)	Listed: March 14, 2003

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16.Other Information

Issue date	11/18/2020
Revision #	4
Revision Indicator	Updated address in Section 1.
List of abbreviations	ACGIH: American Conference of Governmental Industrial Hygienists CAS: Chemical Abstract Services CERCLA: Comprehensive Environmental Response, Compensation and Liability Act of 1980 CFR: Code of Federal Regulations CSA: Canadian Standards Association DOT: Department of Transportation DSL: Domestic Substance List HMIS: Hazardous Materials Identification System HPA: Hazardous Protection Act HSDB® - Hazardous Substances Data Bank IARC: International Agency for Research on Cancer IATA: International Air Transport Association IDLH: immediately dangerous to life or health IMDG: International Maritime Dangerous Goods LC: Lethal Concentration LD: Lethal Dose NFPA: National Fire Protection Association NIOSH: National Institute of Occupational Safety and Health NTP: National Toxicology Program OECD: Organisation for Economic Co operation and Development OEL: National occupational exposure limits OSHA: Occupational Safety and Health Administration PPE: Personal Protective Equipment RTECS: Registry of Toxic Effects of Chemical Substances SAR: supplied-air respirator SARA: Superfund Amendments and Reauthorization Act SCBA: self-contained breathing apparatus STEL: Short Term Exposure Limit TWA: Time Weighted Average
References	Canadian Centre for Occupational Health and Safety, CCInfoWeb Databases, 2014 (Chempendium, RTECs, HSDB, INCHEM) European Chemicals Agency, Classification Legislation, 2014. Material Safety Data Sheet from manufacturer. OECD - The Global Portal to Information on Chemical Substances - eChemPortal, 2014.

Disclaimer

Information presented in this SDS is furnished in accordance with OSHA's Hazard Communication Standard (HCS) 2012.

This information provided was developed and is provided for educational purposes and is not intended to be, nor should it be construed as, legal advice or as ensuring compliance with any laws or regulations of any jurisdiction. ERCO Worldwide, A division of Superior Plus LP ("ERCO") assumes no responsibility and shall have no liability for any inaccuracies, errors or omissions in, nor for any damages (including consequential, or indirect damages), losses, costs, fees, resulting from the use of, or reliance on, any part of this information. Likewise, ERCO assumes no responsibility for injury to, or the death of, recipient(s) or users of this information, or for any loss or damage to any property, arising from the use or consideration of this information. The recipient(s) and users, and each of their respective employees and agents, assume all responsibility and liability for all such risks, costs, losses, damages, fees, or otherwise, even if caused by the negligence, omission, default, or error in judgement of ERCO, its agents, subsidiaries, affiliates, or representatives.

Recipients or users of this information should ensure, and are responsible for, its compliance with the current state of the law and legislation applicable thereto, and the content of the laws and regulations of any other jurisdictions, as applicable. Any person receiving or using this SDS is responsible for and must exercise their own judgment and due diligence in ensuring safe and lawful use and handling of any product or information, as they assume the risk of using or relying on any information contained herein.

Diesel Fuel

Safety Data Sheet

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Section 1: Identification

1.1. Product identifier

Product form : Mixture

Product Identifier(s) : Diesel Fuel
Heating Oil
Low Sulfur Diesel
Ultra-low Sulfur Diesel
High Sulfur Diesel
Diesel
Fuel Oil #2
Furnace Oil #2
No. 2 Diesel Fuel
Hydrotreated Diesel Fuel
ULSD
Export Diesel
UULSD
Colonial Grade 67
Distillates (petroleum), hydrodesulfurized middle

Other means of identification : A complex combination of hydrocarbons obtained from a petroleum stock by treating with hydrogen to convert organic sulfur to hydrogen sulfide which is removed. It consists of hydrocarbons having carbon numbers predominantly in the range of C11 through C25 and boiling in the range of approximately 205°C to 400°C (401°F to 752°F).

CAS-No. : 64742-80-9

1.2. Recommended use of the chemical and restrictions on use

Use of the substance/mixture : Fuel

1.3. Details of the supplier of the safety data sheet

TotalEnergies Petrochemicals & Refining USA, Inc.
P O Box 674411
Houston, TX 77267-4411

For non-emergency product information:
Phone: 713-483-5000
Email: product.stewardship@totalenergies.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 (Toll Free USA & Canada) / 703-527-3887 (Multiple languages)
TotalEnergies Petrochemicals & Refining USA, Inc.: 1-800-322-3462 (Language: English only)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Flammable liquids Category 3
Acute toxicity (inhalation:dust,mist) Category 4
Skin corrosion/irritation Category 2
Carcinogenicity Category 2
Specific target organ toxicity (single exposure) Category 3 - Narcotic effects
Specific target organ toxicity (repeated exposure) Category 2
Aspiration hazard Category 1
Hazardous to the aquatic environment - Chronic Hazard Category 2

2.2. Label elements

RCC-CW000597

GHS US labeling

Hazard pictograms (GHS-US) :

Signal word (GHS US) : Danger

Hazard statements (GHS-US) :
Flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Harmful if inhaled
May cause drowsiness or dizziness
Suspected of causing cancer
May cause damage to organs (bone marrow, liver, thymus) through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) :
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical, lighting, ventilating equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe mist, spray, vapors.
Wash hands, forearms and face thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.
Wear eye protection, impermeable protective gloves, flame retardant protective clothing.
Specific treatment (see Section 4.1 of SDS or information on this label).
If swallowed: Immediately call doctor, a POISON CENTER.
Do NOT induce vomiting.
If on skin: Wash with plenty of water.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Get medical advice/attention if you feel unwell.
If exposed or concerned: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use water spray or fog, foam, dry chemical to extinguish.
Collect spillage.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents and container in accordance with all local, regional, national and international regulations.

2.3. Hazards not otherwise classified

Other hazards which do not result in classification : Product can accumulate electrostatic charges that may cause fire by electrical discharges.

2.4. Unknown acute toxicity (GHS-US)

Not applicable

2.5. Additional information

Based on professional judgment, inconclusive testing, or sensitive individuals : May cause mild eye irritation.
May cause mild respiratory irritation.

Section 3: Composition/Information on ingredients

3.1. Substance

Not applicable

RCC-CW000598

3.2. Mixture

Where concentrations in this product are displayed as ranges, it is due to batch-to-batch variability.

Name	CAS-No.	% (Weight Percent)
Hydrocarbons (C11 - C20)	-	98 – 100
Naphthalene	91-20-3	< 1
Biphenyl	92-52-4	< 1
Polycyclic Aromatic Compounds	130498-29-2	< 0.5

Section 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). Suspected of causing cancer.

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if irritation persists.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after inhalation : May cause mild respiratory irritation.

Symptoms/effects after skin contact : Causes skin irritation.

Symptoms/effects after eye contact : May cause mild eye irritation.

Symptoms/effects after ingestion : May be fatal if swallowed and enters airways.

Chronic symptoms : Suspected of causing cancer. May cause damage to organs through prolonged or repeated exposure.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Section 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the chemical

Fire hazard : Flammable liquid and vapor.

Explosion hazard : May form flammable/explosive vapor-air mixture.

Hazardous decomposition products in case of fire : Hazardous decomposition products formed under fire conditions: carbon monoxide, carbon dioxide, toxic fumes. Fire will produce dense black smoke.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Emergency procedures for non-emergency personnel : Evacuate unnecessary personnel.

Emergency procedures for emergency responders : Ventilate area.

6.2. Methods and material for containment and cleaning up

For containment : Dike for recovery or absorb with appropriate material. Do not contaminate ground and surface water.

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.3. Reference to other sections

See section 8. Exposure controls/personal protection.

RCC-CW000599

Section 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Handle empty containers with care because residual vapors are flammable. Keep away from heat, sparks, open flames, hot surfaces. - No smoking.

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. No bare lights. No smoking. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing vapors, mist. Use only outdoors or in a well-ventilated area.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Proper grounding procedures to avoid static electricity should be followed. All efforts should be made to prevent any leaks or spills. Storage tanks should be engineered to prevent contact with water resources, as this material could contaminate the water resources. Surface spills can reach groundwater through porous soil or cracked surfaces. The storage tanks should be monitored regularly for leaks. Where spills or leaks are possible, a comprehensive response plan should be developed and implemented.

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Direct sunlight, flames, heat sources, sparks. Keep in fireproof place. Keep container tightly closed.

Incompatible products : Strong bases. Strong acids.

Incompatible materials : Sources of ignition. Direct sunlight. Heat sources.

Section 8: Exposure controls/personal protection

8.1. Occupational Exposure Limits

The following constituents are the only constituents of the product which have a PEL, TLV, or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Diesel Fuel (64742-80-9)		
USA ACGIH	ACGIH OEL TWA	100 mg/m³ Measured as Inhalable fraction and vapor as total hydrocarbons. ACGIH Skin Notation

Naphthalene (91-20-3)		
USA ACGIH	ACGIH OEL TWA [ppm]	10 ppm
USA OSHA	OSHA PEL (TWA) [1]	50 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	10 ppm
IDLH	IDLH [ppm]	250 ppm

Biphenyl (92-52-4)		
USA ACGIH	ACGIH OEL TWA [ppm]	0.2 ppm
USA OSHA	OSHA PEL (TWA) [1]	1 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	0.2 ppm
IDLH	IDLH	100 mg/m³

8.2. Exposure controls

Appropriate engineering controls : Ensure adequate ventilation.

Personal protective equipment : Avoid all unnecessary exposure.

Hand protection : Impermeable protective gloves. Choosing the proper glove is a decision that depends not only on the type of material, but also on other quality features, which differ for each manufacturer. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection : Chemical goggles or safety glasses.

Skin and body protection : Wear fire/flame resistant/retardant clothing.

Respiratory protection : An approved organic vapor respirator/supplied air or self-contained breathing apparatus must be used when vapor concentration exceeds applicable exposure limits.

Other information : Do not eat, drink or smoke during use.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Color : Straw.

RCC-CW000600

Odor	:	characteristic.
Odor threshold	:	No data available
pH	:	Not applicable
Relative evaporation rate (butyl acetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	600 x slower than ethyl ether
Melting point	:	No data available
Freezing point	:	No data available
Boiling point	:	160 (160 – 354.4) °C
Flash point	:	50 (≥ 50) °C Closed cup
Auto-ignition temperature	:	> 200 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	Not applicable
Vapor pressure	:	< 1 mm Hg @ 20°C
Relative vapor density at 20 °C	:	8 Air = 1
Relative density	:	0.87
Solubility	:	Water: 0.1 – 52 mg/l @ 25°C
Partition coefficient n-octanol/water (Log Kow)	:	No data available
Viscosity, kinematic	:	1 – 5 cSt at 40°C
Viscosity, dynamic	:	No data available
Explosion limits	:	0.4 – 6 vol %

9.2. Other information

VOC content : 100 %

Section 10: Stability and reactivity

10.1. Reactivity

Flammable liquid and vapor.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous polymerization will not occur.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks.

10.5. Incompatible materials

Strong oxidizing agents.

10.6. Hazardous decomposition products

Hazardous decomposition products formed under fire conditions: carbon monoxide, carbon dioxide, toxic fumes. Fire will produce dense black smoke.

Section 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure : Inhalation. Ingestion. Skin and eye contact.

Acute toxicity (oral) : Not classified

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Harmful if inhaled.

Combustion of hydrocarbon substances, like this product, produces potentially toxic gases which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur. Exposure to carbon monoxide gas decreases the ability of the blood to carry oxygen to the body and may be potentially fatal. NIOSH lists the Immediately Dangerous to Life or Health Concentration (IDLH) for carbon monoxide gas as 1200 ppm.

Diesel Fuel (64742-80-9)	
LD50 oral rat	≈ 5000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat	4.6 (4.6 – 7.6) mg/l/4h Inhalation form: aerosol (mist)

Skin corrosion/irritation : Causes skin irritation.

RCC-CW000601

Diesel Fuel (64742-80-9)	
Skin Irritation Data	Primary Irritation Index = 4.3-5.6

Serious eye damage/irritation : Not classified
May cause mild eye irritation.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Suspected of causing cancer.
Petroleum middle distillates, like diesel, have been shown to cause skin tumors in mice following repeated and prolonged skin contact. Additionally, this product contains naphthalene, which has been classified as an IARC Group 2B carcinogen (possibly carcinogenic to humans).

IARC has classified diesel engine exhaust emissions as a Class 1 carcinogen - carcinogenic to humans. Prevent exposure to diesel exhaust emissions.

Naphthalene (91-20-3)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen

Polycyclic Aromatic Compounds (130498-29-2)	
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen
Additional information	**This product may contain polycyclic aromatic hydrocarbons, PAHs (also called polynuclear aromatics, PNAs or Aromatic Hydrocarbons, polycyclic), some of which are suspected of causing skin cancer in humans under conditions of poor personal hygiene and prolonged, repeated contact. Wear chemically impervious gloves. Always wash skin with soap and water after skin contact.**

Reproductive toxicity : Not classified

STOT-single exposure : May cause drowsiness or dizziness.

STOT-repeated exposure : May cause damage to organs (bone marrow, liver, thymus) through prolonged or repeated exposure.

Aspiration hazard : May be fatal if swallowed and enters airways.

Potential Adverse human health effects and symptoms : Dizziness. Drowsiness. Causes skin irritation. Harmful if inhaled.

Section 12: Ecological information

12.1. Toxicity

Ecology - general : Toxic to aquatic life with long lasting effects.

Diesel Fuel (64742-80-9)	
LC50 - Fish [1]	21 mg/l Oncorhynchus mykiss 96 h
EC50 - Crustacea [1]	68 mg/l Daphnia magna 48 h
EC50 - Other aquatic organisms [1]	22 mg/l Selenastrum capricornutum 72 h

12.2. Persistence and degradability

Diesel Fuel (64742-80-9)	
Persistence and degradability	Inherently biodegradable.

12.3. Bioaccumulative potential

Diesel Fuel (64742-80-9)	
Partition coefficient n-octanol/water (Log Pow)	> 3.5
Bioaccumulative potential	Not established.

12.4. Mobility in soil

Diesel Fuel (64742-80-9)	
Ecology - soil	It may pass through the soil and is likely to contaminate ground water.

12.5. Other adverse effects

Other information : Avoid release to the environment.

RCC-CW000602

Section 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents and container in accordance with all local, regional, national and international regulations.

Additional information : Handle empty containers with care because residual vapors are flammable.

Ecology - waste materials : Avoid release to the environment. Hazardous waste due to toxicity.

Section 14: Transport information

US Transport (DOT) for Bulk Shipments (Non-Bulk Shipments May Differ)

Transport document description (DOT) : UN1202, Diesel fuel, 3 , PGIII

UN or NA Number : UN1202

Proper Shipping Name : Diesel fuel

Primary Hazard Class : 3 - Flammable liquid

Packing Group : PGIII

Hazard labels :

Emergency Response Guide (ERG) Number : 128

In accordance with the definition in 49 CFR § 171.8, a hazardous substance does not include petroleum, including crude oil or any fraction thereof which is not other specifically listed or designated as such in Appendix A to 49 CFR § 172.101. Therefore, this product does not require a RQ designation.

Not a marine pollutant under DOT regulations. International shipments may differ.

Transport by sea (IMDG)

Transport document description (IMDG) : UN 1202 DIESEL FUEL, 3, III, MARINE POLLUTANT (50°C c.c.)

UN Number : UN1202

Proper Shipping Name : DIESEL FUEL

Primary Hazard Class : 3 - Flammable liquids

Packing Group : PGIII

Hazard labels (IMDG) :

EmS-No. (Fire) : F-E - FIRE SCHEDULE Echo - NON-WATER-REACTIVE FLAMMABLE LIQUIDS

EmS-No. (Spillage) : S-E - SPILLAGE SCHEDULE Echo - FLAMMABLE LIQUIDS, FLOATING ON WATER

Stowage category (IMDG) : A

Flash point (IMDG) : 50°C c.c.

MARPOL and US Coast Guard Regulations

Cargo name listed in 46 CFR 30.25, Table 30.25-1 : Oil, fuel: No. 2

Air transport (IATA)

Transport document description (IATA) : UN 1202 Diesel fuel, 3, III

UN Number : UN1202

Proper Shipping Name : Diesel fuel

Primary Hazard Class : 3 - Flammable Liquids

Packing Group : PGIII

Hazard labels (IATA) :

RCC-CW000603

Section 15: Regulatory information

15.1. US Federal regulations

EPA TSCA Status

This product is a substance under TSCA (CAS No. 64742-80-9; Distillates (petroleum), hydrodesulfurized middle).

SARA Section 313 Supplier Notification

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372:

CAS number	Chemical name	Concentration
91-20-3	Naphthalene	< 1%
130498-29-2	Polycyclic Aromatic Compounds	< 0.5%

This product contains Polycyclic Aromatic Compounds (PAC). PACs are listed as a category under SARA 313 and include only specific PACs listed in 40 CFR 372.65(c). The US EPA has established Reporting Threshold for PACs of 100 lbs (40 CFR 372.28). If a facility manufactures, processes, or otherwise uses more than 100 lbs per calendar year of the PAC category SARA 313 reporting is required. See EPA "Emergency Planning and Community Right-to-know Act - Section 313: Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category" (EPA # 260-B-01-03).

This information must be included in all Safety Data Sheets that are copied and distributed for this product. For additional information, see 40 CFR §372.45 Notification About Toxic Chemicals.

SARA Section 311/312 Hazard Classes

Physical hazard - Flammable (gases, aerosols, liquids, or solids)
Physical hazard - Hazard Not Otherwise Classified (HNOC)
Health hazard - Aspiration hazard
Health hazard - Acute toxicity (any route of exposure)
Health hazard - Carcinogenicity
Health hazard - Skin corrosion or Irritation
Health hazard - Specific target organ toxicity (single or repeated exposure)

15.2. International regulations

CANADA

No additional information available

National inventories

Diesel Fuel (64742-80-9)
Listed on or exempt from listing on the AICS (Australian Inventory of Chemical Substances)
Listed on or exempt from listing on the Canadian DSL (Domestic Substances List)
Listed on or exempt from listing on the China Inventory of Existing Chemical Substances (IECSC)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on or exempt from listing on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on or exempt from listing on the Korean ECL (Existing Chemicals List)
Listed on or exempt from listing on NZIoC (New Zealand Inventory of Chemicals)
Listed on or exempt from listing on the Philippines Inventory of Chemicals and Chemical Substances (PICCS)

15.3. US State regulations

California Proposition 65 - This product contains, or may contain, trace quantities of a substance(s) known to the state of California to cause cancer and/or reproductive toxicity, not limited to any that may be listed below.

Naphthalene (91-20-3)	
U.S. - California - Proposition 65 - Carcinogens List	Yes
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
No significant risk level (NSRL)	5.8 µg/day

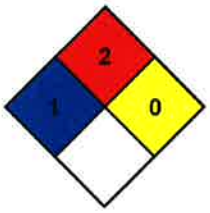
Section 16: Other information

Other information : None.

RCC-CW000604

NFPA (National Fire Protection Association)

NFPA health hazard	: 1
NFPA fire hazard	: 2
NFPA reactivity	: 0



Hazard System Rating

Health	: 1*
Flammability	: 2
Physical Hazard	: 0
Personal protection	: See section 8 of SDS

US OSHA LABEL as specified under 29 CFR §1910.1200 (f). The label shown may include supplemental information in addition to required elements.

Diesel Fuel

TotalEnergies Petrochemicals & Refining USA, Inc.
PO Box 674411
Houston, TX 77267-4411 USA
Tel. 713-483-5000

Danger

Flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Harmful if inhaled
May cause drowsiness or dizziness
Suspected of causing cancer
May cause damage to organs (bone marrow, liver, thymus) through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical, lighting, ventilating equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe mist, spray, vapors.
Wash hands, forearms and face thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.
Wear eye protection, impermeable protective gloves, flame retardant protective clothing.
Specific treatment (see Section 4.1 of SDS or information on this label).
If swallowed: Immediately call doctor, a POISON CENTER.
Do NOT induce vomiting.
If on skin: Wash with plenty of water.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Get medical advice/attention if you feel unwell.
If exposed or concerned: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use water spray or fog, foam, dry chemical to extinguish.
Collect spillage.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental Information

Product can accumulate electrostatic charges that may cause fire by electrical discharges.

RCC-CW000605

US SDS Version: 3.1
Issue date: September 9, 2021

SDS ID: DIESEL
SDS REFERENCE NUMBER: RF0049

SDS Template - TotalEnergies SDS US TEPRI Version 20.00

The information contained in this Safety Data Sheet (SDS) is believed by TotalEnergies Petrochemicals & Refining USA, Inc. (TEPRI) to be accurate on the date issued. However, materials may present unknown hazards and should be used with caution. Final determination of suitability and use of any material is the sole responsibility of the user. Neither TEPRI nor any of its subsidiaries or affiliated companies assumes any liability whatsoever for the accuracy or completeness of the information contained herein or reliance thereto. If the material is repackaged, the user is responsible and must ensure that proper health, safety and other necessary information is included with the material and/or on the container. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING THE MATERIALS OR THE INFORMATION CONTAINED IN THIS SDS. ALTERATION OF THIS DOCUMENT IS STRICTLY PROHIBITED.

RCC-CW000606

HUDBAY

A.2 SULFIDE PLANT SDS

SOLVAY

SDS: 0061084
Date Prepared: 10/14/2016

SAFETY DATA SHEET

1. IDENTIFICATION

Product Name:	**AERO® OX 100 Promoter**
Product Description:	Mineral processing reagent
Synonyms:	None
Chemical Family:	Alkyl Hydroxamates
Molecular Weight:	Mixture
Intended/Recommended Use:	Mining chemical

CYTEC INDUSTRIES INC., FIVE GARRET MOUNTAIN PLAZA, WOODLAND PARK, NEW JERSEY 07424, USA
For Product and all Non-Emergency Information call 1-800/652-6013. Outside the USA and Canada call 1-973/357-3193.

EMERGENCY PHONE (24 hours/day) - For emergency only involving spill, leak, fire, exposure or accident call:
Asia Pacific:
Australia - +61-3-9663-2130 or 1800-033-111 (IXOM)
China (PRC) - +86 0532 83889090 (NRCC)
New Guinea - +61-3-9663-2130 or 1800-033-111
New Zealand - +61-3-9663-2130 or 0800-734-607 (IXOM)
India, Japan, Korea, Malaysia, Thailand - +65 3158 1074 (Carechem24 Singapore)
India (Hindi Speaking Only) - +65 3158 1198 or 000800 100 7479 (Carechem24 Singapore)
Canada: +1-905-356-8310 (Cytec Welland, Canada plant)
Europe/Africa/Middle East (Carechem24 UK):
Europe, Middle East, Africa, Israel - +44 (0) 1235 239 670
(Arabic speaking countries) - +44 (0) 1235 239 671
Latin America:
Brazil - 0800 7077 022 (SUATRANS)
Chile - +56-2-2-247-3600 (CITUC QUIMICO)
All Others - +52-376-73 74122 (Cytec Atequiza, Mexico plant)
USA: +1-703-527-3887 or 1-800-424-9300 (CHEMTREC #CCN6083)

2. HAZARDS IDENTIFICATION

GHS Classification
Flammable Liquid Hazard Category 4
Reproductive Toxicant Category 2
Specific Target Organ Toxicity - Single Exposure Hazard Category 3
Skin Corrosion / Irritation Hazard Category 2
Serious Eye Damage / Eye Irritation Hazard Category 2A
Aquatic Environment Acute Hazard Category 1
Aquatic Environment Chronic Hazard Category 3

LABEL ELEMENTS

Signal Word
Warning

Hazard Statements
Combustible liquid
Suspected of damaging fertility or the unborn child
May cause drowsiness or dizziness
May cause respiratory irritation
Causes skin irritation
Causes serious eye irritation
Very toxic to aquatic life
Harmful to aquatic life with long lasting effects

Precautionary Statements
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Wear protective gloves/protective clothing/eye protection/face protection.
Obtain special instructions before use.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Use only outdoors or in a well-ventilated area.
Wash face, hands and any exposed skin thoroughly after handling.
Avoid release to the environment.
In case of fire: Use CO2, dry chemical, or foam for extinction.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN: Wash with plenty of soap and water.
Specific treatment (see supplemental first aid instructions on this label).
If skin irritation occurs: Get medical advice/attention.
Take off all contaminated clothing and wash it before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
Collect spillage.
Store in a well-ventilated place. Keep cool.
Store locked up.
Store in a well-ventilated place. Keep container tightly closed.
Dispose of contents/container in accordance with local and national regulations.

Hazards Not Otherwise Classified (HNOC), Other Hazards
This is a research and development (R&D) sample. The chemical, physical, and toxicological properties of this material have not been fully investigated. Its handling or use may be hazardous. It may only be used for R&D purposes under the supervision of technically qualified individuals.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance, Mixture or Article? Mixture

HAZARDOUS INGREDIENTS

Component / CAS No.	%	GHS Classification	Carcinogen
Alkyl hydroxamic acids #3 -	10-30	STOT Single 3 (H335) Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Aquatic Acute 1 (H400) Aquatic Chronic 3 (H412)	-
Alkyl Glycol -	10-30	STOT Single 3 (H336) Eye Irrit. 2A (H319)	-

Component / CAS No.	%	GHS Classification	Carcinogen
Alkyl hydroxamic acids #2 -	10-20	STOT Single 3 (H335) Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Aquatic Acute 1 (H400) Aquatic Chronic 3 (H412)	-
Alkyl Glycol Ester #2 -	1-5	STOT Single 3 (H336) Eye Irrit. 2A (H319)	-
Alkyl Glycol Ester -	1-5	STOT Single 3 (H336) Eye Irrit. 2A (H319)	-
Monocarboxylic fatty acids #2 -	0.5-1.5	Skin Corr. 1C (H314) Eye Dam. 1 (H318) Aquatic Acute 3 (H402) Aquatic Chronic 3 (H412)	-
Monocarboxylic fatty acids -	0.5 - 1.5	Skin Irrit. 2 (H315) Eye Irrit. 2A (H319) Aquatic Acute 3 (H402) Aquatic Chronic 3 (H412)	-
Toluene 108-88-3	0.1-0.5	Flam. Liq. 2 (H225) Repr. 2 (H361) STOT RE 2 (H373) STOT SE 3 (H336) Skin Irrit. 2 (H315) Eye Irrit. 2B (H320) Asp. Tox. 1 (H304) Aquatic Acute 2 (H401) Aquatic Chronic 3 (H412)	-
Quaternary ammonium compounds, di-C8-10-alkyldimethyl, chlorides 68424-95-3	0.1-0.3	Acute tox. 4 (H302) Acute tox. 3 (H313) Skin corr. 1B (H314) Eye dam. 1 (H318) Aquatic Acute 1 (H400)	-

The specific chemical identity and/or exact percentage of composition for one or more ingredients has been withheld as a trade secret.

Additional GHS classification or other information may be included in this section but has not been adopted by OSHA. See Section 16 for full text of H phrases.

4. FIRST AID MEASURES

DESCRIPTION OF FIRST AID MEASURES

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes. Obtain medical advice if there are persistent symptoms.

Skin Contact:
Wash immediately with plenty of water and soap. Remove contaminated clothing and shoes without delay. Obtain medical attention. Do not reuse contaminated clothing without laundering. Destroy or thoroughly clean shoes before reuse.

Ingestion:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

None known

INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDS

Not applicable

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray or fog, carbon dioxide or dry chemical.

Extinguishing Media to Avoid:
full water jet

Protective Equipment:
Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing.

Special Hazards:
None known

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Where exposure level is known, wear approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

Methods For Cleaning Up:
Remove sources of ignition. Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush spill area with water.

References to other sections:
See Sections 8 and 13 for additional information.

7. HANDLING AND STORAGE

HANDLING

Precautions: Avoid release to the environment. Keep away from heat, sparks and open flame. - No smoking. Wear protective gloves and eye/face protection. Wash hands thoroughly after handling. Use only outdoors or in a well-ventilated area. Avoid breathing vapors or spray mist.

Special Handling Statements: This is a research and development (R&D) sample. The chemical, physical, and toxicological properties of this material have not been fully investigated. Its handling or use may be hazardous. It may only be used for R&D purposes under the supervision of technically qualified individuals.

STORAGE
Areas containing this material should have fire safe practices and electrical equipment in accordance with applicable regulations and/or guidelines. Standards are primarily based on the material`s flashpoint, but may also take into account properties such as miscibility with water or toxicity. All local and national regulations should be followed.
In the Americas, National Fire Protection Association (NFPA) 30: Flammable and Combustible Liquids Code, is a widely used standard. NFPA 30 establishes storage conditions for the following classes of materials: Class I Flammable Liquids, Flashpoint <37.8 °C. Class II Combustible Liquids, 37.8 °C < Flashpoint <60 °C. Class IIIa Combustible Liquids, 60 °C < Flashpoint < 93 °C. Class IIIb Combustible Liquids, Flashpoint > 93 °C.

Storage Temperature: Store at 20 - 40 °C 68 - 104 °F
Reason: Safety.

---

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection:
Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure.

Eye Protection:
Wear eye/face protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure.

Skin Protection:
Avoid skin contact. Wear impermeable gloves and suitable protective clothing.

Hand Protection:
Wear impermeable gloves. Replace gloves immediately when torn or any change in appearance (dimension, colour, flexibility etc) is noticed. Barrier creams may help to protect the exposed areas of the skin, they should however not be applied once exposure has occurred.

Additional Advice:
Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water. It is recommended that a shower be taken after completion of workshift especially if significant contact has occurred. Work clothing should then be laundered prior to reuse. Street clothing should be stored separately from work clothing and protective equipment. Work clothing and shoes should not be taken home.

Exposure Limit(s)

The below constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

108-88-3 Toluene

OSHA (PEL):	200 ppm (TWA) 300 ppm (Ceiling)
ACGIH (TLV):	20 ppm (TWA)
Other Value:	Not established

---

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	yellow to red
Appearance:	liquid
Odor:	odorless to amine-like

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point:	Not available	
Melting Point:	Not applicable	
Vapor Pressure:	Not available	
Specific Gravity/Density:	1.004g/mL @ 25°C	
Vapor Density:	Not available	
Percent Volatile (% by wt.):	Not available	
pH:	Not applicable	
Saturation In Air (% By Vol.):	Not available	
Evaporation Rate:	Not available	
Solubility In Water:	miscible	
Volatile Organic Content:	Not available	
Flash Point:	65 °C 149 °F	Pensky-Martens Closed Cup
Flammability (solid, gas):	Not available	
Flammable Limits (% By Vol):	Not available	
Autoignition (Self) Temperature:	Not available	
Decomposition Temperature:	Not available	
Partition coefficient (n-octanol/water):	Not available	
Odor Threshold:	Not available	
Viscosity (Kinematic):	Not available	

DUST HAZARD INFORMATION

Particle Size (microns):	Not applicable
Kst (bar-m/sec):	Not applicable
Maximum Explosion Pressure (Pmax):	Not applicable
Dust Class:	Not applicable
Minimum Ignition Energy (MIE) (mJ):	Not applicable
Minimum Ignition Temperature (MIT) (°C):	Not applicable
Minimum Explosive Concentration (MEC) (g/m^3):	Not applicable
Limiting Oxygen Concentration (LOC) (%):	Not applicable

10. STABILITY AND REACTIVITY

Reactivity:	No information available
Stability:	Stable
Materials To Avoid:	Strong acids Reducing agents Oxidizing agents Strong bases
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide (CO) Oxides of nitrogen Thermal decomposition or combustion may produce:

11. TOXICOLOGICAL INFORMATION

PRODUCT TOXICITY INFORMATION

Likely Routes of Exposure: Skin, Oral, Eyes.

ACUTE TOXICITY DATA

oral	rat	Acute LD50	>2000 mg/kg
dermal	rabbit	Acute LD50	>2000 mg/kg
inhalation	rat	Acute LC50 4 hr	No data

LOCAL EFFECTS ON SKIN AND EYE

Acute Irritation	skin	Irritating
Acute Irritation	eye	Causes serious damage

ALLERGIC SENSITIZATION

Sensitization	skin	Not sensitizing
Sensitization	respiratory	No data

GENOTOXICITY

Assays for Gene Mutations

Ames Salmonella Assay	No data

OTHER INFORMATION

The product toxicity information above has been estimated.
This is a research and development (R&D) sample. The chemical, physical, and toxicological properties of this material have not been fully investigated. Its handling or use may be hazardous. It may only be used for R&D purposes under the supervision of technically qualified individuals.

HAZARDOUS INGREDIENT TOXICITY DATA

Alkyl glycol has a reported acute oral (rat) LD50 valus of >2000 mg/kg. The acute (vapor) 4-hr inhalation (rat) LC50 is reported to be >20000 ppm. Direct contact with this material may produce moderate eye irritation. Inhalation exposure may cause drowsiness or dizziness. Alkyl glycol was non-mutagenic in the Ames Assay and non-clastogenic in an in vitro Chromosomal Aberrations Test. In a Combined Repeated Dose and Reproductive/Developmental Screening test, male and female rats the No-Observed Effect level (NOEL) for systemic effects was 1000 mg/kg day for the males and 200 mg/kg/day for the females. The NOEL for both reproductive and developmental effects was 1000 mg/kg/day.

The chemical, physical, and toxicological properties of this material have not been fully investigated. Direct contact with Alkyl Glycol Ester #2 may produce moderate eye irritation. Inhalation exposure may cause drowsiness and dizziness

The chemical, physical, and toxicological properties of this material have not been fully investigated. Direct contact with Alkyl Glycol Ester may produce moderate eye irritation. Inhalation exposure may cause drowsiness and dizziness.

Monocarboxylic fatty acids #2 has acute oral (rat) and estimated acute dermal (rabbit) LD50 values of >2000 mg/kg, respectively. Direct contact with this substance is expected to be corrosive to skin and cause serious eye damage. This substance is not expected to be a dermal sensitizer. Based on testing with a structurally similar material, this material is not expected to be mutagenic, genotoxic or clastogenic. Based on testing with a structurally similar substance Monocarboxylic fatty acids #2 is not expected to be harmful upon repeat oral exposure and not expected to be a reproductive or developmental toxin.

Monocarboxylic fatty acids has reported acute oral (rat) and acute dermal (rabbit) LD50 values of >10 g/kg and >5000 mg/kg, respectively. Direct contact with this material may cause moderate eye and skin irritation. Inhalation exposure may cause respiratory irritation.

Toluene has acute oral (rat) and dermal (rabbit) LD50 values of 4,328 mg/kg and 12124 mg/kg, respectively. The acute 4-hour inhalation (rat, female) LC50 value is 5,060 ppm (19.07 mg/L). Toluene is a severe eye and moderate skin irritant. Inhalation overexposure to toluene vapor can cause headache, fatigue, nausea, and central nervous system depression. Sustained inhalation of high levels of toluene has been shown to cause reversible kidney and liver damage. Subchronic inhalation of toluene vapors have caused permanent hearing loss, decreased learning capabilities and damage to the eyes in laboratory animal tests. Deliberate inhalation of high concentrations of toluene vapor by pregnant women has been shown to adversely affect the fetus. These fetotoxic effects include intrauterine growth retardation and delayed postnatal development. The fetotoxic effects of toluene seen in laboratory animals are similar to those seen in humans. Ingestion of toluene in laboratory animals caused mild gastritis and harmful effects on the respiratory system, kidneys, liver and heart. Ingestion in laboratory animals also caused harmful effects on the central nervous system and death. It has also been reported that subchronic ingestion of toluene caused brain and bladder damage in laboratory animals. Due to synergistic effects, the toxicity of toluene may be enhanced by exposure to n-hexane, benzene, xylene, acetylsalicylic acid and chlorinated hydrocarbons. The literature reports that toluene is an aspiration hazard, that acute oral exposure resulted in reversible visual dysfunction, and that chronic exposure has caused altered immune function in animals. Toluene is a chemical known to the State of California to cause reproductive toxicity.

Quaternary ammonium compounds, di-C8-10-alkyldimethyl, chlorides has an acute oral (rat) LD50, acute dermal (rabbit) LD50 and 4-hour inhalation values of 455 mg/kg, 397 mg/kg and > 5 mg/L (dust/mist), respectively. This material produces severe skin irritation and severe eye damage.

California Proposition 65 Warning (applicable in California only) - This product contains (a) chemical(s) known to the State of California to cause birth defects or other reproductive harm.

12. ECOLOGICAL INFORMATION

TOXICITY, PERSISTENCE AND DEGRADABILITY, BIOACCUMULATIVE POTENTIAL, MOBILITY IN SOIL, OTHER ADVERSE EFFECTS

Overall Environmental Toxicity: Very toxic to aquatic life. Harmful to aquatic life with long lasting effects.

The ecological assessment for this material is based on an evaluation of its components.
This is a research and development (R&D) sample. The ecological properties of this material have not been fully investigated. Avoid release to the environment.

RESULTS OF PBT AND vPvB ASSESSMENT

Not determined

HAZARDOUS INGREDIENT TOXICITY DATA

Component / CAS No.	Toxicity to Algae	Toxicity to Fish	Toxicity to Water Flea
Alkyl hydroxamic acids #3 -	EC50 >0.1-1.0 mg/L (estimated) - Green Algae (72h) NOEC >0.1-1.0 mg/L (estimated) - Green Algae (72h)	LC50 >10-100 mg/L (estimated) - Fish (96h) NOEC >0.1-1.0 mg/L (estimated) - Fish (96h) chronic	EC50 >10-100 mg/L (estimated) - Daphnia magna (48h)

Component / CAS No.	Toxicity to Algae	Toxicity to Fish	Toxicity to Water Flea
Alkyl Glycol -	Not available	Not available	Not available
Alkyl hydroxamic acids #2 -	EC50 >0.1-1.0 mg/L (estimated) - Green Algae (72h) NOEC >0.1-1.0 mg/L (estimated) - Green Algae (72h)	LC50 >10-100 mg/L (estimated) - Fish (96h) NOEC >0.1-1.0 mg/L (estimated) - Fish (96h) chronic	EC50 >10-100 mg/L (estimated) - Daphnia magna (48h)
Alkyl Glycol Ester #2 -	Not available	Not available	Not available
Alkyl Glycol Ester -	Not available	Not available	Not available
Monocarboxylic fatty acids #2 -	ErC50 = 31 mg/L (measured) - Green Algae (72h)	LC50 = 22 mg/L (nominal) - Bluegill sunfish (96h)	EC50 >20 mg/L (nominal) - Daphnia magna (48h)
Monocarboxylic fatty acids -	EC50 >10-100 mg/L (estimated) - Green Algae (72h)	LC50 = 54 mg/L - Oryzias latipes (96h) semi-static	EC50 >10-100 mg/L (estimated) - Daphnia magna (48h)
Toluene 108-88-3	EC50 = 12.5 mg/L - Green Algae (72h)	LC50 11-70.3 mg/L - Various Fish Species (96h) static LC50 5.8-28.2 mg/L - Various Fish Species (96h) semi-static LC50 5.89-19.05 mg/L - Various Fish Species (96h) flow-through NOEC = 1.39 mg/L - Coho Salmon (40 Day) flow-thorugh	EC50 5.46 - 11.5 mg/L - Daphnia magna (48h) Static EC50 = 3.78 mg/L (measured) - Ceriodaphnia dubia (48h) Daily renewal NOEC = 0.74 - Ceriodaphnia dubia (7 Day) Daily Renewal
Quaternary ammonium compounds, di-C8-10-alkyldimethyl, chlorides 68424-95-3	Not available	Not available	Not available

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicate if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristics: There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, see Section 9 of this MSDS (flash point). For Corrosivity, see Sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 3 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material if it is to be disposed. The Company encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. The Company recommends that organic materials classified as RCRA hazardous wastes be disposed of by thermal treatment or incineration at EPA approved facilities. The Company has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

US DOT

Dangerous Goods? X

Proper Shipping Name: Combustible liquid, n.o.s.
Hazard Class: Combustible liquid

Packing Group: III
UN/ID Number: NA1993
Technical Name (N.O.S.): Toluene

Comments: Combustible liquids are not regulated in non-bulk packagings unless the combustible liquid is a hazardous substance, a hazardous waste, or a marine pollutant.

TRANSPORT CANADA

Dangerous Goods? Not applicable/Not regulated

ICAO / IATA

Dangerous Goods? Not applicable/Not regulated

IMO

Dangerous Goods? Not applicable/Not regulated

15. REGULATORY INFORMATION

Inventory Information

United States (USA): All components of this product are Included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.

Canada: One or more components of this product are NOT included on the Canadian Domestic Substances List (DSL). These components are included on the Canadian Non-Domestic Substances List (NDSL).

European Economic Area (including EU): When purchased from a Cytec legal entity based in the EU, this product is compliant with the registration of the REACH Regulation (EC) No. 1907/2006 as all its components are either excluded, exempt, pre-registered and/or registered.

Australia: One or more components of this product have NOT yet been included in the Australian Inventory of Chemical Substances (AICS) or assessed by NICNAS.

China: One or more components of this product are NOT included on the Chinese (IECSC) inventory.

Japan: One or more components of this product are NOT included on the Japanese (ENCS) inventory.

Korea: One or more components of this product are NOT included on the Korean (ECL) inventory.

Philippines: One or more components of this product are NOT included on the Philippine (PICCS) inventory.

OTHER ENVIRONMENTAL INFORMATION
The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

This product does not contain any components regulated under these sections of the EPA

PRODUCT HAZARD CLASSIFICATION UNDER SECTION 311 OF SARA

- Fire
- Acute
- Chronic

16. OTHER INFORMATION

16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

Fire: 2 - Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.

Instability: 0 - Materials that in themselves are normally stable, even under fire exposure conditions.

Reasons For Issue: New Product

Date Prepared: 10/14/2016
Date of last significant revision: 10/14/2016

Component Hazard Phrases

Alkyl hydroxamic acids #3
- H315 - Causes skin irritation.
- H319 - Causes serious eye irritation.
- H335 - May cause respiratory irritation.
- H400 - Very toxic to aquatic life.
- H412 - Harmful to aquatic life with long lasting effects.

Alkyl Glycol
- H319 - Causes serious eye irritation.
- H336 - May cause drowsiness or dizziness.

Alkyl hydroxamic acids #2
- H315 - Causes skin irritation.
- H319 - Causes serious eye irritation.
- H335 - May cause respiratory irritation.
- H400 - Very toxic to aquatic life.
- H412 - Harmful to aquatic life with long lasting effects.

Alkyl Glycol Ester #2
- H319 - Causes serious eye irritation.
- H336 - May cause drowsiness or dizziness.

Alkyl Glycol Ester
- H319 - Causes serious eye irritation.
- H336 - May cause drowsiness or dizziness.

Monocarboxylic fatty acids #2
- H314 - Causes severe skin burns and eye damage.
- H318 - Causes serious eye damage.
- H402 - Harmful to aquatic life.
- H412 - Harmful to aquatic life with long lasting effects.

Monocarboxylic fatty acids
- H315 - Causes skin irritation.
- H319 - Causes serious eye irritation.
- H402 - Harmful to aquatic life.
- H412 - Harmful to aquatic life with long lasting effects.

Toluene
- H225 - Highly flammable liquid and vapor.
- H361 - Suspected of damaging fertility or the unborn child.
- H373 - May cause damage to organs through prolonged or repeated exposure.
- H336 - May cause drowsiness or dizziness.
- H315 - Causes skin irritation.
- H320 - Causes eye irritation.
- H304 - May be fatal if swallowed and enters airways.
- H401 - Toxic to aquatic life.
- H412 - Harmful to aquatic life with long lasting effects.

Quaternary ammonium compounds, di-C8-10-alkyldimethyl, chlorides

H302 - Harmful if swallowed.
H311 - Toxic in contact with skin.
H314 - Causes severe skin burns and eye damage.
H400 - Very toxic to aquatic life.

Prepared By: Legal & Compliance Services; E-mail: custinfo@cytec.com

This information is given without any warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement, or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation, and verification. Before using any product, read its label.

Material Safety Data Sheet

LA1173
Dowfroth 250 Flotation Frother

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Id: LA1173
Product Name: Dowfroth 250 Flotation Frother
Synonyms: None
Chemical Family: None Known
Application: Not Available.

Distributed By:
Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC
V6X 1W5

Prepared By: The Safety, Health and Environment Department of Univar Canada Ltd.
Preparation date of MSDS: 07 July 2009
Telephone number of preparer: 1-866-686-4827

24-Hour Emergency Telephone Number (CANUTEC): (613) 996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Percentage (W/W)	LD50s and LC50s Route & Species:
Polypropylene glycol methyl ethers 37286-64-9	99	Oral LD50 (Rat) = 48700 µL/kg Dermal LD50 (Rabbit) > 20 mL/kg
Potassium Hydroxide 1310-58-3	1	Oral LD50 (Rat) = 214 mg/kg

Note: No additional remark.

3. HAZARDS IDENTIFICATION

Potential Acute Health Effects:
Eye Contact: May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness.
Skin Contact: No significant irritation expected from a single short-term exposure. May cause moderate skin irritation. May cause more severe response if confined to skin or skin is abraded (scratched or cut). Prolonged or repeated exposure to very large amounts of component (s) in this mixture may cause narcosis (drowsiness).
Inhalation: At room temperature, vapors are minimal due to physical properties; a single exposure is not likely to be hazardous. If material is heated or aerosol/mist is produced, concentrations may be attained that are sufficient to cause respiratory irritation and other effects. Signs and symptoms of excessive exposure may be anesthetic or narcotic effects.

3. HAZARDS IDENTIFICATION

Ingestion: Single dose oral toxicity is considered to be low. Small amounts swallowed incidental to normal handling operations are not likely to cause injury. Swallowing larger amounts may cause injury. Observations in animals include tremors and convulsions.

4. FIRST AID MEASURES

Eye Contact: Flush eyes with gently flowing water for at least 30 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse the contaminated water into the unaffected eye or face. Seek immediate medical attention. Do not transport victim until the recommended flushing period is completed, unless flushing can be continued during transport.
Skin Contact: Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.
Inhalation: Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate medical attention.
Ingestion: Do NOT induce vomiting. Never give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.
Notes to Physician: Treatment based on sound judgment of physician and individual reactions of patient. No specific antidote.

5. FIRE FIGHTING MEASURES

Flash Point: None.
Flash Point Method: Setaflash.
Autoignition Temperature: Not available.
Flammable Limits in Air (%): Not Available.
Extinguishing Media: Use DRY chemicals, CO2, alcohol foam or water spray.
Special Exposure Hazards: Isolate and restrict area access. Use fine water spray or fog to control fire spread and cool adjacent structures or containers. Do not use a solid stream of water. Move containers from fire area if you can do it without risk.
Hazardous Decomposition/Combustion Materials (under fire conditions): Oxides of carbon.
Special Protective Equipment: Fire fighters should wear full protective clothing, including self-contained breathing equipment.
NFPA RATINGS FOR THIS PRODUCT ARE: Not Available.
HMIS RATINGS FOR THIS PRODUCT ARE: Not Available.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures: Wear appropriate protective equipment.
Environmental Precautionary Measures: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Consult local authorities.
Procedure for Clean Up: Isolate hazard area and restrict access. Absorb with an inert dry material and place in an appropriate waste disposal container. Avoid direct contact with material.

7. HANDLING AND STORAGE

Handling: For industrial use only. Handle and open containers with care. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid inhalation of chemical. Empty containers may contain hazardous product residues. Keep the containers closed when not in use. Protect against physical damage. Use appropriate personnel protective equipment. Avoid contact with vapors from head space of containers.
Storage: To avoid uncontrolled emissions vent vapor from container to storage tank.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.
Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection is needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator.
Gloves:

Impervious gloves.
Skin Protection: Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential. Consideration must be given both to durability as well as permeation resistance.
Eyes: Chemical splash goggles.
Other Personal Protection Data: Ensure that eyewash stations and safety showers are proximal to the work-station location.

Ingredients	Exposure Limit - ACGIH	Exposure Limit - OSHA	Immediately Dangerous to Life or Health - IDLH
Polypropylene glycol methyl ethers	Not available.	Not available.	Not Available.
Potassium Hydroxide	2 mg/m^3 Ceiling	2 mg/m^3 Ceiling	Not Available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid.
Colour: Yellow - Brown
Odour: Not available.
pH Not Available.
Specific Gravity: 0.98 @ 25 °C
Boiling Point: Not Available.
Freezing/Melting Point: Not Available.
Vapour Pressure: <0.01 mmHg @ 20°C
Vapour Density: Low
% Volatile by Volume: Not Available.
Evaporation Rate: Not Available.
Solubility: Completely miscible.
VOCs: Not Available.
Viscosity: Not Available.
Molecular Weight: Not Available.
Other: Not Available.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.
Hazardous Polymerization: Will not occur.
Conditions to Avoid: None known.
Materials to Avoid: Contact with oxidizing agents.
Hazardous Decomposition Products: Not available.
Additional Information:

No additional remark.

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure

Ingestion: Single dose oral toxicity is considered to be low. Small amounts swallowed incidental to normal handling operations are not likely to cause injury. Swallowing larger amounts may cause injury. Observations in animals include tremors and convulsions.
Skin Contact: No significant irritation expected from a single short-term exposure. May cause moderate skin irritation. May cause more severe response if confined to skin or skin is abraded (scratched or cut). Prolonged or repeated exposure to very large amounts of component (s) in this mixture may cause narcosis (drowsiness).

11. TOXICOLOGICAL INFORMATION

Inhalation: At room temperature, vapors are minimal due to physical properties; a single exposure is not likely to be hazardous. If material is heated or aerosol/mist is produced, concentrations may be attained that are sufficient to cause respiratory irritation and other effects. Signs and symptoms of excessive exposure may be anesthetic or narcotic effects.
Eye Contact: May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness.

Additional Information: None known.
Acute Test of Product:
Acute Oral LD50: Not Available.
Acute Dermal LD50: Not Available.
Acute Inhalation LC50: Not Available.

Carcinogenicity:

Ingredients	IARC - Carcinogens	ACGIH - Carcinogens
Polypropylene glycol methyl ethers	Not listed.	Not listed.
Potassium Hydroxide	Not listed.	Not listed.

Carcinogenicity Comment: No additional information available.

Reproductive Toxicity/ Teratogenicity/ Embryotoxicity/ Mutagenicity: Negative in mutagenicity assays.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Polypropylene glycol methyl ethers	Not Available.	Not Available.	Not Available.
Potassium Hydroxide	LC50 (Gambusia affinis) 80.0 mg/L	Not Available.	Not Available.

Other Information:
Material is practically non-toxic to fish on an acute basis.

13. DISPOSAL CONSIDERATIONS

Disposal of Waste Method: Disposal of all wastes must be done in accordance with municipal, provincial and federal regulations.
Contaminated Packaging: Empty containers should be recycled or disposed of through an approved waste management facility.

14. TRANSPORT INFORMATION

DOT (U.S.):
DOT Shipping Name: Not Regulated.
DOT Hazardous Class Not Applicable.
DOT UN Number: Not Applicable.
DOT Packing Group: Not Applicable.
DOT Reportable Quantity (lbs): Not Available.
Note: No additional remark.
Marine Pollutant: No.

TDG (Canada):
TDG Shipping Name: Not Regulated.
Hazard Class: Not Applicable.
UN Number: Not Applicable.

14. TRANSPORT INFORMATION

Packing Group: Not Applicable.
Note: No additional remark.
Marine Pollutant: No.

15. REGULATORY INFORMATION

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

Note: Not available.

U.S. Regulatory Rules

Ingredients	CERCLA/SARA - Section 302:	SARA (311, 312) Hazard Class:	CERCLA/SARA - Section 313:
Polypropylene glycol methyl ethers	Not Listed.	Not Listed.	Not Listed.
Potassium Hydroxide	Not Listed.	Listed	Not Listed.

California Proposition 65: Not Listed.
MA Right to Know List: Listed.
New Jersey Right-to-Know List: Listed.
Pennsylvania Right to Know List: Listed.

WHMIS Hazardous Class:
D2B TOXIC MATERIALS

16. OTHER INFORMATION

Additional Information: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Disclaimer: NOTICE TO READER:
Univar, expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.

*****END OF MSDS*****

Aluminum Sulfate Solution, 7 % Acid

SDS No. 013
25 Jan 2019

Safety Data Sheet

IDENTIFICATION

Product Identifier

Product Name **Aluminum Sulfate Solution**

Other means of identification

USALCO SDS # 013
UN/ID No UN3264
Synonyms Acid Alum

Manufacturer

USALCO, LLC
2601 Cannery Ave
Baltimore, MD 21226

Recommended use of the chemical and restrictions on use

Recommended Use Water treatment coagulant, flocculent, alumina source for catalyst, pH control in papermaking/water treatment.

Emergency Telephone Number

Company Phone Number 410-918-2230
Emergency Telephone (24 hr) 800-282-5322

2. HAZARDS IDENTIFICATION

Appearance Colorless to clear amber or clear light green liquid **Physical State** Liquid **Odor** Negligible

Signal Word
Danger

Hazard Statements
Causes skin severe skin burns and serious eye damage

Precautionary Statements - Prevention
Avoid breathing mist. Wash hands and any exposed skin thoroughly after handling. Wear protective gloves and clothing, eye/face protection.

Precautionary Statements - Response
If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
Wash contaminated clothing before reuse. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Precautionary Statements - Storage
Store in corrosive resistant plastic or FRP container or container with corrosive resistant inner liner.

Precautionary Statements – Disposal
Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D002 (Corrosive) if the pH is <2. May be D002 under §261.22(a)(2) due to the rate of corrosion of metal.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Family Inorganic Salt.

Chemical Name	CAS No	Weight-%
Water	7732-18-5	50-55
Aluminum sulfate	10043-01-3	41-45
Sulfuric acid	7664-93-9	7

4. FIRST-AID MEASURES

First Aid Measures

Eye Contact If in eyes: Rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor/physician if irritation continues.

Skin Contact Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

Inhalation If adverse effects occur, remove to fresh air and observe. If not breathing, give artificial respiration. Seek immediate medical attention/advice.

Ingestion If swallowed, do not induce vomiting. Rinse mouth. Get immediate medical attention.

Most important symptoms and effects

Symptoms Harmful if swallowed, will cause skin burns, eye burns, mucous membrane burns, respiratory system damage.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Aluminum Sulfate will not burn. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Small Fire Move containers from fire area if you can do it without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Large Fire Same procedures as for small fires.

Specific Hazards Arising from the Chemical

Negligible fire hazard.

Hazardous Decomposition Products Oxides of sulfur.

Sensitivity to Mechanical Impact Not sensitive.

Sensitivity to Static Discharge Not sensitive.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Do not release runoff from fire control methods to sewers or waterways.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions Use personal protection recommended in Section 8. Keep unnecessary people away, isolate hazard area and deny entry.

Environmental Precautions Do not release into sewers or waterways. For spills in excess of allowable limits (RQ) notify the National Response Center (800) 424-8802; refer to SARA Title III, Section 313 40 CFR 372, and CERCLA 40 CFR 302 for detailed instructions concerning reporting requirements. Notify Local Emergency Planning Committee (LEPC) and State Emergency Response Commission (SERC) for

a release greater than or equal to Reportable Quantities (RQ). Refer to U.S. SARA Section 304. See Section 12 for additional Ecological Information.

Methods and material for containment and clean up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Clean-Up Small Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on Safe Handling Avoid contact with skin, eyes or clothing. Handle in accordance with good industrial hygiene and safety practice. Wash face, hands and any exposed skin thoroughly after handling. Store and handle in accordance with all current regulations and standards.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep container tightly closed and store in a cool, dry and well-ventilated place. Store with acids. See original container for storage recommendations. Store away from incompatible materials.

Incompatible Materials Alkalis, metals. Alkalis (bases): Violent reaction. Metals: May be corrosive in the presence of moisture.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines No exposure limits noted for aluminum sulfate
Sulfuric acid, ACGIH: 0.2 mg/m3 TWA
Exposure Limits for aluminum metal
NIOSH REL - TWA 10 mg/m3 (total) TWA 5 mg/m3 (resp)
OSHA PEL - TWA 15 mg/m3 (total) TWA 5 mg/m3 (resp)

Appropriate engineering controls

Engineering Controls Apply technical measures to comply with the occupational exposure limits. Ensure adequate ventilation, especially in confined areas. Maintain eye wash fountain and quick-drench facilities in work area.

Individual protection measures, such as personal protective equipment

Eye/Face Protection Wear chemical tight goggles and full face shield.

Skin and Body Protection Wear appropriate chemical resistant clothing including chemical resistant gloves.

Respiratory Protection Seek professional advice prior to respirator selection and use. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen.
WARNING!: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Colorless to clear amber or clear light green liquid
Odor	Negligible
Odor threshold	Not determined
pH	1.9±0.4
Relative density; (specific gravity)	1.3± @15.5 °C
Melting point/freezing point	-13° C / 9° F
Initial boiling point and boiling range	Not relevant
Decomposition temperature	1,400° F ±
Viscosity	5-25 centipoise
Auto-ignition temperature	Not flammable
Evaporation rate;	Similar to water
Flammability (solid, gas)	Not flammable
Flash point	Will not burn
Upper/lower flammability or explosive limits	Will not burn
Partition coefficient: n-octanol/water	Not relevant
Solubility	Soluble in water
Vapor density	Similar to water
Vapor pressure	Similar to water

10. STABILITY AND REACTIVITY

Reactivity
Not reactive under normal conditions.

Chemical Stability
Stable under recommended storage conditions.

Possibility of Hazardous Reactions
None under normal processing.

Hazardous Polymerization
Hazardous polymerization does not occur.

Conditions to Avoid
Protect from freezing. Keep separated from incompatible substances.

Incompatible Materials
Alkalis, metals. Alkalis (bases): Violent reaction. Metals: May be corrosive in the presence of moisture.

Hazardous Decomposition Products
Thermal oxidative decomposition of Aluminum Sulfate occurs at temperatures greater than 1400°F and can produce sulfur oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Eye Contact Causes serious eye damage.
Skin Contact May cause severe skin burns
Inhalation Avoid breathing vapors or mists.
Ingestion Do not taste or swallow. May be harmful if swallowed.

Component Information

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Aluminum Sulfate 10043-01-3	1930 mg/kg (Rat)	-	-
Sulfuric acid 7664-93-9	2140 mg/kg; (Rat)		510 mg/m^3 (Rat)
Water 7732-18-5	> 90 mL/kg (Rat)	-	-

Information on physical, chemical and toxicological effects

Symptoms Please see section 4 of this SDS for symptoms.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Component Carcinogenicity

Sulfuric acid (7664-93-9)

ACGIH: A2 - Suspected Human Carcinogen (contained in strong inorganic acid mists)
IARC: Monograph 54 [1992] (Occupational exposure to mists and vapours from sulfuric acid and other strong inorganic acids) (Group 1 (carcinogenic to humans))
DFG: Category 4 (no significant contribution to human cancer)

Numerical measures of toxicity
Not determined

12. ECOLOGICAL INFORMATION

Ecotoxicity

Component Information

Chemical Name	Algae/aquatic plants	Fish	Invertebrate	Crustacea
Aluminum Sulfate 10043-01-		100: 96 h Carassius auratus mg/L LC50 37: 96 h Gambusia affinis mg/L LC50 static		136: 15 min Daphnia magna mg/L EC50
Sulfuric acid (7664-93-9)		96 Hr LC50 Brachydanio rerio: >500 mg/L [static]	24 Hr EC50 Daphnia magna: 29 mg/L	

Persistence/Degradability
Not determined

Bioaccumulation
Not determined

Mobility
Not determined

Other Adverse Effects
Not determined

13. DISPOSAL CONSIDERATIONS

Waste Treatment Methods

Disposal of Wastes	Disposal should be in accordance with applicable regional, national and local laws and regulations.
Contaminated Packaging	Disposal should be in accordance with applicable regional, national and local laws and regulations.

US EPA Waste Number
EPA Hazardous Waste Code: D002 (Corrosive) if the pH is <2. May be D002 per 40CFR261.22(a)(2) due to the rate of corrosion of steel. The U.S. EPA has not published waste codes for this products components.

14. TRANSPORT INFORMATION

Note Please see current shipping paper for most up to date shipping information, including exemptions and special circumstances. Information also applies to TDG, ADR and RID.

DOT

UN/ID No	UN3264
Proper Shipping Name	Corrosive liquid, acidic, inorganic, n.o.s., (Aluminum Sulfate)
Hazard Class	8
Packing Group	III
Reportable Quantity (RQ)	5000 lb

IATA

UN/ID No	UN3264
Proper Shipping Name	Corrosive liquid, acidic, inorganic, n.o.s., (Aluminum Sulfate)
Hazard Class	8
Packing Group	III

IMDG

UN/ID No	UN3264
Proper Shipping Name	Corrosive liquid, acidic, inorganic, n.o.s., (Aluminum Sulfate)
Hazard Class	8
Packing Group	III

15. REGULATORY INFORMATION

International Inventories

Not determined

Component Analysis

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

ALUMINUM SULFATE (10043-01-3)

CERCLA: 5000 lb RQ; 2270 kg RQ

SULFURIC ACID (7664-93-9)

SARA 302: 1000 lb TPQ

SARA 313: 1.0 % de minimis concentration (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

CERCLA: 1000 lb RQ; 454 kg RQ

SARA 311/312 Hazardous Categories

Acute Health: Yes **Chronic Health:** Yes **Fire:** No **Pressure:** No **Reactive:** No

16. OTHER INFORMATION

	Health Hazards	Flammability	Instability	Special Hazards
NFPA	1	0	0	Not determined

Issue Date 20-Sep-2011
Revision Date: 25 Jan 2019
Revision Note New format

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

RCC-CW000632

SAFETY DATA SHEET
Methyl Isobutyl Carbinol

1. IDENTIFICATION

Product name: Methyl Isobutyl Carbinol

Recommended use of the chemical and restrictions on use
Identified uses: Chemical additive. Chemical intermediate. Frothing agent.

COMPANY IDENTIFICATION
ALTIVIA Ketones & Additives, LLC
1100 Louisiana Street, Suite 4800
Houston, TX 77002
UNITED STATES

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 1-800-424-9300
Local Emergency Contact: 1-800-424-9300

Emergency Response: For Chemical Emergency Spill, Leak, Fire, Exposure, or Accident Call CHEMTREC Day or Night
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1 703-527-3887 (collect calls accepted)

Web Address: www.ALTIVIA.com

2. HAZARDS IDENTIFICATION

Hazard classification
This product is hazardous under the criteria of the Hazardous Products Regulation (HPR) as implemented under the Workplace Hazardous Materials Information System (WHMIS 2015).
Flammable liquids - Category 3
Eye irritation - Category 2A
Specific target organ toxicity - single exposure - Category 3

Label elements
Hazard pictograms

Signal word: **WARNING!**

Hazards
H226 Flammable liquid and vapour
H319 Causes serious eye irritation.

Precautionary statements
Prevention
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ eye protection/ face protection.

Response
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P 312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage
P403 + P235 + P405 Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.

Disposal
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: Methyl isobutyl carbinol
This product is a substance.

Component	CASRN	Concentration
Methyl Isobutyl Carbinol	108-11-2	> 98.0 %
2,6-Dimethyl-4-heptanone	108-83-8	< 2.0 %
Methyl isobutyl ketone	108-10-1	< 1.0 %

4. FIRST AID MEASURES

Description of first aid measures
General advice:
First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Skin contact: Wash off with plenty of water. Suitable emergency safety shower facility should be available in work area.

Eye contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

Most important symptoms and effects, both acute and delayed:
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: Maintain adequate ventilation and oxygenation of the patient. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. The decision of whether to induce vomiting or not should be made by a physician. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Repeated excessive exposure may aggravate preexisting lung disease. Skin contact may aggravate preexisting dermatitis.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Unsuitable extinguishing media: No data available

Special hazards arising from the substance or mixture
Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Do not use direct water stream. May spread fire. Eliminate ignition sources. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Avoid accumulation of water. Product may be carried across water surface spreading fire or contacting an ignition source.

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard. Keep out of sewers. Isolate area. Refer to section 7, Handling, for additional precautionary measures. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Ground and bond all containers and handling equipment. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Removal of ignition sources: Keep away from sources of ignition.

Dust Control: Not applicable

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Small spills: Absorb with materials such as: Sand. Vermiculite. Large spills: Contain spilled material if possible. Collect in suitable and properly labeled containers. Pump with explosion-proof equipment. If available, use foam to smother or suppress. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation.
Keep away from heat, sparks and flame. Avoid contact with eyes. Avoid breathing vapor. No smoking, open flames or sources of ignition in handling and storage area. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Electrically ground and bond all equipment. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation.

Conditions for safe storage: Minimize sources of ignition, such as static build-up, heat, spark or flame.

Storage stability
Steel drums. 24 Month
Bulk 12 Month

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Consult local authorities for recommended exposure limits.

Component	Regulation	Type of listing	Value/Notation
Methyl Isobutyl Carbinol	ACGIH	TWA	25 ppm
	ACGIH	STEL	40 ppm
	ACGIH	TWA	SKIN
	ACGIH	STEL	SKIN
	CA AB OEL	TWA	104 mg/m3 25 ppm
	CA AB OEL	STEL	167 mg/m3 40 ppm
	CA AB OEL	TWA	SKIN
	CA BC OEL	TWA	25 ppm
	CA AB OEL	STEL	SKIN
	CA BC OEL	STEL	40 ppm
	CA BC OEL	TWA	SKIN
	CA BC OEL	STEL	SKIN
	CA ON OEL	TWAEV	104 mg/m3 25 ppm
	CA ON OEL	TWAEV	SKIN
	CA ON OEL	STEV	167 mg/m3 40 ppm
	CA ON OEL	STEV	SKIN
	CA QC OEL	TWAEV	104 mg/m3 25 ppm
	CA QC OEL	TWAEV	SKIN
	CA QC OEL	STEV	167 mg/m3 40 ppm
	CA QC OEL	STEV	SKIN
2,6-Dimethyl-4-heptanone	ACGIH	TWA	25 ppm

	CA AB OEL	TWA	145 mg/m3 25 ppm
	CA BC OEL	TWA	25 ppm
	CA ON OEL	TWAEV	145 mg/m3 25 ppm
	CA QC OEL	TWAEV	145 mg/m3 25 ppm
Methyl isobutyl ketone	ACGIH	TWA	20 ppm
	ACGIH	STEL	75 ppm
	CA AB OEL	TWA	205 mg/m3 50 ppm
	CA AB OEL	STEL	307 mg/m3 75 ppm
	CA BC OEL	TWA	20 ppm
	CA BC OEL	STEL	75 ppm
	CA QC OEL	TWAEV	205 mg/m3 50 ppm
	CA QC OEL	STEV	307 mg/m3 75 ppm

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Methyl isobutyl ketone	108-10-1	methyl isobutyl ketone	Urine	End of shift (As soon as possible after exposure ceases)	1 mg/l	ACGIH BEI

Exposure controls

Engineering controls: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Eye/face protection: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

Skin protection

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Chlorinated polyethylene. Natural rubber ("latex"). Neoprene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Examples of acceptable glove barrier materials include: Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl alcohol ("PVA"). Viton. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus.

The following should be effective types of air-purifying respirators: Organic vapor cartridg

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	Liquid.
Color	Colorless
Odor	Mild
Odor Threshold	No test data available
pH	No test data available
Melting point/range	Not applicable to liquids
Freezing point	-90 °C *Literature*
Boiling point (760 mmHg)	132 °C *Literature*
Flash point	40.56 °C *open cup*
Evaporation Rate (Butyl Acetate = 1)	0.43 *Literature*
Flammability (solid, gas)	Not applicable to liquids
Lower explosion limit	1.0 % vol *Literature*
Upper explosion limit	5.5 % vol *Literature*
Vapor Pressure	No data available
Relative Vapor Density (air = 1)	3.5 *Literature*
Relative Density (water = 1)	0.807 at 20 °C / 20 °C *Literature*
Water solubility	1.7 % at 20 °C *Literature*
Partition coefficient: n-octanol/water	log Pow: 1.57 *estimated*
Auto-ignition temperature	335 °C at 1,013 hPa *Literature*
Decomposition temperature	No test data available
Dynamic Viscosity	5.2 mPa.s at 20 °C *Literature*
Kinematic Viscosity	6.4 mm2/s at 20 °C *Literature*
Explosive properties	Not explosive
Oxidizing properties	No Oxidizing
Molecular weight	102.17 g/mol
Molecular formula	(CH3)2CHCH2CH(OH)CH3

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: No data available

Chemical stability: Thermally stable at recommended temperatures and pressures.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose.

Incompatible materials: Avoid contact with: Acid chlorides. Acids. Oxidizers.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity
Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

LD50, Rat, 2,590 mg/kg OECD 401 or equivalent

Acute dermal toxicity
Prolonged skin contact is unlikely to result in absorption of harmful amounts.

LD50, Rabbit, 2,870 mg/kg OECD 402 or equivalent

Acute inhalation toxicity
Prolonged excessive exposure may cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed.

LC50, Rat, male and female, 4 Hour, vapour, > 16 mg/l

Skin corrosion/irritation
Brief contact may cause slight skin irritation with local redness.
May cause drying and flaking of the skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.
May cause moderate corneal injury.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Sensitization
Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

Specific Target Organ Systemic Toxicity (Repeated Exposure)
In animals, effects have been reported on the following organs:
Kidney.

Carcinogenicity
For the minor component(s) Has caused cancer in some laboratory animals. However, the relevance of this to humans is unknown.

Teratogenicity
For similar material(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Reproductive toxicity
For similar material(s): In animal studies, did not interfere with reproduction.

Mutagenicity
In vitro genetic toxicity studies were negative.

Aspiration Hazard
May be harmful if swallowed and enters airways.

Carcinogenicity

Component	List	Classification
Methyl isobutyl ketone	IARC	Group 2B: Possibly carcinogenic to humans
	ACGIH	A3: Confirmed animal carcinogen with unknown relevance to humans.

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

LC50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 Hour, 359 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), semi-static test, 48 Hour, 337 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
EbC50, Pseudokirchneriella subcapitata (green algae), 96 Hour, Biomass, 147 mg/l, OECD Test Guideline 201 or Equivalent

ErC50, Pseudokirchneriella subcapitata (green algae), 96 Hour, Growth rate inhibition, 334 mg/l, OECD Test Guideline 201 or Equivalent

NOEC, Pseudokirchneriella subcapitata (green algae), 96 Hour, Growth rate, 75.5 mg/l

Toxicity to bacteria
EC50, Bacteria, static test, 3 Hour, Respiration rates., > 100 mg/l, activated sludge test (OECD 209)

Persistence and degradability

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
10-day Window: Pass
Biodegradation: 85 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent

Theoretical Oxygen Demand: 2.82 mg/mg

Chemical Oxygen Demand: 2.43 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	38 - 50 %
10 d	67 - 72 %
20 d	67 - 94 %

Photodegradation
Test Type: Half-life (indirect photolysis)
Sensitization: OH radicals
Atmospheric half-life: 10 Hour
Method: Estimated.

Bioaccumulative potential

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 1.57 estimated

Mobility in soil

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 13 Estimated.

13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR

UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. TRANSPORT INFORMATION

TD ;

Proper shipping name	METHYL ISOBUTYL CARBINOL
UN number	UN 2053
Class	3
Packing group	III

Classification for SEA transport (IMO-IMDG):

Proper shipping name	METHYL ISOBUTYL CARBINOL
UN number	UN 2053
Class	3
Packing group	III
Marine pollutant	No
Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Proper shipping name	Methyl isobutyl carbinol
UN number	UN 2053
Class	3
Packing group	III

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

Canadian Domestic Substances List (DSL)
All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. OTHER INFORMATION

Hazard Rating System
NFPA

Health	Flammability	Instability
1	2	0

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	ACGIH - Biological Exposure Indices (BEI)
CA AB OEL	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
CA BC OEL	Canada. British Columbia OEL
CA ON OEL	Canada. Ontario OELs
CA QC OEL	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
SKIN	Absorbed via skin
STEL	Short term exposure limit
STEV	short-term exposure value
TWA	Time weighted average
TWAEV	time-weighted average exposure value

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

ALTIVIA urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer- specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version
CA

Diesel Fuel

Safety Data Sheet

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Section 1: Identification

1.1. Product identifier

Product form : Mixture

Product Identifier(s) : Diesel Fuel
Heating Oil
Low Sulfur Diesel
Ultra-low Sulfur Diesel
High Sulfur Diesel
Diesel
Fuel Oil #2
Furnace Oil #2
No. 2 Diesel Fuel
Hydrotreated Diesel Fuel
ULSD
Export Diesel
UULSD
Colonial Grade 67
Distillates (petroleum), hydrodesulfurized middle

Other means of identification : A complex combination of hydrocarbons obtained from a petroleum stock by treating with hydrogen to convert organic sulfur to hydrogen sulfide which is removed. It consists of hydrocarbons having carbon numbers predominantly in the range of C11 through C25 and boiling in the range of approximately 205°C to 400°C (401°F to 752°F).

CAS-No. : 64742-80-9

1.2. Recommended use of the chemical and restrictions on use

Use of the substance/mixture : Fuel

1.3. Details of the supplier of the safety data sheet

TotalEnergies Petrochemicals & Refining USA, Inc.
P O Box 674411
Houston, TX 77267-4411

For non-emergency product information:
Phone: 713-483-5000
Email: product.stewardship@totalenergies.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 (Toll Free USA & Canada) / 703-527-3887 (Multiple languages)
TotalEnergies Petrochemicals & Refining USA, Inc.: 1-800-322-3462 (Language: English only)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Flammable liquids Category 3
Acute toxicity (inhalation:dust,mist) Category 4
Skin corrosion/irritation Category 2
Carcinogenicity Category 2
Specific target organ toxicity (single exposure) Category 3 - Narcotic effects
Specific target organ toxicity (repeated exposure) Category 2
Aspiration hazard Category 1
Hazardous to the aquatic environment - Chronic Hazard Category 2

2.2. Label elements

RCC-CW000646

GHS US labeling

Hazard pictograms (GHS-US) :

Signal word (GHS US) : Danger

Hazard statements (GHS-US) :
Flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Harmful if inhaled
May cause drowsiness or dizziness
Suspected of causing cancer
May cause damage to organs (bone marrow, liver, thymus) through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) :
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical, lighting, ventilating equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe mist, spray, vapors.
Wash hands, forearms and face thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.
Wear eye protection, impermeable protective gloves, flame retardant protective clothing.
Specific treatment (see Section 4.1 of SDS or information on this label).
If swallowed: Immediately call doctor, a POISON CENTER.
Do NOT induce vomiting.
If on skin: Wash with plenty of water.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Get medical advice/attention if you feel unwell.
If exposed or concerned: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use water spray or fog, foam, dry chemical to extinguish.
Collect spillage.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents and container in accordance with all local, regional, national and international regulations.

2.3. Hazards not otherwise classified

Other hazards which do not result in classification : Product can accumulate electrostatic charges that may cause fire by electrical discharges.

2.4. Unknown acute toxicity (GHS-US)

Not applicable

2.5. Additional information

Based on professional judgment, inconclusive testing, or sensitive individuals : May cause mild eye irritation.
May cause mild respiratory irritation.

Section 3: Composition/Information on ingredients

3.1. Substance

Not applicable

RCC-CW000647

3.2. Mixture

Where concentrations in this product are displayed as ranges, it is due to batch-to-batch variability.

Name	CAS-No.	% (Weight Percent)
Hydrocarbons (C11 - C20)	-	98 – 100
Naphthalene	91-20-3	< 1
Biphenyl	92-52-4	< 1
Polycyclic Aromatic Compounds	130498-29-2	< 0.5

Section 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). Suspected of causing cancer.

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if irritation persists.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after inhalation : May cause mild respiratory irritation.

Symptoms/effects after skin contact : Causes skin irritation.

Symptoms/effects after eye contact : May cause mild eye irritation.

Symptoms/effects after ingestion : May be fatal if swallowed and enters airways.

Chronic symptoms : Suspected of causing cancer. May cause damage to organs through prolonged or repeated exposure.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Section 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the chemical

Fire hazard : Flammable liquid and vapor.

Explosion hazard : May form flammable/explosive vapor-air mixture.

Hazardous decomposition products in case of fire : Hazardous decomposition products formed under fire conditions: carbon monoxide, carbon dioxide, toxic fumes. Fire will produce dense black smoke.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Emergency procedures for non-emergency personnel : Evacuate unnecessary personnel.

Emergency procedures for emergency responders : Ventilate area.

6.2. Methods and material for containment and cleaning up

For containment : Dike for recovery or absorb with appropriate material. Do not contaminate ground and surface water.

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.3. Reference to other sections

See section 8. Exposure controls/personal protection.

RCC-CW000648

Section 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Handle empty containers with care because residual vapors are flammable. Keep away from heat, sparks, open flames, hot surfaces. - No smoking.

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. No bare lights. No smoking. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing vapors, mist. Use only outdoors or in a well-ventilated area.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Proper grounding procedures to avoid static electricity should be followed. All efforts should be made to prevent any leaks or spills. Storage tanks should be engineered to prevent contact with water resources, as this material could contaminate the water resources. Surface spills can reach groundwater through porous soil or cracked surfaces. The storage tanks should be monitored regularly for leaks. Where spills or leaks are possible, a comprehensive response plan should be developed and implemented.

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : Direct sunlight, flames, heat sources, sparks. Keep in fireproof place. Keep container tightly closed.

Incompatible products : Strong bases. Strong acids.

Incompatible materials : Sources of ignition. Direct sunlight. Heat sources.

Section 8: Exposure controls/personal protection

8.1. Occupational Exposure Limits

The following constituents are the only constituents of the product which have a PEL, TLV, or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Diesel Fuel (64742-80-9)		
USA ACGIH	ACGIH OEL TWA	100 mg/m³ Measured as Inhalable fraction and vapor as total hydrocarbons. ACGIH Skin Notation

Naphthalene (91-20-3)		
USA ACGIH	ACGIH OEL TWA [ppm]	10 ppm
USA OSHA	OSHA PEL (TWA) [1]	50 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	10 ppm
IDLH	IDLH [ppm]	250 ppm

Biphenyl (92-52-4)		
USA ACGIH	ACGIH OEL TWA [ppm]	0.2 ppm
USA OSHA	OSHA PEL (TWA) [1]	1 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	0.2 ppm
IDLH	IDLH	100 mg/m³

8.2. Exposure controls

Appropriate engineering controls : Ensure adequate ventilation.

Personal protective equipment : Avoid all unnecessary exposure.

Hand protection : Impermeable protective gloves. Choosing the proper glove is a decision that depends not only on the type of material, but also on other quality features, which differ for each manufacturer. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection : Chemical goggles or safety glasses.

Skin and body protection : Wear fire/flame resistant/retardant clothing.

Respiratory protection : An approved organic vapor respirator/supplied air or self-contained breathing apparatus must be used when vapor concentration exceeds applicable exposure limits.

Other information : Do not eat, drink or smoke during use.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Color : Straw.

RCC-CW000649

Odor	:	characteristic.
Odor threshold	:	No data available
pH	:	Not applicable
Relative evaporation rate (butyl acetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	600 x slower than ethyl ether
Melting point	:	No data available
Freezing point	:	No data available
Boiling point	:	160 (160 – 354.4) °C
Flash point	:	50 (≥ 50) °C Closed cup
Auto-ignition temperature	:	> 200 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	Not applicable
Vapor pressure	:	< 1 mm Hg @ 20°C
Relative vapor density at 20 °C	:	8 Air = 1
Relative density	:	0.87
Solubility	:	Water: 0.1 – 52 mg/l @ 25°C
Partition coefficient n-octanol/water (Log Kow)	:	No data available
Viscosity, kinematic	:	1 – 5 cSt at 40°C
Viscosity, dynamic	:	No data available
Explosion limits	:	0.4 – 6 vol %

9.2. Other information

VOC content : 100 %

Section 10: Stability and reactivity

10.1. Reactivity

Flammable liquid and vapor.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous polymerization will not occur.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks.

10.5. Incompatible materials

Strong oxidizing agents.

10.6. Hazardous decomposition products

Hazardous decomposition products formed under fire conditions: carbon monoxide, carbon dioxide, toxic fumes. Fire will produce dense black smoke.

Section 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure : Inhalation. Ingestion. Skin and eye contact.

Acute toxicity (oral) : Not classified

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Harmful if inhaled.

Combustion of hydrocarbon substances, like this product, produces potentially toxic gases which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur. Exposure to carbon monoxide gas decreases the ability of the blood to carry oxygen to the body and may be potentially fatal. NIOSH lists the Immediately Dangerous to Life or Health Concentration (IDLH) for carbon monoxide gas as 1200 ppm.

Diesel Fuel (64742-80-9)	
LD50 oral rat	≈ 5000 mg/kg
LD50 dermal rabbit	> 2000 mg/kg
LC50 inhalation rat	4.6 (4.6 – 7.6) mg/l/4h Inhalation form: aerosol (mist)

Skin corrosion/irritation : Causes skin irritation.

RCC-CW000650

Diesel Fuel (64742-80-9)	
Skin Irritation Data	Primary Irritation Index = 4.3-5.6

Serious eye damage/irritation : Not classified
May cause mild eye irritation.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Suspected of causing cancer.
Petroleum middle distillates, like diesel, have been shown to cause skin tumors in mice following repeated and prolonged skin contact. Additionally, this product contains naphthalene, which has been classified as an IARC Group 2B carcinogen (possibly carcinogenic to humans).

IARC has classified diesel engine exhaust emissions as a Class 1 carcinogen - carcinogenic to humans. Prevent exposure to diesel exhaust emissions.

Naphthalene (91-20-3)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen

Polycyclic Aromatic Compounds (130498-29-2)	
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen
Additional information	**This product may contain polycyclic aromatic hydrocarbons, PAHs (also called polynuclear aromatics, PNAs or Aromatic Hydrocarbons, polycyclic), some of which are suspected of causing skin cancer in humans under conditions of poor personal hygiene and prolonged, repeated contact. Wear chemically impervious gloves. Always wash skin with soap and water after skin contact.**

Reproductive toxicity : Not classified

STOT-single exposure : May cause drowsiness or dizziness.

STOT-repeated exposure : May cause damage to organs (bone marrow, liver, thymus) through prolonged or repeated exposure.

Aspiration hazard : May be fatal if swallowed and enters airways.

Potential Adverse human health effects and symptoms : Dizziness. Drowsiness. Causes skin irritation. Harmful if inhaled.

Section 12: Ecological information

12.1. Toxicity

Ecology - general : Toxic to aquatic life with long lasting effects.

Diesel Fuel (64742-80-9)	
LC50 - Fish [1]	21 mg/l Oncorhynchus mykiss 96 h
EC50 - Crustacea [1]	68 mg/l Daphnia magna 48 h
EC50 - Other aquatic organisms [1]	22 mg/l Selenastrum capricornutum 72 h

12.2. Persistence and degradability

Diesel Fuel (64742-80-9)	
Persistence and degradability	Inherently biodegradable.

12.3. Bioaccumulative potential

Diesel Fuel (64742-80-9)	
Partition coefficient n-octanol/water (Log Pow)	> 3.5
Bioaccumulative potential	Not established.

12.4. Mobility in soil

Diesel Fuel (64742-80-9)	
Ecology - soil	It may pass through the soil and is likely to contaminate ground water.

12.5. Other adverse effects

Other information : Avoid release to the environment.

RCC-CW000651

Section 13: Disposal considerations

13.1. Waste treatment methods

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Dispose of contents and container in accordance with all local, regional, national and international regulations.

Additional information : Handle empty containers with care because residual vapors are flammable.

Ecology - waste materials : Avoid release to the environment. Hazardous waste due to toxicity.

Section 14: Transport information

US Transport (DOT) for Bulk Shipments (Non-Bulk Shipments May Differ)

Transport document description (DOT) : UN1202, Diesel fuel, 3 , PGIII

UN or NA Number : UN1202

Proper Shipping Name : Diesel fuel

Primary Hazard Class : 3 - Flammable liquid

Packing Group : PGIII

Hazard labels :

Emergency Response Guide (ERG) Number : 128

In accordance with the definition in 49 CFR § 171.8, a hazardous substance does not include petroleum, including crude oil or any fraction thereof which is not other specifically listed or designated as such in Appendix A to 49 CFR § 172.101. Therefore, this product does not require a RQ designation.

Not a marine pollutant under DOT regulations. International shipments may differ.

Transport by sea (IMDG)

Transport document description (IMDG) : UN 1202 DIESEL FUEL, 3, III, MARINE POLLUTANT (50°C c.c.)

UN Number : UN1202

Proper Shipping Name : DIESEL FUEL

Primary Hazard Class : 3 - Flammable liquids

Packing Group : PGIII

Hazard labels (IMDG) :

EmS-No. (Fire) : F-E - FIRE SCHEDULE Echo - NON-WATER-REACTIVE FLAMMABLE LIQUIDS

EmS-No. (Spillage) : S-E - SPILLAGE SCHEDULE Echo - FLAMMABLE LIQUIDS, FLOATING ON WATER

Stowage category (IMDG) : A

Flash point (IMDG) : 50°C c.c.

MARPOL and US Coast Guard Regulations

Cargo name listed in 46 CFR 30.25, Table 30.25-1 : Oil, fuel: No. 2

Air transport (IATA)

Transport document description (IATA) : UN 1202 Diesel fuel, 3, III

UN Number : UN1202

Proper Shipping Name : Diesel fuel

Primary Hazard Class : 3 - Flammable Liquids

Packing Group : PGIII

Hazard labels (IATA) :

RCC-CW000652

Section 15: Regulatory information

15.1. US Federal regulations

EPA TSCA Status

This product is a substance under TSCA (CAS No. 64742-80-9; Distillates (petroleum), hydrodesulfurized middle).

SARA Section 313 Supplier Notification

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372:

CAS number	Chemical name	Concentration
91-20-3	Naphthalene	< 1%
130498-29-2	Polycyclic Aromatic Compounds	< 0.5%

This product contains Polycyclic Aromatic Compounds (PAC). PACs are listed as a category under SARA 313 and include only specific PACs listed in 40 CFR 372.65(c). The US EPA has established Reporting Threshold for PACs of 100 lbs (40 CFR 372.28). If a facility manufactures, processes, or otherwise uses more than 100 lbs per calendar year of the PAC category SARA 313 reporting is required. See EPA "Emergency Planning and Community Right-to-know Act - Section 313: Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category" (EPA # 260-B-01-03).

This information must be included in all Safety Data Sheets that are copied and distributed for this product. For additional information, see 40 CFR §372.45 Notification About Toxic Chemicals.

SARA Section 311/312 Hazard Classes

Physical hazard - Flammable (gases, aerosols, liquids, or solids)
Physical hazard - Hazard Not Otherwise Classified (HNOC)
Health hazard - Aspiration hazard
Health hazard - Acute toxicity (any route of exposure)
Health hazard - Carcinogenicity
Health hazard - Skin corrosion or Irritation
Health hazard - Specific target organ toxicity (single or repeated exposure)

15.2. International regulations

CANADA

No additional information available

National inventories

Diesel Fuel (64742-80-9)
Listed on or exempt from listing on the AICS (Australian Inventory of Chemical Substances)
Listed on or exempt from listing on the Canadian DSL (Domestic Substances List)
Listed on or exempt from listing on the China Inventory of Existing Chemical Substances (IECSC)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on or exempt from listing on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on or exempt from listing on the Korean ECL (Existing Chemicals List)
Listed on or exempt from listing on NZIoC (New Zealand Inventory of Chemicals)
Listed on or exempt from listing on the Philippines Inventory of Chemicals and Chemical Substances (PICCS)

15.3. US State regulations

California Proposition 65 - This product contains, or may contain, trace quantities of a substance(s) known to the state of California to cause cancer and/or reproductive toxicity, not limited to any that may be listed below.

Naphthalene (91-20-3)	
U.S. - California - Proposition 65 - Carcinogens List	Yes
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
No significant risk level (NSRL)	5.8 µg/day

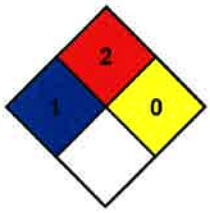
Section 16: Other information

Other information : None.

RCC-CW000653

NFPA (National Fire Protection Association)

NFPA health hazard	: 1
NFPA fire hazard	: 2
NFPA reactivity	: 0



Hazard System Rating

Health	: 1*
Flammability	: 2
Physical Hazard	: 0
Personal protection	: See section 8 of SDS

US OSHA LABEL as specified under 29 CFR §1910.1200 (f). The label shown may include supplemental information in addition to required elements.

Diesel Fuel

TotalEnergies Petrochemicals & Refining USA, Inc.
PO Box 674411
Houston, TX 77267-4411 USA
Tel. 713-483-5000

Danger

Flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Harmful if inhaled
May cause drowsiness or dizziness
Suspected of causing cancer
May cause damage to organs (bone marrow, liver, thymus) through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical, lighting, ventilating equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe mist, spray, vapors.
Wash hands, forearms and face thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Avoid release to the environment.
Wear eye protection, impermeable protective gloves, flame retardant protective clothing.
Specific treatment (see Section 4.1 of SDS or information on this label).
If swallowed: Immediately call doctor, a POISON CENTER.
Do NOT induce vomiting.
If on skin: Wash with plenty of water.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Get medical advice/attention if you feel unwell.
If exposed or concerned: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use water spray or fog, foam, dry chemical to extinguish.
Collect spillage.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental Information

Product can accumulate electrostatic charges that may cause fire by electrical discharges.

RCC-CW000654

US SDS Version: 3.1
Issue date: September 9, 2021

SDS ID: DIESEL
SDS REFERENCE NUMBER: RF0049

SDS Template - TotalEnergies SDS US TEPRI Version 20.00

The information contained in this Safety Data Sheet (SDS) is believed by TotalEnergies Petrochemicals & Refining USA, Inc. (TEPRI) to be accurate on the date issued. However, materials may present unknown hazards and should be used with caution. Final determination of suitability and use of any material is the sole responsibility of the user. Neither TEPRI nor any of its subsidiaries or affiliated companies assumes any liability whatsoever for the accuracy or completeness of the information contained herein or reliance thereto. If the material is repackaged, the user is responsible and must ensure that proper health, safety and other necessary information is included with the material and/or on the container. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING THE MATERIALS OR THE INFORMATION CONTAINED IN THIS SDS. ALTERATION OF THIS DOCUMENT IS STRICTLY PROHIBITED.

RCC-CW000655

Conforms to HazCom 2012/United States

SAFETY DATA SHEET

Quicklime

Section 1. Identification

GHS product identifier : Quicklime

Other means of identification : Snowbright Quicklime, Quicklime, High calcium quicklime, Pebble lime, Hi Cal, Unslaked lime, Calcium Oxide, CaO, Type S, Type N, Calcined limestone, Burnt lime, Chemical lime

Identified uses **:** Water treatment, Caustic agent, pH adjustment, Neutralization, Acid gas absorption, Construction

Supplier's details : Pete Lien & Sons, Inc.
PO Box 440
Rapid City, SD 57702

Emergency telephone number (hours of operation) : (605) 342-7224 (Monday-Friday 8am-5pm)

Section 2. Hazards identification

Classification of the substance or mixture : SKIN IRRITATION - Category 2
EYE DAMAGE - Category 1
SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE [Respiratory System] - Category 3
SPECIFIC TARGET ORGAN TOXICITY REPEAT EXPOSURE [Respiratory System] - Category 1
CARCINOGEN - Category 1A

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Causes skin irritation. Causes serious eye damage. May cause cancer through inhalation. May cause respiratory irritation. Reacts violently with water, releasing heat, which can ignite combustible material. Causes damage to lungs through prolonged and repeated exposure.

Precautionary statements

Prevention : Wear protective gloves/protective clothing/face protection /eye protection. Wash exposed skin thoroughly after handling. Use only outdoors or in a well-ventilated area. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust. Do not eat, drink or smoke when using this product.

Response : IF ON SKIN: Wash exposed skin with plenty of water. If skin irritation occurs: Get medical attention. Take off contaminated clothing and wash it before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention immediately.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Seek medical attention if you feel unwell
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
If exposed or concerned: Get medical advice

Storage : Store to minimize dust generation. Store in a well-ventilated place. Keep container tightly closed.

Disposal : Dispose of contents or containers in accordance with applicable regulations.
Do not use water on material spills.

Hazards not otherwise classified : Calcium oxide reacts violently with water, releasing heat which can ignite combustible materials.

Ingredients with unknown toxicity : Not Applicable

Section 3. Composition/information on ingredients

Substance/mixture : Calcium Oxide (CaO)

CAS number/other identifiers

Component	CAS #	% by weight
Calcium Oxide	1305-78-8	>87
Magnesium Oxide	1309-48-4	<5
Crystalline Silica (Quartz)	14808-60-7	<2.0

Section 4. First aid measures

Description of necessary first aid measures

Eye Contact : Contact can cause severe irritation or burning of eyes, including permanent damage. Immediately flush eyes with generous amounts of water for at least 15 minutes. Pull back the eyelid to ensure that all lime dust has been washed out. Seek medical attention immediately. Do not rub eyes.

Skin Contact : Contact can cause severe irritation or burning of skin, especially in the presence of moisture. Wash exposed area with large amounts of water. Seek medical attention immediately.

Ingestion : This product can cause severe irritation or burning of gastrointestinal tract if swallowed. Do not induce vomiting. Seek medical attention immediately. Never give anything by mouth unless instructed to do so by medical personnel.

Inhalation : This product can cause severe irritation of the respiratory system. Move victim to fresh air. Seek medical attention if necessary. If breathing has stopped, give artificial respiration.

Most important symptoms/effects, acute and delayed : Irritation of skin, eyes, gastrointestinal tract or respiratory tract. Long-term exposure by inhalation may cause permanent damage. This product contains crystalline silica, which has been classified by IARC as (Group I) carcinogenic to humans when inhaled. Inhalation of silica can also cause a chronic lung disorder, silicosis.

Indication of immediate medical attention and special treatment needed, if necessary: See first aid information above. Note to Physicians: Provide general supportive measures and treat symptomatically.

Section 5. Fire-fighting measures

Extinguishing Media : Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of quicklime.

Fire Hazards : Quicklime is not combustible or flammable. However, quicklime reacts violently with water, and can release heat sufficient to ignite combustible materials. Quicklime is not considered to be an explosion hazard, although reaction with water or other incompatible materials may rupture containers. Hazardous Combustion Products: None.

Special Protective Equipment and Fire Fighting Instructions:

Keep personnel away from and upwind of fire. Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (SCBA)

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Spill/Leak Procedures : Do NOT use water on bulk material spills. Lime reacts violently with water, releasing heat. Use proper protective equipment.

Small Spills **:** Use dry methods to collect spilled materials. Avoid generating dust. Do not clean up with compressed air. Store collected materials in dry, sealed plastic or metal containers. Residue on surfaces may be water washed.

Large Spills : Use dry methods to collect spilled materials. Evacuate area downwind of clean-up operations to minimize dust exposure. Store spilled materials in dry sealed plastic or metal containers.

Methods and materials for containment and cleaning up

Containment : For large spills, as much as possible, avoid the generation of dusts. Prevent release to sewers or waterways.

Cleanup : Residual amounts of material can be flushed with large amounts of water. Equipment can be washed with either mild vinegar and water solution, or detergent and water.

Section 7. Handling and storage

Precautions for safe handling

Keep in tightly closed containers. Protect containers from physical damage. Avoid direct skin contact with the material.

Conditions for safe storage, including any incompatibilities

Store in a cool, dry, and well-ventilated location. Do not store near incompatible materials (see Section 10 below). Keep away from moisture. Long-term storage in aluminum containers is not recommended, as calcium oxide may corrode aluminum over long periods of time.

Section 8. Exposure controls/personal protection

Exposure limits

Component	CAS #	Exposure limits
Calcium Oxide	1305-78-8	OSHA PEL: 5mg/m^3
		ACGIH TLV: 2mg/m^3
Magnesium Oxide	1309-48-4	OSHA PEL: 15mg/m^3
		ACGIH TLV: 10mg/m^3
Crystalline Silica	14808-60-7	OSHA PEL: 0.050 mg/m^3 as an 8hr TWA (respirable)
		ACGIH TLV: 0.025 mg/m^3 (respirable)

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
Calcium oxide (CaO) (CAS 1305-78-8)	TWA	2 mg/m3

Impurities	Type	Value	Form
Quartz (CAS 14808-60-7)	TWA	0.05 mg/m3	Respirable dust.

Biological limit values No biological exposure limits noted for the ingredient(s).

Engineering controls : Provide ventilation adequate to maintain PELs.

Individual Protection Measures

Respiratory Protection :Use NIOSH/MSHA approved respirators if airborne concentration exceeds PEL.

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Wear NIOSH approved respirator appropriate for airborne exposure at the point of use.

Skin Protection : Use appropriate gloves to prevent skin contact. When there is a risk of skin contact, wear suitable clothing to prevent such contact. Clothing should fully cover arms and legs.

Eye Protection : Use safety glasses with side shields or safety goggles. Contact lenses should not be worn when working with lime products. When working with powders or dusts, wear dust-proof chemical goggles and face shield unless full facepiece respiratory protection is worn.

Other : Eye wash fountain and emergency showers are recommended
: Wear appropriate thermal protective clothing, when necessary.

Section 9. Physical and chemical properties

Physical State	: Solid
Appearance	: White or grayish-white material
Odor	: Odorless
Odor threshold	: Not applicable
pH at 25 degrees C	: 12.45
Melting point	: 4658°F, 2570°C
Initial boiling point	: 5162°F, 2850°C
Flash point	: Not applicable.
Evaporation rate	: Not applicable.
Flammability (solid, gas)	: Not applicable.
Lower and upper explosive (flammable) limits	: Not applicable.
Vapor pressure	: Not applicable.
Vapor density	: Not applicable.
Relative density	: Not applicable.
Solubility in water	: Negligible, but reacts with water to produce calcium hydroxide and heat
Partition coefficient: n octanol/water	: Not applicable.
Auto-ignition temperature	: Not applicable.
Decomposition temperature	: Not applicable.
Viscosity	: Not applicable.

Section 10. Stability and reactivity

Reactivity : Quicklime reacts violently with water to form calcium hydroxide, releasing heat. See also Incompatibility below

Chemical stability :Quicklime is chemically stable

Possibility of hazardous reactions : See above

Conditions to avoid : Do not allow quicklime to come in contact with incompatible materials. The substance is hygroscopic and will absorb water by contact with the moisture in the air.

Incompatible materials : Quicklime should not be mixed or stored with the following materials, due to the potential for violent reaction and release of heat:

WATER
ACIDS
REACTIVE FLUORIDATED COMPOUNDS
REACTIVE BROMINATED COMPOUNDS
REACTIVE POWDERED METALS
ALUMINUM POWDER
ORGANIC ACID ANHYDRIDES
NITRO-ORGANIC COMPOUNDS

REACTIVE PHOPHOROUS COMPOUNDS
INTERHALOGENATED COMPOUNDS

Hazardous decomposition products **:** None

Section 11. Toxicological Information

Information on the likely routes of exposure: See First Aid discussion in Section 4.
Symptoms related to the physical, chemical and toxicological characteristics: See First Aid discussion in Section 4.
Delayed and immediate effects and also chronic effects from exposure: See First Aid in Section 4.
Carcinogen listing: Quicklime is not listed by MSHA, OSHA, or IARC as a carcinogen, but this product contains crystalline silica, which has been classified by IARC as (Group I) carcinogenic to humans when inhaled

Toxicological data

IARC Monographs. Overall Evaluation of Carcinogenicity

Quartz (CAS 14808-60-7)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Quartz (CAS 14808-60-7)	Known To Be Human Carcinogen.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Quartz (CAS 14808-60-7)	Cancer

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	May cause respiratory irritation.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful.

Section 12. Ecological information

Ecotoxicity	: Because of the high pH of this product, it would be expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems in high concentrations.
Persistence and degradability	**:** Reacts with atmospheric CO_2 over time to form calcium carbonate. The product solely consists of inorganic compounds which are not biodegradable.
Bioaccumulative potential	**:** This material shows no bioaccumulation effects of food chain concentration toxicity.
Mobility in soil	: There is no data available.
Other adverse effects	: This material is alkaline and if released into water or moist soil will cause an increase in pH.

Section 13. Disposal considerations

Dispose of in accordance with all applicable federal, state, and local environmental regulations. If this product as supplied, and unmixed, becomes a waste, it will not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act.

Section 14. Transport information

UN number	: UN1910
UN proper shipping name	**:** Calcium Oxide
Transport hazard class(es)	: When transported by air only: Hazard Class 8-Corrosive
Packing group	: When transported by air only: Packing Group III
Environmental hazards	: This material is alkaline and if released into water or moist soil will cause an increase in pH.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	: Not available.

Special Precautions which a user needs to be aware of , or needs to comply with, in connection with transport or conveyance either within or outside their premises: When being transported by air, quicklime is classified in the Department of Transportation (DOT) regulations as a hazardous material. (49 CFR 172.101). For aircraft transport only, Calcium Oxide is classified as Hazard Class 8-Corrosive, UN1910, Packing Group III. For passenger aircraft, the maximum net quantity allowed per container is 25 kg. For cargo aircraft the maximum net quantity allowed per container is 100kg. For quantities greater than 25kg up to and including 100kg, the container shall be labeled with CARGO AIRCRAFT ONLY. Because express carriers (i.e., Federal Express, Airborne Express, and United Parcel Service) ship by air, quicklime presented to these carriers for shipment must be packaged, marked, and labeled in accordance with IATA requirements, and must be accompanied by the appropriate shipping documentation. Only personnel trained and certified under applicable DOT Hazardous Materials Regulations (contained in Title 49 of the Code of Federal Regulations) may prepare any quicklime product for air transport. Quicklime is not classified as a hazardous material by DOT when transported by means other than air.

Section 15. Regulatory information

National Chemical Inventory Listings:
All Chemical ingredients are listed on the USEPA TSCA Inventory List

US Federal Regulations:

RCRA Hazardous Waste Number: not listed (40 CFR 261.33)
RCRA Hazardous Waste Classification (40 CFR 261): not classified
CERCLA Hazardous Substance (40 CFR 302.4) unlisted specific per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307(a), CAA, Sec. 112
CERCLA Reportable Quantity, not listed.
SARA 311/312 Codes: not listed.
SARA Toxic Chemical (40 CFR 372.65): not listed.

SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed, Threshold Planning Quantity (TPQ): not listed

Specific State Regulations: Consult State and Local authorities for guidance.

State Regulations:

Consult state and local authorities for guidance.

California Proposition 65

WARNING: This product can expose you to SILICA, CRYSTALLINE QUARTZ, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

These naturally occurring impurities may also regulated by other States.
Canadian DSL: Listed
Canadian NPRI: None of the components are listed
CEPA Toxic Substance: None of the components are listed

Section 16. Other information

History

Date of issue (mm/dd/yyyy) : 06/01/2015
Revision date (mm/dd/yy) :09/30/2019
Version : 2

Disclaimer: The information contained in this document applies to this specific material as supplied. Pete Lien & Sons, Inc. believes that the information contained in this SDS is accurate. The suggested precautions and recommendations are based on recognized good work practices and experience as of the date of publication. They are not necessarily all-inclusive or fully adequate in every circumstance as not all use circumstances can be anticipated. The suggestions should not be confused with nor followed in violation of applicable laws, regulation, rules or insurance requirement.

It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for one's own particular use. Since the actual use of the product described herein is beyond our control, Pete Lien & Sons, Inc. , assumes no liability arising out of the use of the product by others. Appropriate warnings and safe handling procedures should be provided to handlers and users. Product must not be used in a manner which could result in harm.

SAFETY DATA SHEET

1. Identification

Product identifier	**Sodium Hydrosulfide Solution**
Other means of identification	
Product number	GENLP-TDC-001-CAN
Recommended use	Product is a unique alkaline material, playing a vital role in many industrial processes.
Recommended restrictions	Use in accordance with supplier's recommendations.
Manufacturer/Importer/Supplier/Distributor information	
Importer	TDC Energy Canada, LTD.
Address	1916 Farmerville Hwy Ruston, LA 71270
Telephone	Customer Service (800) 422-6274
Email	TDCcustomerservice@genlp.com
CHEMTREC:	800-424-9300 (Domestic – North America)
CHEMTREC:	+1-703-527-3887 (International)

2. Hazard identification

Physical hazards	Corrosive to metals	Category 1
Health hazards	Acute toxicity, oral	Category 3
	Skin corrosion/irritation	Category 1B
	Serious eye damage/eye irritation	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 1

Label elements

Signal word	Danger
Hazard statement	May be corrosive to metals. Toxic if swallowed. Causes severe skin burns and eye damage. Very toxic to aquatic life.
Precautionary statement	
Prevention	Keep only in original container. Do not breathe mist or vapour. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Immediately call a poison centre/doctor. Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison centre/doctor. Absorb spillage to prevent material damage.
Storage	Store locked up. Store in corrosive resistant container with a resistant inner liner.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Other hazards	None known.
Supplemental information	None.

3. Composition/information on ingredients

Mixtures

RCC-CW000664

Chemical name	Common name and synonyms	CAS number	%
Sodium hydrosulfide		16721-80-5	5-49
Sodium carbonate		497-19-8	<5
Sodium sulfide		1313-82-2	<5

Composition comments Components not listed are either non-hazardous or are below reportable limits. All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control centre immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control centre immediately.

Ingestion Call a physician or poison control centre immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not give mouth-to-mouth resuscitation. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms/effects, acute and delayed Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Toxic if swallowed. Causes digestive tract burns.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media No restrictions known.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed. Hydrogen sulphide (H2S) may be given off when this material is heated. Do not depend on sense of smell for warning.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Cool containers exposed to heat with water spray and remove container, if no risk is involved.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapour. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up Prevent entry into waterways, sewer, basements or confined areas.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb spillage to prevent material damage. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Recover as much material as possible.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. For waste disposal, see section 13 of the SDS. Recover the product and place in a suitable container for reuse. Neutralization/oxidation of residue using dilute bleach or peroxide. Recover as much product as possible.

Environmental precautions Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

RCC-CW000665

7. Handling and storage

Precautions for safe handling

Do not breathe mist or vapour. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Hydrogen sulfide, a very toxic gas, may be present with this material. Keep face clear of tank and/or tank car openings. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in a cool, dry place out of direct sunlight. Store in corrosive resistant container with a resistant inner liner. Keep only in the original container. Store away from incompatible materials (see Section 10 of the SDS). Protect from heat and direct sunlight. Store at temperature below 150°F. Provide appropriate secondary containment.

8. Exposure controls/personal protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	STEL	5 ppm
	TWA	1 ppm

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	Ceiling	21 mg/m3
		15 ppm
	TWA	14 mg/m3
		10 ppm

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	Ceiling	10 ppm

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	STEL	5 ppm
	TWA	1 ppm

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	STEL	15 ppm
	TWA	10 ppm

Canada. Quebec OELs. (Ministry of Labor - Regulation respecting occupational health and safety)

Components	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	STEL	21 mg/m3
		15 ppm
	TWA	14 mg/m3
		10 ppm

Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21)

Components	Type	Value
Hydrogen sulphide (CAS 7783-06-4)	15 minute	15 ppm
	8 hour	10 ppm

Biological limit values

No biological exposure limits noted for the ingredient(s).

RCC-CW000666

Appropriate engineering controls	Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection	Wear chemical splash goggles and face shield.
Skin protection	
Hand protection	Neoprene gloves are recommended. Wear appropriate chemical resistant gloves.
Other	Wear suitable protective clothing.
Respiratory protection	Do not breathe dust/fume/gas/mist/vapours/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.
Thermal hazards	Wear appropriate thermal protective equipment.
General hygiene considerations	Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state	Liquid.
Form	Liquid.
Colour	Yellow to red to dark green or black.
Odour	Rotten egg or mercaptan odor typical.
Odour threshold	Not available.
pH	11.5 - 12.5
Melting point/freezing point	Not available.
Initial boiling point and boiling range	122.8 - 131.7 °C (253 - 269 °F)
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.

Upper/lower flammability or explosive limits

Explosive limit - lower (%)	4 % (hydrogen sulfide)
Explosive limit – upper (%)	46 % (hydrogen sulfide)
Vapour pressure	17 mm Hg (68 °F (20 °C))
Vapour density	1.17 (Air= 1)
Relative density	1.152 - 1.331 (H20=1)

Solubility(ies)

Solubility (water)	Completely soluble in water.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

Other information

Explosive properties	Not explosive.
Oxidising properties	Not oxidising.
Pounds per gallon	9.6 - 11.1 lb/gal

10. Stability and reactivity

Reactivity	Reacts violently with strong acids. This product will react with oxidizing agents. May be corrosive to metals. Reacts violently with diazonium salts.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Heating this product will evolve toxic fumes of hydrogen sulfide, sulfoxides and sodium oxide. Fire conditions will also cause the production of sulfur dioxide. Contact with acids increases the formation of hydrogen sulfide. Hydrogen sulfide may form flammable mixtures with air. Heating to decomposition emits toxic fumes of sulfoxides and sodium oxide.
Conditions to avoid	Contact with incompatible materials. Do not mix with other chemicals.
Incompatible materials	Acids, alkalis, oxidizing agents, light metals, aldehydes or organic anhydrides. Alkylene oxides. Aldehydes. Alcohols. Glycols. Phenols.
Hazardous decomposition products	Uncontrolled heating of this product will evolve toxic fumes of hydrogen sulfide, sulfoxides and sodium oxide. Fire conditions will also cause the production of sulfur dioxide.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Toxic if swallowed. Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Toxic if swallowed. Causes digestive tract burns. May be harmful in contact with skin.

Information on toxicological effects

Acute toxicity Toxic if swallowed.

Components	Species	Test Results
Sodium carbonate (CAS 497-19-8)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Oral		
LD50	Rat	2080 mg/kg
Sodium hydrosulfide (CAS 16721-80-5)		
Acute		
Oral		
LD50	Rat	100 - 215 mg/kg
Sodium sulfide (CAS 1313-82-2)		
Acute		
Oral		
LD50	Rat	208 mg/kg

Skin corrosion/irritation	Causes severe skin burns.
Serious eye damage/eye irritation	Causes serious eye damage.
Respiratory or skin sensitisation	
Respiratory sensitisation	Not a respiratory sensitiser.
Skin sensitisation	This product is not expected to cause skin sensitisation.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.
Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.

RCC-CW000668

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Further information No other specific acute or chronic health impact noted.

12. Ecological information

Ecotoxicity Very toxic to aquatic life.

Components		Species	Test Results
Sodium carbonate (CAS 497-19-8)			
Aquatic			
Acute			
Crustacea	EC50	Ceriodaphnia dubia	200 mg/l, 48 Hours
Fish	LC50	Lepomis macrochirus	300 mg/l, 96 Hours
Sodium hydrosulfide (CAS 16721-80-5)			
Aquatic			
Acute			
Fish	LC50	Lepomis macrochirus	> 0.0478 mg/l, 96 Hours
Chronic			
Fish	LOAEL	Lepomis macrochirus	> 0.0041 mg/l, 97 days
Sodium sulfide (CAS 1313-82-2)			
Aquatic			
Acute			
Crustacea	LC50	Crustacea	0.08 mg/l, 48 Hours

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Mobility in soil This product is water soluble and may disperse in soil.

Other adverse effects The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]
D003: Waste Reactive material
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

TDG

UN number UN2922

UN proper shipping name CORROSIVE LIQUID, TOXIC, N.O.S. (SODIUM HYDROSULFIDE)

Transport hazard class(es)

Class 8

Subsidiary risk 6.1

Packing group II

Environmental hazards Yes

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IATA

UN number UN2922

RCC-CW000669

UN proper shipping name	Corrosive liquid, toxic, n.o.s. (Sodium hydrosulfide)
Transport hazard class(es)	
Class	8
Subsidiary risk	6.1
Label(s)	8, 6.1
Packing group	II
Environmental hazards	Yes
ERG Code	8P
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN2922
UN proper shipping name	CORROSIVE LIQUID, TOXIC, N.O.S. (SODIUM HYDROSULFIDE)
Transport hazard class(es)	
Class	8
Subsidiary risk	6.1
Packing group	II
Environmental hazards	
Marine pollutant	Yes
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

Canadian regulations This product has been classified in accordance with the hazard criteria of the HPR and the SDS contains all the information required by the HPR.

Controlled Drugs and Substances Act

Not regulated.

Export Control List (CEPA 1999, Schedule 3)

Not listed.

Greenhouse Gases

Not listed.

Precursor Control Regulations

Not regulated.

International regulations

Stockholm Convention

Not applicable.

Rotterdam Convention

Not applicable.

Kyoto Protocol

Not applicable.

Montreal Protocol

Not applicable.

Basel Convention

Not applicable.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes

RCC-CW000670

Country(s) or region	Inventory name	On inventory (yes/no)*
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

Issue date 16-August-2016

Revision date 12-May-2020

Version No. 03

List of abbreviations

EC50: Effective Concentration, 50%.
LOAEC: Lowest observed adverse effect concentration.
LC50: Lethal Concentration, 50%.
IC50: Inhibitory concentration, 50%.
TWA: Time weighted average.
STEL: Short term exposure limit.

Disclaimer

TDC, L.L.C. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

SAFETY DATA SHEET

SDS02976
SODIUM ISOBUTYL XANTHATE

Preparation Date: 14/Aug/2018 Version: 1

1. IDENTIFICATION

Product identifier

Product Name SODIUM ISOBUTYL XANTHATE

Other means of identification

SDS Number SDS02976

Synonyms none

Recommended use of the chemical and restrictions on use

Recommended Use Mining chemicals

Restricted Uses No information available

Initial Supplier Identifier
Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC V6X 1W5
Telephone: 1-866-686-4827

Emergency telephone number

24 Hour Emergency Phone Number (CANUTEC): 1-888-226-8832 (1-888-CAN-UTEC)

2. HAZARD IDENTIFICATION

Hazardous Classification of the substance or mixture

Flammable solids	Category 1
Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A

Label elements

Hazard pictograms

Signal Word: Danger

Hazard statements
FLAMMABLE SOLID
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation

Precautionary Statements

Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower
IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
Rinse mouth

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish

Storage
Store locked up

Disposal
Dispose of contents/container to an approved waste disposal plant

Unknown acute toxicity No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Chemical Name	CAS No	Weight-%	Synonyms
Sodium isobutyl xanthate	25306-75-6	60 - 100%	Sodium isobutyl xanthate

Notes:
The actual percentage concentration has been withheld as a trade secret.

4. FIRST-AID MEASURES

Description of first aid measures

General advice
Show this safety data sheet to the doctor in attendance.

Inhalation
Remove to fresh air.

Eye contact
Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact
Wash skin with soap and water.

Ingestion
Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Call a physician.

Most important symptoms and effects, both acute and delayed:
Harmful if swallowed Causes serious eye irritation Causes skin irritation

Indication of any immediate medical attention and special treatment needed:

Note to physicians
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific hazards arising from the substance or mixture
Self-heating; may catch fire.

Hazardous combustion products
See section 10 for more information.

Special protective equipment and precautions for fire-fighters
Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation.

Environmental precautions

See Section 12 for additional Ecological Information.

Methods and materials for containment and cleaning up

Prevent further leakage or spillage if safe to do so.

7. HANDLING AND STORAGE

Precautions for safe handling

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin and eyes. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Keep at temperatures below 50°C / 122°F.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Limits This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Chemical Name	Alberta OEL	British Columbia OEL	Ontario	Quebec OEL	Exposure Limit - ACGIH	Immediately Dangerous to Life or Health - IDLH
Sodium isobutyl xanthate 25306-75-6	Not available	Not available	Not available	Not available	Not available	Not available

Consult local authorities for recommended exposure limits

Appropriate engineering controls

Engineering controls
Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection
Chemical goggles; also wear a face shield if splashing hazard exists.

Skin and body protection
Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential. Consideration must be given both to durability as well as permeation resistance.

Respiratory protection
If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator.

General hygiene considerations
Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance

Physical state	Solid
Color	Yellow
Odor	Strong Disagreeable.
Odor threshold	0.02-0.21 (Carbon disulfide) ppm

PROPERTIES	Values	Remarks • Method
pH	> 12	
Melting point / freezing point	255-280 °C / 491-536 °F	
Initial boiling point/boiling range	No data available	None known
Flash point	90 °C / 194 °F	
Evaporation rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		
Upper flammability limit:	50%	
Lower flammability limit:	1.25%	
Vapor pressure	No data available	None known
Relative vapor density	No data available	None known
Specific Gravity	1.25	
Water solubility	Soluble in water	
Solubility in other solvents	No data available	None known
Partition coefficient	No data available	
Autoignition temperature	90 °C / 194 °F	
Decomposition temperature	No data available	None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known
Explosive properties	No information available.	
Oxidizing properties	No information available.	

Molecular weight	No information available
VOC Percentage Volatility	No information available
Liquid Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Reactivity/Chemical Stability
Stable under normal conditions

Possibility of hazardous reactions
None under normal processing.

Conditions to avoid
Heat, flames and sparks. Moisture.

Incompatible materials
Acids. Oxidizing agents. Alkalis.

Hazardous decomposition products
None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
Dust may cause irritation to upper respiratory tract (nose and throat). Causes headache, drowsiness or other effects to the central nervous system.

Eye contact
Causes serious eye irritation. Dust contact with the eyes can lead to mechanical irritation.

Skin contact
Causes skin irritation.

Ingestion
Harmful if swallowed. May cause burns of the mouth, throat and stomach.

Information on toxicological effects

Symptoms
No information available.

Numerical measures of toxicity

Acute toxicity

The following values are calculated based on chapter 3.1 of the GHS document .
ATEmix (oral) 556.00 mg/kg

Unknown acute toxicity No information available

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Sodium isobutyl xanthate 25306-75-6	= 500 mg/kg (Rat)	Not available	Not available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation
No information available.

Serious eye damage/eye irritation
No information available.

Respiratory or skin sensitization
No information available.

Germ cell mutagenicity
No information available.

Carcinogenicity
No information available.

Chemical Name	ACGIH	IARC	NTP	OSHA
Sodium isobutyl xanthate 25306-75-6	Not available	Not available	Not available	Not available

Reproductive toxicity
No information available.

Specific target organ systemic toxicity - single exposure
No information available.

Specific target organ systemic toxicity - repeated exposure

No information available.

Aspiration hazard
No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity
The environmental impact of this product has not been fully investigated.

Chemical Name	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Fish Species Data	Toxicity to microorganisms	Crustacea
Sodium isobutyl xanthate 25306-75-6	Not available	Not available	Not available	Not available

Persistence and degradability No information available.

Bioaccumulation No information available.

Chemical Name	Partition coefficient
Sodium isobutyl xanthate 25306-75-6	Not available

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Do not reuse empty containers.

14. TRANSPORT INFORMATION

TDG (Canada):

UN Number	UN3342
Shipping name	XANTHATES
Class	4.2
Packing Group	III
Marine pollutant	Not available.

DOT (U.S.)

UN Number	UN3342
Shipping name	XANTHATES
Class	4.2
Packing Group	III
Marine pollutant	Not available

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Regulatory Rules

Chemical Name	CERCLA/SARA - Section 302:	SARA (311, 312) Hazard Class:	CERCLA/SARA - Section 313:
Sodium isobutyl xanthate - 25306-75-6	Not Listed	Not Listed	Not Listed

International Inventories

TSCA	Complies
DSL/NDSL	Complies

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

NFPA:	**Health hazards** 2	**Flammability** 2	**Instability** 2	**Physical and chemical properties** -
HMIS Health Rating:	**Health hazards** 2	**Flammability** 2	**Physical hazards** 2	**Personal protection** X

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation

Prepared By: The Environment, Health and Safety Department of Univar Canada Ltd.

Preparation Date: 14/Aug/2018
Revision Date: 14/Aug/2018

Disclaimer
NOTICE TO READER:
Univar expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this SDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.

©2015 Univar Inc. All rights reserved. Univar, the hexagon, the Univar logo and MasterLine are the registered trademarks of Univar Inc.

End of Safety Data Sheet

Safety Data Sheet

Sodium Silicate Solution

CAROLINA®
www.carolina.com

Section 1 Product Description

Product Name: Sodium Silicate Solution
Recommended Use: Science education applications
Synonyms: Liquid Glass, Waterglass, Sodium Metasilicate
Distributor: Carolina Biological Supply Company
2700 York Road, Burlington, NC 27215
1-800-227-1150
Chemical Information: 800-227-1150 (8am-5pm (ET) M-F)
Chemtrec: 800-424-9300 (Transportation Spill Response 24 hours)

Section 2 Hazard Identification

Classification of the chemical in accordance with paragraph (d) of §1910.1200;

WARNING

Harmful if swallowed.

GHS Classification:
Acute Toxicity - Oral Category 4

Other Safety Precautions:
May burn eyes
May cause gastrointestinal discomfort.
May cause irritation to respiratory tract.
May cause irritation to skin.

Section 3 Composition / Information on Ingredients

Chemical Name	CAS #	%
Water	7732-18-5	60
Sodium Silicate	1344-09-8	40

Section 4 First Aid Measures

Emergency and First Aid Procedures
Inhalation: In case of accident by inhalation: remove casualty to fresh air and keep at rest.
Eyes: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin Contact: After contact with skin, wash immediately with plenty of water.
Ingestion: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

Section 5 Firefighting Procedures

Extinguishing Media: Use dry chemical, CO2 or appropriate foam.
Fire Fighting Methods and Protection: Firefighters should wear full protective equipment and NIOSH approved self-contained breathing apparatus.
Fire and/or Explosion Hazards: Fire or excessive heat may produce hazardous decomposition products.
Hazardous Combustion Products: Hydrogen

Section 6 Spill or Leak Procedures

Steps to Take in Case Material Is Released or Spilled: Exposure to the spilled material may be irritating or harmful. Follow personal protective equipment recommendations found in Section 8 of this SDS. Additional precautions may be necessary based on special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred. Also consider the expertise of employees in the area responding to the spill. Ventilate the contaminated area. Isolate area. Keep unnecessary personnel away. Remove soiled clothing and launder before reuse. Surfaces may become slippery after spillage. Avoid contact with clothing. Avoid contact with material. Avoid creating and inhaling spray or mist. Avoid contact with skin and eyes. Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation. Neutralize spill with a weak acid such as vinegar or acetic acid Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container

Section 7 Handling and Storage

Handling: Wash thoroughly after handling. Do no eat, drink or smoke when using this product. Avoid creating and inhaling dust. Avoid contact with skin.
Storage: Store in a secure area suitable for corrosives.
Storage Code: Green - general chemical storage

Section 8 Protection Information

	ACGIH		OSHA PEL	
Chemical Name	**(TWA)**	**(STEL)**	**(TWA)**	**(STEL)**
No data available	N/A	N/A	N/A	N/A

Control Parameters

Engineering Measures: No exposure limits exist for the constituents of this product. General room ventilation might be required to maintain operator comfort under normal conditions of use.
Personal Protective Equipment (PPE): Lab coat, apron, eye wash, safety shower.
Respiratory Protection: No respiratory protection required under normal conditions of use.
Respirator Type(s): NIOSH approved air purifying respirator with dust/mist filter.
Eye Protection: Wear chemical splash goggles when handling this product. Have an eye wash station available.
Skin Protection: Avoid skin contact by wearing chemically resistant gloves, an apron and other protective equipment depending upon conditions of use. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work.
Gloves: Nitrile

Section 9 Physical Data

Formula: Na2SiO3 in H2O
Molecular Weight: 100.08 g/mol
Appearance: Colorless to White Viscous Liquid
Odor: None
Odor Threshold: No data available
pH: 11.3
Melting Point: No data available
Boiling Point: 100 C
Flash Point: No data available
Flammable Limits in Air: N/A
Vapor Pressure: N/A
Evaporation Rate (BuAc=1): N/A
Vapor Density (Air=1): N/A
Specific Gravity: approx. 1.3
Solubility in Water: Soluble
Log Pow (calculated): No data available
Autoignition Temperature: No data available
Decomposition Temperature: No data available
Viscosity: No data available
Percent Volatile by Volume: 0%

Section 10 Reactivity Data

Reactivity: No data available
Chemical Stability: Stable under normal conditions.
Conditions to Avoid: None known.
Incompatible Materials: Acids, Ammonium Salts, Aluminum alloys, Zinc
Hazardous Decomposition Products: Hydrogen
Hazardous Polymerization: Will not occur

Safety Data Sheet

Section 11 Toxicity Data

Routes of Entry Inhalation, Ingestion, and Skin contact.
Symptoms (Acute): , Impaired Kidney Function
Delayed Effects: No data available

Acute Toxicity:

Chemical Name	CAS Number	Oral LD50	Dermal LD50	Inhalation LC50
Water	7732-18-5	Oral LD50 Rat 90000 mg/kg		
Sodium Silicate	1344-09-8	Oral LD50 Rat 1960 mg/kg	Dermal LD50 Rabbit > 4640 mg/kg	

Carcinogenicity:

Chemical Name	CAS Number	IARC	NTP	OSHA
No data available	7732-18-5 1344-09-8	Not listed	Not listed	Not listed

Chronic Effects:
Mutagenicity: No evidence of a mutagenic effect.
Teratogenicity: No evidence of a teratogenic effect (birth defect).
Sensitization: No evidence of a sensitization effect.
Reproductive: No evidence of negative reproductive effects.
Target Organ Effects:
Acute: See Section 2
Chronic: Not listed as a carcinogen by IARC, NTP or OSHA.

Section 12 Ecological Data

Overview: Slight ecological hazard. In high concentrations, this product may be dangerous to plants and/or wildlife. Keep out of waterways.
Mobility: No data
Persistence: No data
Bioaccumulation: No data
Degradability: No data
Other Adverse Effects: No data

Chemical Name	CAS Number	Eco Toxicity
Water	7732-18-5	No data available
Sodium Silicate	1344-09-8	96 HR LC50 LEPOMIS MACROCHIRUS 301 - 478 MG/L 96 HR EC50 DAPHNIA MAGNA 216 MG/L

Section 13 Disposal Information

Disposal Methods: Dispose in accordance with all applicable Federal, State and Local regulations. Always contact a permitted waste disposer (TSD) to assure compliance.
Waste Disposal Code(s): Not Determined

Section 14 Transport Information

Ground - DOT Proper Shipping Name:
Not Regulated For Transport

Air - IATA Proper Shipping Name:
Not regulated for air transport by IATA.

Section 15 Regulatory Information

TSCA Status: All components in this product are on the TSCA Inventory.

Chemical Name	CAS Number	§ 313 Name	§ 304 RQ	CERCLA RQ	§ 302 TPQ	CAA 112(2) TQ
No data available	7732-18-5 1344-09-8	No	No	No	No	No

California Prop 65: No California Proposition 65 ingredients

Section 16 Additional Information

Revised: 08/21/2018 **Replaces: 06/15/2018** **Printed: 08-25-2018**

The information provided in this (Material) Safety Data Sheet represents a compilation of data drawn directly from various sources available to us. Carolina Biological Supply makes no representation or guarantee as to the suitability of this information to a particular application of the substance covered in the (Material) Safety Data Sheet.

Glossary

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstract Service Number
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	U.S. Department of Transportation
IARC	International Agency for Research on Cancer
N/A	Not Available
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
IDLH	Immediately dangerous to life and health

A.3 MINE & MISCELLANEOUS SDS

SAFETY DATA SHEET

Version 6.4
Revision Date 06/30/2021
Print Date 07/31/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Ammonium nitrate

Product Number : A3795
Brand : Sigma
CAS-No. : 6484-52-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Oxidizing solids (Category 3), H272
Eye irritation (Category 2A), H319

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H272 May intensify fire; oxidizer.
H319 Causes serious eye irritation.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Precautionary statement(s)	
P210	Keep away from heat.
P220	Keep/Store away from clothing/ combustible materials.
P221	Take any precaution to avoid mixing with combustibles.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$H_4N_2O_3$
Molecular weight	:	80.04 g/mol
CAS-No.	:	6484-52-2
EC-No.	:	229-347-8

Component	Classification	Concentration
Ammonium nitrate		
	Ox. Sol. 3; Eye Irrit. 2A; H272, H319	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

RCC-CW000686

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nitrogen oxides (NOx)
Not combustible.
Has a fire-promoting effect due to release of oxygen.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Keep away from open flames, hot surfaces and sources of ignition.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Away from combustible materials and sources of ignition and heat. TRGS 511 must be observed.

Hygroscopic. Store under inert gas.
Storage class (TRGS 510): 5.1C: Ammonium nitrate and ammonium nitrate containing preparations

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid Color: white
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	4.5 - 6.0 at 80.40 g/l at 25 °C (77 °F)
e)	Melting point/freezing point	Melting point/range: 169 °C (336 °F) - lit.
f)	Initial boiling point and boiling range	210 °C 410 °F - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	Not applicable
l)	Vapor density	2.8
m)	Relative density	No data available
n)	Water solubility	completely soluble
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	No data available
q)	Decomposition temperature	> 180 °C (> 356 °F) -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	The substance or mixture is classified as oxidizing with the category 3.

9.2 Other safety information

Relative vapor	2.8

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

density

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of explosion with:
Alkali metals
aluminium chloride
Ammonia
ammonium compounds
Barium nitrate
combustible substances
carbides
charcoal
chlorates
Chlorites
2,4 Dinitrotoluene
Esters
urea
iron(III) compounds
Potassium
potassium permanganate
Hydrocarbons
copper compounds
Nitro compounds
oils
perchlorates
Powdered metals
powdered aluminium
Reducing agents
Rust
sodium
sodium hypochlorite
sulfur
Wood/Sawdust
sugars
Organic Substances
hypochlorous acid
organic nitro compounds
Aluminum
antimony
Bismuth
Lead
cadmium
chromium
Iron
Copper
magnesium

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Manganese
Nickel
Zinc
Tin
Mild steel
in powder form
Water
with
Heat.
metallic oxides
with
charcoal
Acetic anhydride
with
Nitric acid
Risk of ignition or formation of inflammable gases or vapours with:
potassium dichromate
nitrites
Metals
phosphorus
acetic acid
with
heat
Exothermic reaction with:
metallic chlorides
salts of oxyhalogenic acids
Sulfides
organic nitro compounds
Oxidizing agents
alkalines
nonmetals
Acids

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Metals, Mild steel

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 2,950 mg/kg
(OECD Test Guideline 401)
Symptoms: Nausea, Vomiting, Diarrhea, Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.
LC50 Inhalation - Rat - 4 h - > 88.8 mg/l
Remarks: (IUCLID)
Symptoms: Symptoms may be delayed., mucosal irritations

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

LD50 Dermal - Rat - male and female - > 5,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes. - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Remarks: (IUCLID)

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - NOAEL (No observed adverse effect level) - 256 - 284 mg/kg
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: ammonium sulphate

RTECS: BR9050000

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Gastrointestinal disturbance, Blood disorders
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption of large quantities:

Methaemoglobinaemia with headache, cardiac arrhythmia, drop in blood pressure, dyspnoea, and spasms, key symptom: cyanosis (blue colouration of the blood).

The following applies to ammonium salts in general: after swallowing: local irritation symptoms, nausea, vomiting, diarrhoea. Systemic effect: after the uptake of very large qantities: drop in blood pressure, collapse, CNS disorders, spasms, narcotic conditions, respiratory paralysis, haemolysis.

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Cyprinus carpio (Carp) - 447 mg/l - 48 h Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 490 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	static test ErC50 - diatoms - > 1,700 mg/l - 10 Days Remarks: (in analogy to similar products) The value is given in analogy to the following substances: potassium nitrate
Toxicity to bacteria	EC50 - activated sludge - > 1,000 mg/l - 3 h (OECD Test Guideline 209) Remarks: (in analogy to similar products) The value is given in analogy to the following substances: sodium nitrate

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

Biological effects:
Hazard for drinking water supplies.
Fertilising effect possible.
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 1942 Class: 5.1 Packing group: III
Proper shipping name: Ammonium nitrate
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG

UN number: 1942 Class: 5.1 Packing group: III EMS-No: F-H, S-Q
Proper shipping name: AMMONIUM NITRATE

IATA

UN number: 1942 Class: 5.1 Packing group: III
Proper shipping name: Ammonium nitrate

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Ammonium nitrate	6484-52-2	1993-04-24

SARA 311/312 Hazards

Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.4 Revision Date: 06/30/2021 Print Date: 07/31/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

CCi MANUFACTURING IL CORPORATION
15550 Canal Bank Rd., P.O Box 339, Lemont, IL 60439 U.S.A.
TEL +1-630-739-0606 FAX +1-630-739-1116

Safety Data Sheet

SDS No. LD2900/20001 Revision No. 01
Issue Date: June 10, 2021 Revision Date: August 31, 2021

CCi Coolant/Antifreeze L288LT 50%

SECTION 1: IDENTIFICATION

1.1 Product identifier

Product : CCi Coolant/Antifreeze L288LT 50%
Synonyms : None
Product Part Number: None

1.2 Relevant identified uses of the substance or mixture and advised against

Antifreeze/Coolant

1.3 Detail of the supplier of the safety data sheet

Manufacturer Name CCi MANUFACTURING IL CORPORATION
Address 15550 Canal Bank Road, Lemont, IL 60439
Telephone (630) 739-0606

1.4 Emergency telephone number

INFOTRAC: 1-800-535-5053 - DOMESTIC
1-352-323-3500 - INTERNATIONAL

SECTION 2: HAZARD IDENTIFICATION

2.1 Classification of the substance or mixture

Health Hazard Classification:

Hazard	Category	Code
Acute Toxicity (Oral)	5	H303
Specific Target Organ Toxicity (Repeated/Prolonged Exposure)	2	H373

Physical Hazard Classification:

Not Classified

2.2 Label elements

Hazard Pictograms

GHS07

GHS08

Signal word WARNING

Hazard statements

H303 May be harmful if swallowed
H373 May cause damage to organs (kidneys) through prolonged or repeated exposure

CCi MANUFACTURING IL CORPORATION
15550 Canal Bank Rd., P.O Box 339, Lemont, IL 60439 U.S.A.
TEL +1-630-739-0606 FAX +1-630-739-1116

Safety Data Sheet

SDS No. LD2900/20001 Revision No. 01
Issue Date: June 10, 2021 Revision Date: August 31, 2021

CCi Coolant/Antifreeze L288LT 50%

Precautionary statements

Prevention

P260 Do not breathe mist/vapors/spray.

Response

P312 Call a POISON CENTER or doctor/physician if you feel unwell.

P314 Get medical advice/attention if you feel unwell.

Storage

None

Disposal

P501 Dispose of contents/container in accordance with applicable federal, state and local regulations.

2.3 Other hazards

Data not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Components	CAS No.	Nominal %	Hazard Code
Ethylene Glycol	107-21-1	40 - 50 %	H302, H373
Diethylene Glycol	111-46-6	Less than 5%	H302
Hydrated inorganic acid, organic acid salts	Proprietary	Less than 7%	
Water	7732-18-5	40 - 50%	None

Proprietary items on this SDS are designated as trade secrets. Requests for disclosure of trade secret information will be made in accordance with the provisions contained in OSHA 29 CFR 1910.1200(i).

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Swallowing: If victim is conscious and able to swallow, quickly have victim drink water or milk to dilute. Do NOT give sodium bicarbonate, fruit juices or vinegar. NEVER give anything by mouth if victim is unconscious or having convulsions. Induce vomiting only if advised by physician or Poison Control Center. CALL PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY.

Skin Contact: Immediately flush skin with plenty of water while removing contaminated clothing.

Eye Contact: Immediately flush eyes with plenty of cool water for at least 15 minutes. Do NOT permit victim to rub eyes. GET MEDICAL ATTENTION IMMEDIATELY.

Inhalation: Immediately remove victim to fresh air. If victim has stopped breathing give artificial respiration, preferably mouth-to-mouth. GET MEDICAL ATTENTION IMMEDIATELY.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed

No recommendation given, but first aid may still be required in case of accidental exposure, inhalation or ingestion of this chemical. If in doubt, GET MEDICAL ATTENTION PROMPTLY!

SECTION 5 : FIREFIGHTING MEASURES

5.1 Extinguishing media

Individuals should perform only those firefighting procedures for which they have been trained. Use water spray, dry chemical,

CCi MANUFACTURING IL CORPORATION
15550 Canal Bank Rd., P.O Box 339, Lemont, IL 60439 U.S.A.
TEL +1-630-739-0606 FAX +1-630-739-1116

Safety Data Sheet

SDS No. LD2900/20001 Revision No. 01
Issue Date: June 10, 2021 Revision Date: August 31, 2021

CCi Coolant/Antifreeze L288LT 50%

foam or carbon dioxide. Use water to keep fire-exposed containers cool. If a spill or leak has not ignited, use water spray to disperse the vapors. Water spray may be used to flush spills away from fire and diluted spills to noncombustible proportions(see warning on water spray on hot glycol below.)

5.2 Special hazards arising from the substance or mixture

Data not available

5.3 Advice for firefighters

To prevent possible storage container rupture, do not permit to freeze. Incompatible with strong acids, oxidizers, bases and chromium trioxide, potassium permanganate, and sodium peroxide.

Water spray may cause foaming of hot glycol so indirect application of water spray or use of other extinguishing media should be used on hot glycol.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

For personal protection, see section 8. In case of spills, beware of slippery floors and surfaces.

6.2 Environmental precautions

The product should not be dumped in nature but collected and delivered according to agreement with the local authorities.

6.3 Method and material for containment cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions and safe handling

- Do not expose children and pets to this material.
- After handling product, wash thoroughly with soap and water before drinking, eating, or smoking.
- Keep away from open flames.

7.2 Conditions for safe storage, including any incompatibilities

- To prevent possible storage container rupture, do not permit to freeze. Incompatible with strong acids, oxidizers, bases and chromium trioxide, potassium permanganate, and sodium peroxide.

7.3 Specific end use(s)

The identified uses for this product are detailed in section 1.2.

CCi MANUFACTURING IL CORPORATION
15550 Canal Bank Rd., P.O Box 339, Lemont, IL 60439 U.S.A.
TEL +1-630-739-0606 FAX +1-630-739-1116

Safety Data Sheet

SDS No. LD2900/20001 Revision No. 01
Issue Date: June 10, 2021 Revision Date: August 31, 2021

CCi Coolant/Antifreeze L288LT 50%

SECTION 8 : EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Component	CAS No.	Source	Exposure Limit	Notes
Ethylene glycol	107-21-1	US OSHA	None	None
		US ACGIH	100 mg/m3 TLV	Ceiling Limit for Aerosols Only; A4 - Not classifiable as a human carcinogen
Diethylene Glycol	111-46-6	US OSHA	None	None
		US ACGIH	None	None
		US AIHA (WEEL)	10 mg/m^3	TWA

8.2 Exposure controls

Control Measures : Handle in the presence of adequate ventilation. Engineering controls should be used whenever feasible to maintain concentrations below acceptable exposure criteria, including enclosures and local exhaust ventilation.

Respiratory Protection : Where exposure is likely to exceed acceptable criteria and engineering controls are not feasible, use NIOSH/MSHA approved respiratory protection equipment. Respirators should be selected based on the form and concentration of contaminants in air and in accordance with OSHA (29 CFR 1910.134)

Protective Clothing : Wear gloves and protective clothing which are impervious to the product for the duration of exposure if there is potential for skin contact.

Eye Protection : Wear safety glasses meeting the specifications of ANSI Standard Z87.1 where no contact with the eye is anticipated. Chemical safety goggles meeting the specification of ANSI Standard Z87.1 should be worn whenever there is the possibility of splashing or other contact with the eyes.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information of basic physical and chemical properties

Item	Value/Range
Appearance	Clear, slightly viscous, blue dyed liquid
Odor	No characteristic odor
Odor threshold	Data not available
pH	7.8 (original)
Freezing Point (original)	Lower than -36°C (-34°F)
Initial boiling point and boiling range	Higher than 108°C (226°F)
Flash point	Data not available
Evaporation rate	Data not available
Flammability(Solid, gas)	Data not available
Upper/Lower flammability or explosive limits	Data not available
Vapor pressure	Data not available

CCi MANUFACTURING IL CORPORATION
15550 Canal Bank Rd., P.O Box 339, Lemont, IL 60439 U.S.A.
TEL +1-630-739-0606 FAX +1-630-739-1116

Safety Data Sheet

SDS No. LD2900/20001 Revision No. 01
Issue Date: June 10, 2021 Revision Date: August 31, 2021

CCi Coolant/Antifreeze L288LT 50%

Vapor Density (Air = 1)	Data not available
Density (20°C)	1.07 g/cm^3
Solubility in Water	Infinite miscibility
Partition coefficient n-octanol/water	Data not available
Auto ignition temperature	Data not available
Decomposition temperature	Data not available
Viscosity	Data not available

9.2 Other information
None

SECTION 10 : STABILITY AND REACTIVITY

10.1 Reactivity
Hazardous Polymerization : Not likely to occur

Conditions and Materials to Avoid : Avoid concentrated strong acids, oxidizing agents and bases. Do not expose to open flame.

10.2 Chemical stability
Generally stable

10.3 Possibility of hazardous reactions
Data not available

10.4 Conditions to avoid
Avoid heat, flames and other sources of ignition.

10.5 Incompatible materials
Data not available

10.6 Hazardous decomposition products
Hazardous Decomposition Products : If pyrolyzed, thermal decomposition products of residue may include C, CO, CO2, H2O, NH3, organic vapors and nitrogen-containing.

SECTION 11:TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Inhalation: Breathing excessive levels of the vapor or mist can irritate the respiratory tract. Excessive vapor concentrations of the major component (ethylene glycol), might be generated during heating of this material, have occasionally been reported to cause adverse effects on the blood-forming system and the nervous system.

Ingestion: The acute oral toxicities of the main components of this mixture are as follows:

Ethylene Glycol:

The lowest dose reported to produce death in humans was estimated to be 1,560 mg/kg body weight; for a person weighing 150 pounds, this would be equivalent to drinking about three fluid ounces of pure ethylene glycol in a short period of time.

Acute oral LD50's = 4,700 mg/kg (rat)
5,500 mg/kg (mouse)
1,600 mg/kg (human)

CCi MANUFACTURING IL CORPORATION
15550 Canal Bank Rd., P.O Box 339, Lemont, IL 60439 U.S.A.
TEL +1-630-739-0606 FAX +1-630-739-1116

Safety Data Sheet

SDS No. LD2900/20001 Revision No. 01
Issue Date: June 10, 2021 Revision Date: August 31, 2021

CCi Coolant/Antifreeze L288LT 50%

Diethylene Glycol:
Acute oral LD50's = 12,600 mg/kg (rat)
23,700 mg/kg (mouse)

Eye Contact: Based on the pH and irritation potential of this mixture's constituents, the mist or liquid can be expected to cause mild to moderate irritation or inflammation of the eyes

Skin Contact: The acute dermal LD50 of the major component (ethylene glycol) of this product is 10,600mg/kg(rabbits). Based on the pH and the irritation potential of this mixture's constituents, the mist or liquid can be expected to cause mild to moderate irritation of the skin.

Chronic Effects: No chronic or delayed effects have been identified.
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity
Ecological information of the product : Data not available
Ecological information of the main ingredient of the product:
Ethylene Glycol :
LC50 - Oncorhynchus mykiss (rainbow trout) - 18,500 mg/l - 96 h
Diethylene Glycol :
LC50 - Pimephales promelas (fathead minnow) - 75,200 mg/l - 96 h

12.2 Persistence and degradability
Degradation half life: Readily biodegradable

12.3 Bioaccumulative potential
Bioaccumulative potential: Bioconcentration potential is low.
Comments to bioaccumulation Log Pow: -0,30

12.4 Mobility in soil
Mobility: The product is miscible with water. May spread in water systems.

12.5 Results of PBT and vPvB assessment
PBT assessment results: This substance is not classified as PBT or vPvB.

12.6 Other adverse effects
Other adverse effects / Remarks: None known.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal : Disposal should be made in accordance with applicable federal, state and local regulations. All recovered material should be packaged, labeled, transported, and disposed of or reclaimed in conformance with good engineering practices. Avoid land filling of liquids. Reclaim where possible.

CCi MANUFACTURING IL CORPORATION
15550 Canal Bank Rd., P.O Box 339, Lemont, IL 60439 U.S.A.
TEL +1-630-739-0606 FAX +1-630-739-1116

Safety Data Sheet

SDS No. LD2900/20001 Revision No. 01
Issue Date: June 10, 2021 Revision Date: August 31, 2021

CCi Coolant/Antifreeze L288LT 50%

SECTION 14 : TRANSPORT INFORMATION

14.1 UN number
UN3082

14.2 UN proper shipping name
Environmentally Hazardous Substance Liquid n.o.s. (ethylene glycol)

14.3 Transport hazard class(es)
DOT Classification (Bulk) : Class 9 miscellaneous
DOT Classification (Non-bulk) : Not regulated
IATA (Non-bulk) : Not regulated
IMDG Code (Non-bulk) : Not regulated

14.4 Packaging group
III

14.5 Environmental hazards
Marine pollutant: No
Poison Inhalation Hazard: No

14.6 Special precautions for user
Data not available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Data not available

SECTION 15 : REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Toxic Substance Control Act

This product is a mixture; therefore, it is not listed in the TSCA Inventory of Chemical Substances. All of the components of the mixture are listed in or exempt from the TSCA Inventory of Chemical Substances.

SARA Hazard Categories (as defined in Section 311/312)

Health Immediate (Acute) and Delayed (Chronic)

Physical None

The product contains greater than 40% ethylene glycol (CAS# 107-21-1) which is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

California Proposition 65

WARNING: This product can expose you to chemicals such as Ethylene Glycol which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov/product.

CCi MANUFACTURING IL CORPORATION
15550 Canal Bank Rd., P.O Box 339, Lemont, IL 60439 U.S.A.
TEL +1-630-739-0606 FAX +1-630-739-1116

Safety Data Sheet

SDS No. LD2900/20001 Revision No. 01
Issue Date: June 10, 2021 Revision Date: August 31, 2021

CCi Coolant/Antifreeze L288LT 50%

SECTION 16 : OTHER INFORMATION

NFPA Rating : Health (2) Fire (0) Reactivity (0)

Preparation information: Date of revision: August 31, 2021

The information presented herein is believed to be factual as it has been derived from the works and opinions of people believed to be qualified experts; however, nothing contained in this information is to be taken as a warranty or representation for which CCI MANUFACTURING IL CORPORATION bears legal responsibility. The user should review any recommendation in the specific context of intended use to determine whether they are appropriate.

Safety Data Sheet

According to OSHA HCS 2012 (29 CFR 1910.1200), Health Canada HPR (SOR/2015-17), and Mexico NOM-018-STPS-2015

SECTION 1: Identification

Product Identifier: **Red Line® D4 ATF Automatic/Manual Transmission Fluid/Transaxle Fluid**

Code: **829142**

Issue date: 16-Jul-2021

Relevant identified uses: Automatic Transmission Fluid

Uses advised against: All others

24 Hour Emergency Phone Number: CHEMTREC Global +1 703 527 3887
CHEMTREC United States 1-800-424-9300
CHEMTREC Mexico 01-800-681-9531

Manufacturer/Supplier: RED LINE SYNTHETIC OIL
6100 Egret Court
Benicia, CA 94510

SDS Information: URL: www.phillips66.com/SDS
Phone: 800-762-0942
Email: SDS@P66.com

Technical Information: 1-707-745-6100

SECTION 2: Hazard identification

Classified Hazards
H412 -- Hazardous to the aquatic environment, chronic toxicity -- Category 3

Hazards Not Otherwise Classified (HNOC)
PHNOC: None known

HHNOC: None known

Label elements

H412 - Harmful to aquatic life with long lasting effects

P273 - Avoid release to the environment; P501 - Dispose of contents/ container to an approved waste disposal plant

SECTION 3: Composition/information on ingredients

Chemical Name	CASRN	Concentration[1]
Synthetic Lubricant Base Oil	VARIOUS	<90
Distillates, petroleum, hydrotreated light paraffinic	64742-55-8	2.5-4.99
2-Propanol, 1-(tert-dodecylthio)-	67124-09-8	0.5-0.74

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation: First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects, both acute and delayed: Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea. Prolonged or repeated contact may dry skin and cause irritation.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

SECTION 5: Firefighting measures

NFPA 704: National Fire Protection Association

Health: 0 **Flammability:** 1 **Instability:** 0

0 = minimal hazard
1 = slight hazard
2 = moderate hazard
3 = severe hazard
4 = extreme hazard

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

Special protective actions for fire-fighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods and material for containment and cleaning up: Notify relevant authorities in accordance with all applicable

regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

SECTION 7: Handling and storage

Precautions for safe handling: Wash thoroughly after handling. Keep away from flames and hot surfaces. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

SECTION 8: Exposure controls/personal protection

Occupational exposure limits The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Chemical Name	ACGIH	OSHA	Mexico	Phillips 66
Distillates, petroleum, hydrotreated light paraffinic	TWA-8hr: 5 mg/m^3 STEL: 10 mg/m^3 as Oil Mist, if Generated	---	---	---

State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Biological occupational exposure limits

None.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile rubber

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily

available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and chemical properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Red Transparent
Physical form of product:	Liquid
Odor:	Slight hydrocarbon
Odor threshold:	No data
pH:	Not applicable
Melting / freezing point:	No data
Initial boiling point and boiling range:	No data
Flash point:	> 302 °F / > 150 °C
Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Evaporation Rate (nBuAc=1):	No data
Flammability (solid, gas):	Not applicable
Upper Explosive Limits (vol % in air):	No data
Lower Explosive Limits (vol % in air):	No data
Vapor pressure:	<1 mm Hg
Vapor density:	>1
Relative density:	0.84 @ 60ºF (15.6ºC)
Solubility(ies):	Insoluble
Partition coefficient n-octanol /water (log KOW):	No data
Autoignition temperature:	No data
Decomposition temperature:	No data
Viscosity:	7.4 cSt @ 100°C; 35 cSt @ 40°C
Molecular weight:	No data

Other information

Particle Size:	No data
Pour point:	No data
Bulk density	7.0 lbs/gal

SECTION 10: Stability and reactivity

Reactivity: Not chemically reactive.

Chemical stability: Stable under normal ambient and anticipated conditions of use.

Possibility of Hazardous Reactions: Hazardous reactions not anticipated.

Conditions to Avoid: Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

Incompatible Materials: Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

SECTION 11: Toxicological information

Information on Toxicological Effects

Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful		>5 mg/L (mist, estimated)
Dermal	Unlikely to be harmful		> 2 g/kg (estimated)

Oral	Unlikely to be harmful		> 5 g/kg (estimated)

Likely Routes of Exposure: Inhalation, eye contact, skin contact

Aspiration Hazard: Not expected to be an aspiration hazard

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation.

Skin Sensitization: No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Specific Target Organ Toxicity (Repeated Exposure): No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Carcinogenicity: No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

Information on Toxicological Effects of Components

Distillates, petroleum, hydrotreated light paraffinic

Carcinogenicity: This oil has been highly refined by a variety of processes to reduce aromatics and improve performance characteristics. It meets the IP-346 criteria of less than 3 percent PAH's and is not considered a carcinogen by the International Agency for Research on Cancer.

SECTION 12: Ecological information

GHS Classification:
H412 -- Hazardous to the aquatic environment, chronic toxicity -- Category 3
Harmful to aquatic life with long lasting effects.

Toxicity: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Persistence and Degradability: Synthetic base oils are not considered to be readily biodegradable but may be inherently biodegradable. They are expected to completely biodegrade over extended periods of time.

Bioaccumulative Potential: Not expected to bioaccumulate.

Mobility in Soil: Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, this material will float and spread over the surface at a rate dependent upon viscosity. The main fate process is expected to be slow biodegradation of individual components in soil and sediment.

Other adverse effects: None anticipated.

SECTION 13: Disposal considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally

regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

SECTION 14: Transport information

UN Number: Not regulated
UN proper shipping name: None
Transport hazard class(es): None
Packing Group: None
Environmental Hazard(s): This product does not meet the DOT/UN/IMDG/IMO criteria of a marine pollutant
Special precautions for user: If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

SECTION 15: Regulatory information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds)
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CERCLA/SARA - Section 313 and 40 CFR 372
This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

EPA (CERCLA) Reportable Quantity (in pounds)
This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

International Inventories
TSCA (United States): All ingredients are on the inventory or exempt from listing.
All components are either on the DSL, or are exempt from DSL listing requirements.

SECTION 16: Other information

Issue date	Previous Issue Date:	SDS Number	Status:
16-Jul-2021	02-Jun-2020	829142	FINAL

Revised Sections or Basis for Revision:
Product Name / Synonyms (Section 1)

Mexican NOM-018-STPS-2015:
The information within is considered correct but is not exhaustive and will be used for guidance only, which is based on the current knowledge of the substance or mixture and is applicable to the appropriate safety precautions for the product.

Precautionary Statements
P273 - Avoid release to the environment
P501 - Dispose of contents/ container to an approved waste disposal plant

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; HPR = Hazardous Products Regulations; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Gasoline Blending Component

Safety Data Sheet

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Section 1: Identification

1.1. Product identifier

Product form : Mixture

Product Identifier(s) : Gasoline Blending Component
Uncertified CBOB
Gasoline

1.2. Recommended use of the chemical and restrictions on use

Use of the substance/mixture : Only for use as a blend component of gasoline. Not for use as a finished gasoline.

1.3. Details of the supplier of the safety data sheet

TotalEnergies Petrochemicals & Refining USA, Inc.
P O Box 674411
Houston, TX 77267-4411

For non-emergency product information:
Phone: 713-483-5000
Email: product.stewardship@totalenergies.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 (Toll Free USA & Canada) / 703-527-3887 (Multiple languages)
TotalEnergies Petrochemicals & Refining USA, Inc.: 1-800-322-3462 (Language: English only)

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Flammable liquids Category 1
Skin corrosion/irritation Category 2
Serious eye damage/eye irritation Category 2A
Germ cell mutagenicity Category 1B
Carcinogenicity Category 1A
Reproductive toxicity Category 2
Specific target organ toxicity (single exposure) Category 3 - Narcotic effects
Specific target organ toxicity (single exposure) Category 3 - Respiratory irritation
Specific target organ toxicity (single exposure) Category 2
Specific target organ toxicity (repeated exposure) Category 1
Specific target organ toxicity (repeated exposure) Category 2
Aspiration hazard Category 1
Hazardous to the aquatic environment - Chronic Hazard Category 2

2.2. Label elements

GHS US labeling

Hazard pictograms (GHS-US) :

Signal word (GHS US) : Danger

Hazard statements (GHS-US) : **Extremely flammable liquid and vapor**
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
May cause drowsiness or dizziness

RCC-CW000711

May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
May cause damage to organs (central nervous system, brain (neurological))
Causes damage to organs (blood, hematopoietic system [blood forming], immune system, peripheral nervous system, hearing loss, color vision, brain (neurological), kidneys, central nervous system) through prolonged or repeated exposure
May cause damage to organs (respiratory system, liver) through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) : Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical, lighting, ventilating equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe spray, mist, vapors.
Wash hands, forearms and face thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear flame retardant protective clothing, impermeable protective gloves, eye protection, respiratory protection.
Specific treatment (see Section 4.1 of SDS or information on this label).
If swallowed: Immediately call doctor, a POISON CENTER.
Do NOT induce vomiting.
If on skin: Wash with plenty of soap and water.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Get medical advice/attention if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use water spray or fog, dry chemical to extinguish.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents and container in accordance with all local, regional, national and international regulations.

2.3. Hazards not otherwise classified

Other hazards which do not result in classification : Product can accumulate electrostatic charges that may cause fire by electrical discharges.

2.4. Unknown acute toxicity (GHS-US)

Not applicable

2.5. Additional information

No additional information available

Section 3: Composition/Information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Where concentrations in this product are displayed as ranges, it is due to batch-to-batch variability.

Name	CAS-No.	% (Weight Percent)
Other hydrocarbons (C4- C14)	-	15 – 30
n-Octane and Octane Isomers	-	10 – 30
heptane, n-heptane	142-82-5	0 – 20
Toluene	108-88-3	4 – 15

RCC-CW000712

Nonane Isomers not including n-Nonane	-	5 – 15
Xylene	1330-20-7	2 – 10
Hexane isomers, excluding n-hexane	-	0 – 10
Ethylbenzene	100-41-4	0.1 – 5
n-pentane	109-66-0	0 – 5
Isopentane	78-78-4	0 – 5
n-Hexane	110-54-3	0.1 – 5
1,2,4-trimethylbenzene	95-63-6	0.1 – 3
Benzene	71-43-2	0.1 – 2
Cumene	98-82-8	0.1 – 2
Naphthalene	91-20-3	0.1 – 1
Nonane	111-84-2	< 1

Section 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center/doctor/physician if you feel unwell.

First-aid measures after skin contact : Rinse skin with water/shower. Remove/Take off immediately all contaminated clothing. Wash with plenty of soap and water. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical advice/attention.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if irritation persists.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Immediately call a poison center or doctor/physician.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects : Suspected of damaging fertility or the unborn child. Causes damage to organs.

Symptoms/effects after inhalation : May cause respiratory irritation. May cause drowsiness or dizziness.

Symptoms/effects after skin contact : Causes skin irritation. Skin inflammation is characterized by itching, scaling, reddening or, occasionally, blistering.

Symptoms/effects after eye contact : Causes serious eye irritation. Inflammation of the eye is characterized by redness, watering and itching.

Symptoms/effects after ingestion : May be fatal if swallowed and enters airways. Breathing difficulties.

Chronic symptoms : May cause cancer. May cause genetic defects.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

Section 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the chemical

Fire hazard : Extremely flammable liquid and vapor.

Explosion hazard : May form flammable/explosive vapor-air mixture.

Hazardous decomposition products in case of fire : Carbon oxides (CO, CO2). Toxic fumes. Fire will produce dense black smoke.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Emergency procedures for non-emergency personnel : Evacuate unnecessary personnel.

Emergency procedures for emergency responders : Ventilate area. Eliminate all ignition sources if safe to do so. Stop leak if safe to do so.

6.2. Methods and material for containment and cleaning up

For containment : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Contain large spillage with sand or earth. Do not contaminate ground and surface water.

RCC-CW000713

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.3. Reference to other sections

See section 8. Exposure controls/personal protection.

Section 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Handle empty containers with care because residual vapors are flammable.

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor. No bare lights. No smoking. Take precautionary measures against static discharge. Use only non-sparking tools. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Eliminate all ignition sources if safe to do so. Never siphon by mouth. Use only outdoors or in a well-ventilated area. Do not breathe vapors, mist, spray. DO NOT fill container while container is in vehicle.

Hygiene measures : Wash hands, forearms and face thoroughly after handling. Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Ground/bond container and receiving equipment. Use explosion-proof electrical, ventilating, lighting equipment. All efforts should be made to prevent any leaks or spills. Storage tanks should be engineered to prevent contact with water resources, as this material could contaminate the water resources. Surface spills can reach groundwater through porous soil or cracked surfaces. The storage tanks should be monitored regularly for leaks. Where spills or leaks are possible, a comprehensive response plan should be developed and implemented.

Storage conditions : Keep only in the original container in a cool, well ventilated place away from : flames, heat sources, sparks. Keep in fireproof place. Keep container tightly closed.

Incompatible products : Strong bases. Strong acids. Strong oxidizing agents. Strong reducing agents.

Incompatible materials : Sources of ignition. Direct sunlight. Heat sources.

Section 8: Exposure controls/personal protection

8.1. Occupational Exposure Limits

The following constituents are the only constituents of the product which have a PEL, TLV, or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Gasoline Blending Component		
USA ACGIH	ACGIH OEL TWA [ppm]	300 ppm Based on Gasoline
USA ACGIH	ACGIH OEL STEL [ppm]	500 ppm Based on Gasoline

n-Octane and Octane Isomers (-)		
USA ACGIH	ACGIH OEL TWA [ppm]	300 ppm
USA OSHA	OSHA PEL (TWA) [1]	2350 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	500 ppm
IDLH	IDLH [ppm]	1000 ppm (10% LEL)

heptane, n-heptane (142-82-5)		
USA ACGIH	ACGIH OEL TWA [ppm]	400 ppm
USA ACGIH	ACGIH OEL STEL [ppm]	500 ppm
USA ACGIH	Remark (ACGIH)	TLV® Basis: CNS impair; URT irr
USA OSHA	OSHA PEL (TWA) [1]	2000 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	500 ppm
IDLH	IDLH [ppm]	750 ppm

Toluene (108-88-3)		
USA ACGIH	ACGIH OEL TWA [ppm]	20 ppm
USA ACGIH	Remark (ACGIH)	TLV® Basis: Visual impair; female repro; pregnancy loss. Notations: A4 (Not classifiable as a Human Carcinogen); BEI
USA OSHA	OSHA PEL (TWA) [2]	200 ppm
USA OSHA	OSHA PEL C [ppm]	300 ppm
USA OSHA	Remark (OSHA)	See 29 CFR 1910.1000 TABLE Z-2.
IDLH	IDLH [ppm]	500 ppm

RCC-CW000714

Xylene (1330-20-7)		
USA ACGIH	ACGIH OEL TWA [ppm]	100 ppm
USA ACGIH	ACGIH OEL STEL [ppm]	150 ppm
USA ACGIH	Remark (ACGIH)	TLV® Basis: URT & eye irr; CNS impair. Notations: A4 (Not classifiable as a Human Carcinogen); BEI
USA OSHA	OSHA PEL (TWA) [1]	435 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	100 ppm
IDLH	IDLH [ppm]	900 ppm

Hexane isomers, excluding n-hexane (-)		
USA ACGIH	ACGIH OEL TWA [ppm]	500 ppm
USA ACGIH	ACGIH OEL STEL [ppm]	1000 ppm
IDLH	IDLH [ppm]	1100 ppm (10% LEL)

Ethylbenzene (100-41-4)		
USA ACGIH	ACGIH OEL TWA [ppm]	20 ppm
USA OSHA	OSHA PEL (TWA) [1]	435 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	100 ppm
IDLH	IDLH [ppm]	800 ppm (10% LEL)

n-pentane (109-66-0)		
USA ACGIH	ACGIH OEL TWA [ppm]	1000 ppm (Pentane, all isomers)
USA OSHA	OSHA PEL (TWA) [1]	2950 mg/m³ (Pentane, all isomers)
USA OSHA	OSHA PEL (TWA) [2]	1000 ppm (Pentane, all isomers)
IDLH	IDLH [ppm]	1500 ppm (10% LEL)

Isopentane (78-78-4)		
USA ACGIH	ACGIH OEL TWA [ppm]	1000 ppm (Pentane, all isomers)
USA OSHA	OSHA PEL (TWA) [1]	2950 mg/m³ (Pentane, all isomers)
USA OSHA	OSHA PEL (TWA) [2]	1000 ppm (Pentane, all isomers)

n-Hexane (110-54-3)		
USA ACGIH	ACGIH OEL TWA [ppm]	50 ppm
USA OSHA	OSHA PEL (TWA) [2]	500 ppm
IDLH	IDLH [ppm]	1100 ppm (10% LEL)

1,2,4-trimethylbenzene (95-63-6)		
USA ACGIH	ACGIH OEL TWA	123 mg/m³ Trimethylbenzene, all isomers
USA ACGIH	ACGIH OEL TWA [ppm]	25 ppm Trimethylbenzene, all isomers

Benzene (71-43-2)		
USA ACGIH	ACGIH OEL TWA [ppm]	0.5 ppm
USA ACGIH	ACGIH OEL STEL [ppm]	2.5 ppm
USA OSHA	OSHA PEL (TWA) [2]	1 ppm
USA OSHA	OSHA PEL (STEL) [2]	5 ppm
USA OSHA	Remark (OSHA)	(see 29 CFR 1910.1028)
IDLH	IDLH [ppm]	500 ppm

Cumene (98-82-8)		
USA ACGIH	ACGIH OEL TWA [ppm]	50 ppm
USA ACGIH	Remark (ACGIH)	TLV® Basis: Eye, skin, & URT irr; CNS impair
USA OSHA	OSHA PEL (TWA) [1]	245 mg/m³
USA OSHA	OSHA PEL (TWA) [2]	50 ppm
IDLH	IDLH [ppm]	900 ppm (10% LEL)

Naphthalene (91-20-3)		
USA ACGIH	ACGIH OEL TWA [ppm]	10 ppm
USA OSHA	OSHA PEL (TWA) [1]	50 mg/m³

RCC-CW000715

USA OSHA	OSHA PEL (TWA) [2]	10 ppm
IDLH	IDLH [ppm]	250 ppm

Nonane (111-84-2)		
USA ACGIH	ACGIH OEL TWA [ppm]	200 ppm

8.2. Exposure controls

Appropriate engineering controls : Ensure adequate ventilation.

Personal protective equipment : Avoid all unnecessary exposure.

Hand protection : Impermeable protective gloves. Choosing the proper glove is a decision that depends not only on the type of material, but also on other quality features, which differ for each manufacturer. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection : Chemical goggles or safety glasses.

Skin and body protection : Wear fire/flame resistant/retardant clothing.

Respiratory protection : An approved organic vapor respirator/supplied air or self-contained breathing apparatus must be used when vapor concentration exceeds applicable exposure limits.

Other information : Do not eat, drink or smoke during use.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Color : Colorless. Amber or red, if dyed.

Odor : characteristic.

Odor threshold : 83 ppm Weighted average

pH : Not applicable

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : < 30 Slower than ethyl ether

Melting point : < -60 °C

Freezing point : No data available

Boiling point : 27 (27 – 225) °C

Flash point : < -35 °C (closed cup)

Auto-ignition temperature : 280 – 470 °C (at 1013 hPa)

Decomposition temperature : No data available

Flammability (solid, gas) : No data available

Vapor pressure : 500 – 700 mm Hg at 21°C

Relative vapor density at 20 °C : 3 – 4 Air = 1

Relative density : 0.75

Solubility : Water: 30 – 100 mg/l (at 20 °C)

Partition coefficient n-octanol/water (Log Kow) : No data available

Viscosity, kinematic : < 1 cSt at 40°C

Viscosity, dynamic : No data available

Explosion limits : No data available

9.2. Other information

VOC content : 100 %

Section 10: Stability and reactivity

10.1. Reactivity

Flammable liquid and vapor.

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous polymerization will not occur.

RCC-CW000716

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Sparks. Heat. Overheating. Open flame.

10.5. Incompatible materials

Strong acids. Strong bases. Strong oxidizing agents. Strong reducing agents.

10.6. Hazardous decomposition products

Hazardous decomposition products formed under fire conditions: carbon monoxide, carbon dioxide, toxic fumes. Fire will produce dense black smoke.

Section 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure : Inhalation. Ingestion. Skin contact. Eye contact.

Acute toxicity (oral) : Not classified

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Not classified

Combustion of hydrocarbon substances, like this product, produces potentially toxic gases which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur. Exposure to carbon monoxide gas decreases the ability of the blood to carry oxygen to the body and may be potentially fatal. NIOSH lists the Immediately Dangerous to Life or Health Concentration (IDLH) for carbon monoxide gas as 1200 ppm.

Gasoline Blending Component	
LD50 oral rat	> 14000 mg/kg Based on gasoline
LD50 dermal rabbit	> 3.9 mg/kg Based on gasoline
LC50 inhalation rat	> 5 mg/l/4h Based on gasoline

Skin corrosion/irritation : Causes skin irritation.

Serious eye damage/irritation : Causes serious eye irritation.

The eye irritation classification is based upon evaluation of data of the product components

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : May cause genetic defects.

Mutagenic classification based on the benzene content of this material

Carcinogenicity : May cause cancer.

Classification based on the components

IARC has classified gasoline exhaust emissions as a Class 2B - possibly carcinogenic to humans. Prevent exposure to gasoline exhaust emissions.

Gasoline Blending Component	
IARC group	2B - Possibly carcinogenic to humans
Ethylbenzene (100-41-4)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	Not listed
Benzene (71-43-2)	
IARC group	1 - Carcinogenic to humans
National Toxicology Program (NTP) Status	Known Human Carcinogens
OSHA Carcinogen Status	In OSHA Specifically Regulated Carcinogen list
Additional information	**Benzene is a known human carcinogen and is known to cause acute myeloid leukemia & myelodysplastic syndrome (disease that affects the bone marrow and blood) in humans who have been repeatedly exposed to benzene.**
Naphthalene (91-20-3)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen
Cumene (98-82-8)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen

Reproductive toxicity : Suspected of damaging fertility or the unborn child.

Classification as a reproductive hazard is based on n-hexane and toluene content.

RCC-CW000717

STOT-single exposure	:	May cause drowsiness or dizziness. May cause respiratory irritation. May cause damage to organs (central nervous system, brain (neurological)). Classification based on the components
STOT-repeated exposure	:	Causes damage to organs (blood, hematopoietic system [blood forming], immune system, peripheral nervous system, hearing loss, color vision, brain (neurological), kidneys, central nervous system) through prolonged or repeated exposure. May cause damage to organs (respiratory system, liver) through prolonged or repeated exposure. Classification based on the components
Aspiration hazard	:	May be fatal if swallowed and enters airways.
Potential Adverse human health effects and symptoms	:	Dizziness. Drowsiness. Causes skin and eye irritation. Harmful if swallowed.

Section 12: Ecological information

12.1. Toxicity

Ecology - general	:	Toxic to aquatic life with long lasting effects.
Ecology - air	:	Product evaporates when in contact with the air.
Ecology - water	:	The product spreads out on the surface of the water, a small fraction of the constituents may be dissolved.

Gasoline Blending Component	
LC50 - Fish [1]	8.2 (8.2 – 10) g/l Based on Isomerate and Alkylate
EC50 - Crustacea [1]	4.5 mg/l Based on Light Straight Run Naphtha
ErC50 algae	3.1 mg/l

12.2. Persistence and degradability

Gasoline Blending Component	
Persistence and degradability	Inherently biodegradable.

12.3. Bioaccumulative potential

Gasoline Blending Component	
Partition coefficient n-octanol/water (Log Pow)	2 – 7
Bioaccumulative potential	Not established.

12.4. Mobility in soil

Gasoline Blending Component	
Ecology - soil	It may pass through the soil and is likely to contaminate ground water. Avoid sub-soil penetration.

12.5. Other adverse effects

Other information	:	Avoid release to the environment.

Section 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods	:	Recycle the material as far as possible.
Product/Packaging disposal recommendations	:	Dispose in a safe manner in accordance with local/national regulations. Dispose of contents and container in accordance with all local, regional, national and international regulations.
Additional information	:	Handle empty containers with care because residual vapors are flammable.
Ecology - waste materials	:	Avoid release to the environment.

Section 14: Transport information

US Transport (DOT) for Bulk Shipments (Non-Bulk Shipments May Differ)

Transport document description (DOT)	:	UN1203, Gasoline, 3 , PGII, Marine Pollutant (Heptanes, Octanes)
UN or NA Number	:	UN1203
Proper Shipping Name	:	Gasoline
Primary Hazard Class	:	3 - Flammable liquid
Packing Group	:	PGII
Hazard labels	:	
Emergency Response Guide (ERG) Number	:	128

RCC-CW000718

Marine Pollutant : Marine Pollutant (Heptanes, Octanes)

In accordance with the definition in 49 CFR § 171.8, a hazardous substance does not include petroleum, including crude oil or any fraction thereof which is not other specifically listed or designated as such in Appendix A to 49 CFR § 172.101. Therefore, this product does not require a RQ designation.

Transport by sea (IMDG)

Transport document description (IMDG) : UN 1203 GASOLINE, 3, II, MARINE POLLUTANT (-35°C c.c.)
UN Number : UN1203
Proper Shipping Name : GASOLINE
Primary Hazard Class : 3 - Flammable liquids
Packing Group : PGII
Hazard labels (IMDG) :

EmS-No. (Fire) : F-E - FIRE SCHEDULE Echo - NON-WATER-REACTIVE FLAMMABLE LIQUIDS
EmS-No. (Spillage) : S-E - SPILLAGE SCHEDULE Echo - FLAMMABLE LIQUIDS, FLOATING ON WATER
Stowage category (IMDG) : E
Flash point (IMDG) : -35°C c.c.

MARPOL and US Coast Guard Regulations

Cargo name listed in 46 CFR 30.25, Table 30.25-1 : Gasolines: Automotive

Air transport (IATA)

Transport document description (IATA) : UN 1203 Gasoline, 3, II
UN Number : UN1203
Proper Shipping Name : Gasoline
Primary Hazard Class : 3 - Flammable Liquids
Packing Group : PGII
Hazard labels (IATA) :

Section 15: Regulatory information

15.1. US Federal regulations

EPA TSCA Status

All components of this mixture are listed on TSCA.

This product contains at least one chemical subject to TSCA 12(b) export notification if product is shipped outside the U.S.

TSCA 12(b) Export Notification	Chemical name	CAS-No.
	Nonane	111-84-2

RCC-CW000719

SARA Section 313 Supplier Notification

This product contains the following toxic chemical or chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372:

CAS number	Chemical name	Concentration
108-88-3	Toluene	4 – 15%
1330-20-7	Xylene	2 – 10%
110-54-3	n-Hexane	0.1 – 5%
95-63-6	1,2,4-trimethylbenzene	0.1 – 3%
100-41-4	Ethylbenzene	0.1 – 5%
71-43-2	Benzene	0.1 – 2%
91-20-3	Naphthalene	0.1 – 1%
98-82-8	Cumene	0.1 – 2%

This information must be included in all Safety Data Sheets that are copied and distributed for this product. For additional information, see 40 CFR §372.45 Notification About Toxic Chemicals.

SARA Section 311/312 Hazard Classes

Health hazard - Skin corrosion or Irritation
Physical hazard - Hazard Not Otherwise Classified (HNOC)
Physical hazard - Flammable (gases, aerosols, liquids, or solids)
Health hazard - Serious eye damage or eye irritation
Health hazard - Reproductive toxicity
Health hazard - Germ cell mutagenicity
Health hazard - Carcinogenicity
Health hazard - Specific target organ toxicity (single or repeated exposure)
Health hazard - Aspiration hazard

15.2. International regulations

CANADA

No additional information available

National inventories

No additional information available

15.3. US State regulations

California Proposition 65 - This product contains a substance or substances known to the state of California to cause cancer and/or reproductive toxicity, not limited to any that may be listed below.

Toluene (108-88-3)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
No significant risk level (NSRL)	7,000 µg/day (oral); 13,000 µg/day (inhalation)

n-Hexane (110-54-3)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Yes
No significant risk level (NSRL)	28,000 µg/day (oral); 20,000 µg/day (inhalation)

Ethylbenzene (100-41-4)	
U.S. - California - Proposition 65 - Carcinogens List	Yes
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
No significant risk level (NSRL)	54 µg/day (inhalation)

Benzene (71-43-2)	
U.S. - California - Proposition 65 - Carcinogens List	Yes

RCC-CW000720

U.S. - California - Proposition 65 - Developmental Toxicity	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Yes
No significant risk level (NSRL)	6.4 µg/day (oral)

Naphthalene (91-20-3)	
U.S. - California - Proposition 65 - Carcinogens List	Yes
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
No significant risk level (NSRL)	5.8 µg/day

Cumene (98-82-8)	
U.S. - California - Proposition 65 - Carcinogens List	Yes
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No

Section 16: Other information

Other information : None.

NFPA (National Fire Protection Association)

NFPA health hazard : 1
NFPA fire hazard : 3
NFPA reactivity : 0

Hazard System Rating

Health : 1*
Flammability : 3
Physical Hazard : 0
Personal protection : See section 8 of SDS

RCC-CW000721

US OSHA LABEL as specified under 29 CFR §1910.1200 (f). The label shown may include supplemental information in addition to required elements.

Gasoline Blending Component

TotalEnergies Petrochemicals & Refining USA, Inc.
PO Box 674411
Houston, TX 77267-4411 USA
Tel. 713-483-5000

Danger

Extremely flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
May cause drowsiness or dizziness
May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
May cause damage to organs (central nervous system, brain (neurological))
Causes damage to organs (blood, hematopoietic system [blood forming], immune system, peripheral nervous system, hearing loss, color vision, brain (neurological), kidneys, central nervous system) through prolonged or repeated exposure
May cause damage to organs (respiratory system, liver) through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical, lighting, ventilating equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe spray, mist, vapors.
Wash hands, forearms and face thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear flame retardant protective clothing, impermeable protective gloves, eye protection, respiratory protection.
Specific treatment (see Section 4.1 of SDS or information on this label).
If swallowed: Immediately call doctor, a POISON CENTER.
Do NOT induce vomiting.
If on skin: Wash with plenty of soap and water.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing.
Get medical advice/attention if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use water spray or fog, dry chemical to extinguish.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents and container in accordance with all local, regional, national and international regulations.

Supplemental Information

Product can accumulate electrostatic charges that may cause fire by electrical discharges.

US SDS Version: 5.1
Issue date: September 9, 2021

SDS ID: GASOLINE_BLND_COMP
SDS REFERENCE NUMBER: RF0144

SDS Template - TotalEnergies SDS US TEPRI Version 20.00

RCC-CW000722

The information contained in this Safety Data Sheet (SDS) is believed by TotalEnergies Petrochemicals & Refining USA, Inc. (TEPRI) to be accurate on the date issued. However, materials may present unknown hazards and should be used with caution. Final determination of suitability and use of any material is the sole responsibility of the user. Neither TEPRI nor any of its subsidiaries or affiliated companies assumes any liability whatsoever for the accuracy or completeness of the information contained herein or reliance thereto. If the material is repackaged, the user is responsible and must ensure that proper health, safety and other necessary information is included with the material and/or on the container. NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE MADE REGARDING THE MATERIALS OR THE INFORMATION CONTAINED IN THIS SDS. ALTERATION OF THIS DOCUMENT IS STRICTLY PROHIBITED.

RCC-CW000723

SAFETY DATA SHEET

POWERNEL PLUS

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:	**POWERNEL PLUS**
CHEMICAL FAMILY NAME:	Explosive Ammonium Nitrate Mixture
PRODUCT DESCRIPTION:	Blasting Operations
U.N. NUMBER:	UN 0332
U.N. DANGEROUS GOODS CLASS:	Explosive, Blasting, Type E, PGII
SUPPLIER/MANUFACTURER'S NAME:	**Nelson Brothers Mining Services, LLC**
ADDRESS:	222 South Gillette Ave., Suite 410, Gillette, WY82716 USA
EMERGENCY PHONE:	**TOLL-FREE in USA/Canada** 1-800-424-9300 Chemtrec
BUSINESS PHONE:	1-205-414-2900 (Product Information)
DATE OF PREPARATION:	August 22, 2013
DATE OF LAST REVISION:	May 17, 2016

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Product Description: This product is a white, creamy paste that is explosive with no to a slight odor.

Health Hazards: May cause skin, eye or contaminated tissue irritation. Ingestion may result in adverse effects on the the blood system (methemoglobinemia and cyanosis). May cause allergic respiratory reaction in sensitive individuals.

Flammability Hazards: This product is not flammable, but can act to initiate or sustain the combustion of combustible materials. Do not fight fire involving these products or other explosive materials.

Reactivity Hazards: These products may explode when exposed to extreme heat or other explosives (Class 1.1).

Environmental Hazards: Negligible

Emergency Considerations: Emergency responders must wear the proper personal protective equipment (and have appropriate fire-suppression equipment) suitable for the situation to which they are responding.

US DOT SYMBOLS

CANADA (WHMIS) SYMBOLS

Excluded From WHIMIS

GHS Hazard Symbols

Signal Word: **Danger!**

GHS LABELING AND CLASSIFICATION:

CLASSIFICATION OF SUBSTANCE OR MIXTURE IN ACCORDANCE WITH 29 CFR 1200 (OSHA HCS) AND THE EUROPEAN UNION DIRECTIVES:

This product does meet the definition of a hazardous substance or preparation as defined by 29 CFR 1910. 1200 AND the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.

EC# 229-347-8 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 231-791-2 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 265-156-6 Annex I Index# 649-466-00-2 (See note below)
CAS# 9044-27-4 is not listed in ESIS
Note: EC# 265-156-6 is Severely Hydrotreated Distillate with less than 3 % DMSO extract as measured by IP 346

GHS Hazard Classification(s):

Acute Oral Toxicity Category 4
Skin Irritant Category 2
STOT RE Category 3

Hazard Statement(s):

H302: Harmful if swallowed
H315: Causes skin irritation
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled

Precautionary Statement(s):

P260: Do not breath dust/fume/gas/mist/vapors/spray
P264: Wash hands thoroughly after handling
P270: Do not eat, drink or smoke when using this product

H335: May cause respiratory irritation difficulties if inhaled

P271: Use only in well ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: These products may irritate or burn contaminated eyes, skin, mouth, throat, and other contaminated tissues. Ingestion, skin absorption, and injection of these products may cause nausea, vomiting, headache, flushing, weakness, cyanosis and faintness. Severe ingestion overexposure may be fatal.

CHRONIC: Prolonged or repeated skin overexposure may cause dermatitis (dry, red skin). Due to the presence of Ammonium Nitrate in these products, sensitization and allergic respiratory reaction may occur in susceptible individuals.

TARGET ORGANS: ACUTE: Eye, respiratory System, Skin CHRONIC: Skin

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	GHS HAZARD CLASSIFICATION(S);
Ammonium Nitrate, Solution	6484-52-2	229-347-8	0216	70 - 80%	H272: Ox Liq. Cat 3, H315: Skin Irrit. Cat 2, H319: Eye Irrit. Cat 2, H335; STOT SE Cat 3
Water	7732-18-5	231-791-2	Not Listed	10 – 20%	Not Classified
Distillates (petroleum), Hydrotreated heavy naphthenic	64742-53-6	265-156-6	Not Listed	1 – 10%	H351: Carcinogenic Cat 2
Polyisobutylene Highly Reacted	9044-27-4	Not Listed in ESIS	Not Listed	1 - 2%	Not Classified
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: This product has been classified in accordance with the hazard criteria of OSHA 29CFR1910.1200 and the SDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

SECTION 4 - FIRST-AID MEASURES

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek immediate medical attention.

SKIN CONTACT: Wash skin thoroughly after handling. Seek immediately medical attention if irritation occurs. Remove contaminated clothing. Launder contaminated clothing before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing dificulty continues.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, or respiratory system problems may be aggravated by exposure to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: Not Applicable

AUTOIGNITION TEMPERATURE: Not Applicable

FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): Not Applicable Upper (UEL): Not Applicable

FIRE EXTINGUISHING MATERIALS: NEVER FIGHT EXPLOSIVE FIRES: For incipient fires use extinguishing materials suitable for surrounding fire. Carbon dioxide, foam, dry chemical, halon, water spray, sand, limestone powder.

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire,these products may decompose and produce irritating fumes and toxicgases (e.g., carbon dioxide, carbon monoxide, and nitrogen oxides).

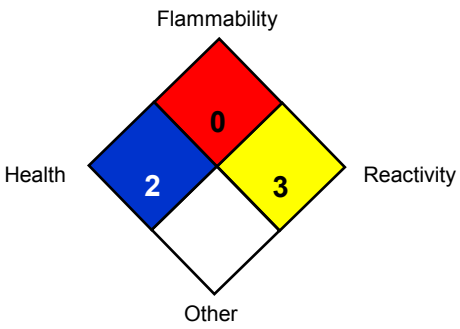
These products are not flammable, but are oxidizing liquids, which can act to initiate and sustain the combustion of flammable materials, especially if the solution is allowed to evaporate to dryness on combustibles. Contact with these products and combustible materials may cause fire.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive

SPECIAL FIRE-FIGHTING PROCEDURES: NEVER FIGHT EXPLOSIVE FIRES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM	
HEALTH HAZARD (BLUE)	2
FLAMMABILITY HAZARD (RED)	0
PHYSICAL HAZARD (YELLOW)	1

PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8

For Routine Industrial Use and Handling Applications

Hazard Scale: **0** = Minimal **1** = Slight **2** = Moderate **3** = Serious **4** = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: In case of a release, clear the affected area and protect people.

SPILLS: DO NOT attempt spill clean up under conditions of potential contamination by a Class 1.1 Explosive; contact the appropriate local or state explosive material authorities. Otherwise, these products are very insensitive explosives and uncontrolled releases should be responded to by appropriately trained personnel in proper personal protective equipment, using pre-planned procedures.

In the event of a non-incidental release, minimum Personal Protective Equipment should be **Level C: gloves, safety goggles, boots, and coveralls.** If the concentration of oil mist or ammonia are above the TLVs (oil mist = 5 mg/m3; ammonia = 17 mg/m3) or if the oxygen level is below 19.5 percent, **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard-hat, and Self-Contained Breathing Apparatus should be worn.** Pick up or sweep up spilled product with a vacuum, non-sparking shovels, or other non-sparking tools. Decontaminate the area thoroughly. Arrangements should be made for safe, controlled detonation or neutralization of the spilled material by an approved authority or company. If necessary, contact the manufacturer or your local waste regulatory authority for specific suggestions regarding these arrangements.

U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations and those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations).

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors/mists/sprays generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: Explosive materials pose such significant hazards that specific rules have been developed for their use. All employees who handle this material should be trained to handle it safely. Ensure that proper safety distances are maintained. Use non-sparking tools and avoid open flames. Open containers slowly on a stable surface. Containers of these products must be properly labeled. Empty containers may contain residual amounts of these products; therefore, empty containers should be handled with care.

Store containers in a location that is isolated, well-constructed, weather-resistant, fire-resistant, and theft-resistant. Storage of explosive materials must conform with 27 CFR 55.201−224. The storage location should conform to the isolation area set forth in the American Table of Distances (27 CFR 55.218).

Store away from incompatible materials (see Section 10, Stability and Reactivity). Material should be stored in secondary containers or in a diked area, as appropriate. Keep container tightly closed when not in use. If appropriate, post warning signs in storage and use areas. Inspect all incoming containers before storage to ensure containers are properly labeled and not damaged. Licensed manufacturers must legibly identify by marking all explosive materials manufactured for sale or distribution (27 CFR 55.109). A licensee or permit must be posted on the business premises where explosive materials are manufactures, imported, or distributed (27 CFR 55.101).

The Institute of Makers of Explosives (IME) has published the “Suggested Code of Regulations for the Manufacture, Transportation, Storage, Sale, Possession, and Use of Explosive Materials”. The following are some important provisions from Article 6 of this Code for the use of explosives:

Under the regulations of the Bureau of Alcohol, Tobacco, and Firearms, personnel handling explosive materials will be at least 21 years of age and possess a permit or be at least 18 years of age and be supervised by a permit holder.

While explosive materials are being handled or used, smoking will not be permitted and no one near the explosive material will possess matches, open light, or fire or flame-producing devices, except that the blaster may possess a device for the specific purpose of igniting the safety fuse.

Do not handle explosive materials under the influence of liquor, narcotics, or drugs.

Explosive materials must be used in a manner that is consistent with the recommendations and instructions of the manufacturer. Refer to “Instructions and Warnings” found in the shipping case of these products or contact the manufacturer.

For additional information, refer to 27 CFR 55, “Commerce in Explosives” and IME publication, “Suggested Code of Regulations for the Manufacture, Transportation, Storage, Sale, Possession, and Use of Explosive Materials”.

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	WEEL
Ammonium Nitrate, Solution	6484-52-2	Not Listed	Not Listed	Not Listed
Distillates (petroleum), Hydrotreated heavy naphthenic	64742-53-6	5 mg/m³ Oil Mists	5 mg/m³ Oil Mists	5 mg/m³ Oil Mists

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided above. Use local exhaust ventilation to control airborne vapor. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses or chemical goggles as appropriate to prevent eye contact. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use chemical resistant gloves to prevent skin contact. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE (Physical State) and COLOR: White creamy paste with no to slight odor
ODOR: Slight
ODOR THRESHOLD: Not Available
pH: Not Applicable
FREEZING POINT: Not Available
BOILING POINT: >210°C
FLASH POINT: Non-Flammable
EVAPORATION RATE (n-BuAc=1): Not Applicable
FLAMMABILITY (SOLID, GAS): Not Available
UPPER/LOWER FLAMMABILITY OR EXLOSION LIMITS: Not Available
VAPOR PRESSURE (mm Hg @ 20°C (68°F): Not Applicable
VAPOR DENSITY: Not Applicable
RELATIVE DENSITY: Not Available
SPECIFIC GRAVITY: 1.20 – 1.25
SOLUBILITY IN WATER: Non-Soluble
WEIGHT PER GALLON: Not Available
PARTITION COEFFICENT (n-octanol/water): Not Available
AUTO-IGNITION TEMPERATURE: Not Available
DECOMPOSITION TEMPERATURE: Not Available
VISCOSITY: Not Applicable

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Stable under normal environmental conditions. The following information is from the Bureau of Mines Test Report or PowerNel 1500. It is representative for all products covered in this MSDS.

TEST	NUMBER OF TRIALS	CONDITIONS	RESULT
Thermal Stability	1	75°C (167°F)/48 hours	Stable
Blasting Cap Sensitivity	3	/////////	No Detonation
Impact Sensitivity	10	10 inches	No Explosion
Differential Thermal Analysis	3	under 100°C (212°F)	No Exothermic Reaction
Electrostatic Sensitivity	3	/////////	No Ignition
Package Drop	3	7.5” X 50 lb bag/4 foot drop	No Rupture or Loss of Contents
Package Burn Test	1	7.5” X 50 lb bag	No Explosion
Large Scale Vented Bomb Bonfire	2	/////////	No Explosion

DECOMPOSITION PRODUCTS: When heated to decomposition this product produces carbon dioxide, carbon monoxide and nitrogen oxides.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Oil, charcoal, flammable and combustible materials, strong acids, chlorates, fluorocarbon lubricants, sodium nitrates, strong reducing agents, corrosive liquids, chlorates, sulfur, finely divided metals, coke, cork, sawdust, phosphorus, urea, potassium permanganate.

HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: Exposure or contact to extreme temperatures, incompatible chemicals.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is not available for this product:
CAS# 6484-52-2
LD50 (Oral-Rat) 2217 mg/kg
LD50 (Unreported-Mouse) 2085 mg/kg
LD50 (Oral-Rat) 2217 mg/kg
LD50 (Unreported-Mouse) 2085 mg/kg
SUSPECTED CANCER AGENT: None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies. This product contains a severely hydrotreated distillate with less than 3 % DMSO extract as measured by IP 346 and is not considered a carcinogen.
IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.
SENSITIZATION OF PRODUCT: The Ammonium Nitrate component of these products may cause sensitization and allergic in susceptible individuals.
REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.
ENVIRONMENTAL STABILITY: These products are expected to slowly degrade in ambient environmental conditions.
EFFECT OF MATERIAL ON PLANTS or ANIMALS: Releases of large amount of these products may adversely affect contaminated plant and animal life.
EFFECT OF CHEMICAL ON AQUATIC LIFE: Releases of large amounts of these products may adversely affect contaminated aquatic plant and animal life.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.
RCRA WASTE CODE: D001 (Ignitable-Oxidizer)
EU WASTE CODE: To be determined based on usage and contamination.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:
THIS PRODUCT IS CLASSIFIED AS DANGEROUS GOODS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.
PROPER SHIPPING NAME: Explosive, Blasting, Type E
HAZARD CLASS NUMBER and DESCRIPTION: 1.5D (Explosives 1.5)
UN IDENTIFICATION NUMBER: UN 0332
PACKING GROUP: PGII
DOT LABEL(S) REQUIRED: Explosive 1.5
NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2012): 112
MARINE POLLUTANT: This product does not contain ingredients that are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)
TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:
This product is classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):
This product is classified as Dangerous Goods, by rules of IATA:
INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:
This product is classified as Dangerous Goods by the International Maritime Organization.
EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):
This product is classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows:

SARA 313: Ammonium Nitrate (Nitrate Compounds) CAS# 6484-52-2 <80%

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes Chronic Health: Yes Fire: Yes Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not Applicable

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): None of the ingredients are on the California Proposition 65 lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDSL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: Explosives (within the meaning of the Explosives Act) are excluded from WHMIS and are exempt from the HPA & CPR requirements (HPA 12).

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory if Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett GHS MSDS Compliance PLUS

Disclaimer: The information and recommendations in this document are accurate to the best of our knowledge. User must conduct their own tests to determine the suitability of these products for their particular purposes. Because of numerous factors affecting results, Nelson Brothers Mining Services, LLC MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR PURPOSE, other than the material conforms to our applicable current specifications. Nelson Brothers, LLC assumes no legal responsibility for use or reliance on the information contained in this Safety Data Sheet.

End of SDS Sheet

Safety Data Sheet

According to OSHA HCS 2012 (29 CFR 1910.1200), Health Canada HPR (SOR/2015-17), and Mexico NOM-018-STPS-2015

SECTION 1: Identification

Product Identifier:	**Phillips 66 Guardol SCA 15W-40**
Code:	**832004**
Issue date:	01-Sep-2021
Relevant identified uses:	Heavy Duty Diesel Engine Oil
Uses advised against:	All others
24 Hour Emergency Phone Number:	CHEMTREC Global +1 703 527 3887 CHEMTREC United States 1-800-424-9300 CHEMTREC Mexico 01-800-681-9531
Manufacturer/Supplier:	Phillips 66 Lubricants A Division of Phillips 66 Company P.O. Box 421959 Houston, Texas 77242-1959
SDS Information:	URL: www.phillips66.com/SDS Phone: 800-762-0942 Email: SDS@P66.com
Customer Service:	U.S.: 800-368-7128 or International: 1-832-765-2500
Technical Information:	1-877-445-9198

SECTION 2: Hazard identification

Classified Hazards
No classified hazards

Hazards Not Otherwise Classified (HNOC)
PHNOC: None known

HHNOC: None known

Label elements

No classified hazards

SECTION 3: Composition/information on ingredients

Substance	CASRN	Concentration[1]
Lubricant Base Oil (Petroleum)	VARIOUS	<95

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation: First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects, both acute and delayed: Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea. Prolonged or repeated contact may dry skin and cause irritation.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

SECTION 5: Firefighting measures

NFPA 704: National Fire Protection Association

Health: 0 **Flammability:** 1 **Instability:** 0

0 = minimal hazard
1 = slight hazard
2 = moderate hazard
3 = severe hazard
4 = extreme hazard

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

Special protective actions for fire-fighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods and material for containment and cleaning up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or

RCC-CW000733

disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

SECTION 7: Handling and storage

Precautions for safe handling: Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. Used motor oils have been shown to cause skin cancer in mice after repeated application to the skin without washing. Brief or intermittent skin contact with used motor oil is not expected to cause harm if the oil is thoroughly removed by washing with soap and water. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

SECTION 8: Exposure controls/personal protection

Occupational exposure limits

Substance	ACGIH	OSHA	Mexico	Phillips 66
Lubricant Base Oil (Petroleum)	TWA: 5mg/m^3 STEL: 10 mg/m^3 as Oil Mist, if Generated	---	---	---

State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Biological occupational exposure limits

None.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye/face protection is not normally required; however, good industrial hygiene practice suggests the use of eye protection that meets or exceeds ANSI Z.87.1 whenever working with chemicals.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile rubber

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and chemical properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Brown
Physical form of product:	Liquid
Odor:	Petroleum
Odor threshold:	No data
pH:	Not applicable
Melting / freezing point:	No data
Initial boiling point and boiling range:	No data
Flash point:	428 °F / 220 °C
Method:	Cleveland Open Cup (COC), ASTM D92
Evaporation Rate (nBuAc=1):	No data
Flammability (solid, gas):	Not applicable
Upper Explosive Limits (vol % in air):	No data
Lower Explosive Limits (vol % in air):	No data
Vapor pressure:	No data
Vapor density:	>1 (air = 1)
Relative density:	No data
Solubility(ies):	Negligible
Partition coefficient n-octanol /water (log KOW):	No data
Autoignition temperature:	No data
Decomposition temperature:	No data
Viscosity:	15.5 cSt @ 100°C; 110 cSt @ 40°C
Molecular weight:	No data

Other information

Particle Size:	No data
Pour point:	No data
Bulk density	No data

SECTION 10: Stability and reactivity

Reactivity: Not chemically reactive.

Chemical stability: Stable under normal ambient and anticipated conditions of use.

Possibility of Hazardous Reactions: Hazardous reactions not anticipated.

Conditions to Avoid: Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

Incompatible Materials: Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use. During use in engines, contamination of oil with low levels of hazardous fuel combustion by-products (e.g. polycyclic aromatic hydrocarbons) may occur.

SECTION 11: Toxicological information

Information on Toxicological Effects

Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful		>5 mg/L (mist, estimated)
Dermal	Unlikely to be harmful		> 2 g/kg (estimated)
Oral	Unlikely to be harmful		> 5 g/kg (estimated)

Likely Routes of Exposure: Inhalation, eye contact, skin contact

Aspiration Hazard: Not expected to be an aspiration hazard

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Not expected to be irritating.

Skin Sensitization: No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

Respiratory Sensitization: No information available.

Specific target organ toxicity - Single exposure: No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Specific target organ toxicity - Repeated exposure: No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Carcinogenicity: No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

Information on Toxicological Effects of Components

Lubricant Base Oil (Petroleum)

Carcinogenicity Information : The petroleum base oils contained in this product have been highly refined by a variety of processes including severe hydrocracking/hydroprocessing to reduce aromatics and improve performance characteristics. All of the oils meet the IP-346 criteria of less than 3 percent PAH's and are not considered carcinogens by NTP, IARC, or OSHA.

SECTION 12: Ecological information

GHS Classification:
No classified hazards

Toxicity: All acute aquatic toxicity studies on samples of lubricant base oils show acute toxicity values greater than 100 mg/L for invertebrates, algae and fish. These tests were carried out on water accommodated fractions and the results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material are greater than 5.3, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

Mobility in Soil: Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent upon viscosity. There will be significant removal of hydrocarbons from the water by sediment adsorption. In soil and sediment, hydrocarbon components will show low mobility with adsorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of the hydrocarbon constituents in soil and sediment.

Other adverse effects: None anticipated.

SECTION 13: Disposal considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

SECTION 14: Transport information

UN Number: Not regulated
UN proper shipping name: None
Transport hazard class(es): None
Packing Group: None
Environmental Hazard(s): This product does not meet the DOT/UN/IMDG/IMO criteria of a marine pollutant
Special precautions for user: If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

SECTION 15: Regulatory information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds)
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CERCLA/SARA - Section 313 and 40 CFR 372
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Substance	Concentration[1]	de minimis
Phosphorodithioic acid, O,O-di-C1-14-alkyl esters, zinc salts	<2	1.0%

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

EPA (CERCLA) Reportable Quantity (in pounds)
This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

International Inventories
TSCA (United States): All ingredients are on the inventory or exempt from listing.
All components are either on the DSL, or are exempt from DSL listing requirements.

SECTION 16: Other information

Issue date	Previous Issue Date:	SDS Number	Status:
01-Sep-2021	None	832004	FINAL

Revised Sections or Basis for Revision:

New SDS

Mexican NOM-018-STPS-2015:
The information within is considered correct but is not exhaustive and will be used for guidance only, which is based on the current knowledge of the substance or mixture and is applicable to the appropriate safety precautions for the product.

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; HPR = Hazardous Products Regulations; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Safety Data Sheet

According to OSHA HCS 2012 (29 CFR 1910.1200), Health Canada HPR (SOR/2015-17), and Mexico NOM-018-STPS-2015

SECTION 1: Identification

Product Identifier:	**Red Line® UTV/ATV Gearcase Oil**
Code:	**831457**
Issue date:	13-Aug-2021
Relevant identified uses:	Gear Lubricant
Uses advised against:	All others
24 Hour Emergency Phone Number:	CHEMTREC Global +1 703 527 3887 CHEMTREC United States 1-800-424-9300 CHEMTREC Mexico 01-800-681-9531
Manufacturer/Supplier:	RED LINE SYNTHETIC OIL 6100 Egret Court Benicia, CA 94510
SDS Information:	URL: www.phillips66.com/SDS Phone: 800-762-0942 Email: SDS@P66.com
Technical Information:	1-707-745-6100

SECTION 2: Hazard identification

Classified Hazards
No classified hazards

Hazards Not Otherwise Classified (HNOC)
PHNOC: None known

HHNOC: None known

Label elements

No classified hazards

SECTION 3: Composition/information on ingredients

Chemical Name	CASRN	Concentration[1]
Synthetic Lubricant Base Oil	VARIOUS	<85

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation: First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects, both acute and delayed: Prolonged or repeated contact may dry skin and cause irritation. Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

SECTION 5: Firefighting measures

NFPA 704: National Fire Protection Association

Health: 0 **Flammability:** 1 **Instability:** 0

0 = minimal hazard
1 = slight hazard
2 = moderate hazard
3 = severe hazard
4 = extreme hazard

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

Special protective actions for fire-fighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods and material for containment and cleaning up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

SECTION 7: Handling and storage

Precautions for safe handling: Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

SECTION 8: Exposure controls/personal protection

Occupational exposure limits

None.

Biological occupational exposure limits

None.

Engineering controls: General ventilation should be adequate for normal conditions of intended use. Additional engineering controls may be necessary if working with the product in enclosed areas and/or at elevated temperatures.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile rubber

Respiratory Protection: Respiratory protection is not normally required under intended conditions of use. Emergencies or conditions that could result in significant airborne exposures may require the use of NIOSH approved respiratory protection. An industrial hygienist or other appropriate health and safety professional should be consulted for specific guidance under these situations.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and chemical properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Red
Physical form of product:	Liquid

Odor:	Slight hydrocarbon
Odor threshold:	No data
pH:	Not applicable
Melting / freezing point:	No data
Initial boiling point and boiling range:	No data
Flash point:	> 302 °F / > 150 °C
Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Evaporation Rate (nBuAc=1):	No data
Flammability (solid, gas):	Not applicable
Upper Explosive Limits (vol % in air):	No data
Lower Explosive Limits (vol % in air):	No data
Vapor pressure:	<1 mm Hg
Vapor density:	>1 (air = 1)
Relative density:	0.865 @ 60ºF (15.6ºC) (water = 1)
Solubility(ies):	Insoluble
Partition coefficient n-octanol /water (log KOW):	No data
Autoignition temperature:	No data
Decomposition temperature:	No data
Viscosity:	10.2 cSt @ 100°C; 49 cSt @ 40°C
Molecular weight:	No data

Other information

Particle Size:	No data
Pour point:	No data
Bulk density	7.21 lbs/gal

SECTION 10: Stability and reactivity

Reactivity: Not chemically reactive.

Chemical stability: Stable under normal ambient and anticipated conditions of use.

Possibility of Hazardous Reactions: Hazardous reactions not anticipated.

Conditions to Avoid: Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

Incompatible Materials: Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

SECTION 11: Toxicological information

Information on Toxicological Effects

Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful		>5 mg/L (mist, estimated)
Dermal	Unlikely to be harmful		> 2 g/kg (estimated)
Oral	Unlikely to be harmful		> 5 g/kg (estimated)

Likely Routes of Exposure: Inhalation, eye contact, skin contact

Aspiration Hazard: Not expected to be an aspiration hazard

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation.

Skin Sensitization: No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

Respiratory Sensitization: No information available.

Specific target organ toxicity - Single exposure: No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Specific target organ toxicity - Repeated exposure: No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Carcinogenicity: No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

SECTION 12: Ecological information

GHS Classification:
No classified hazards

Toxicity: Experimental studies with rainbow trout, daphnia, and fresh water algae indicate that PAO synthetic base oils are not expected to be harmful to aquatic organisms.

Persistence and Degradability: Polyalphaolefins (synthesized hydrocarbons) & polyalkylene glycol synthetic base oils are not considered to be readily biodegradable but may be inherently biodegradable. They are expected to completely biodegrade over extended periods of time. Most synthetic polyol esters are considered readily biodegradable and are expected to completely biodegrade over extended periods of time.

Bioaccumulative Potential: PAO synthetic base oils are not expected to bioaccumulate.

Mobility in Soil: Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, this material does not impart any sheen and will float and spread over the surface at a rate dependent upon viscosity. The main fate process is expected to be slow biodegradation of individual components in soil and sediment.

Other adverse effects: None anticipated.

SECTION 13: Disposal considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

SECTION 14: Transport information

UN Number: Not regulated
UN proper shipping name: None
Transport hazard class(es): None

Packing Group: None
Environmental Hazard(s): This product does not meet the DOT/UN/IMDG/IMO criteria of a marine pollutant
Special precautions for user: If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

SECTION 15: Regulatory information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds)
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CERCLA/SARA - Section 313 and 40 CFR 372
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Chemical Name	Concentration[1]	de minimis
Zinc Compound(s)	1-2.49	1.0%

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

EPA (CERCLA) Reportable Quantity (in pounds)
This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

International Inventories
TSCA (United States): All ingredients are on the inventory or exempt from listing.
All components are either on the DSL, or are exempt from DSL listing requirements.

SECTION 16: Other information

Issue date	Previous Issue Date:	SDS Number	Status:
13-Aug-2021	15-Jun-2017	831457	FINAL

Revised Sections or Basis for Revision:
Composition (Section 3); Exposure limits (Section 8); Personal Protective Equipment (Section 8); Physical Properties (Section 9)

Mexican NOM-018-STPS-2015:
The information within is considered correct but is not exhaustive and will be used for guidance only, which is based on the current knowledge of the substance or mixture and is applicable to the appropriate safety precautions for the product.

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; HPR = Hazardous Products Regulations; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS

EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Safety Data Sheet

According to OSHA HCS 2012 (29 CFR 1910.1200), Health Canada HPR (SOR/2015-17), and Mexico NOM-018-STPS-2015

SECTION 1: Identification

Product Identifier: **P66, UNITRACTION THF SS**
Other means of identification: Phillips 66 Unitraction Transmission Hydraulic Fluid Semi Synthetic
Code: **832001**
Issue date: 08-Sep-2021
Relevant identified uses: Hydraulic Fluid
Uses advised against: All others
24 Hour Emergency Phone Number: CHEMTREC Global +1 703 527 3887
CHEMTREC United States 1-800-424-9300
CHEMTREC Mexico 01-800-681-9531
Manufacturer/Supplier: Phillips 66 Lubricants
A Division of Phillips 66 Company
P.O. Box 421959
Houston, Texas 77242-1959
SDS Information: URL: www.phillips66.com/SDS
Phone: 800-762-0942
Email: SDS@P66.com
Customer Service: U.S.: 800-368-7128 or International: 1-832-765-2500
Technical Information: 1-877-445-9198
Distributor: Phillips 66 Canada Ltd.
1400, 335-8th Ave SW
Calgary, AB T2P 2H9
TEL: +1 800.368.7128

SECTION 2: Hazard identification

Classified Hazards
No classified hazards

Hazards Not Otherwise Classified (HNOC)
PHNOC: None known

HHNOC: None known

Label elements

No classified hazards

SECTION 3: Composition/information on ingredients

Substance	CASRN	Concentration[1]
Distillates, petroleum, hydrotreated heavy paraffinic	64742-54-7	0-50
Zinc, bis[O,O-bis(2-ethylhexyl) phosphorodithioato-S,S]-, (T-4)-	4259-15-8	1-2
Benzenesulfonic acid, propenated, calcium salt, overbased	68610-84-4	0.1-1

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4: First aid measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician. (see Note to Physician)

Inhalation: First aid is not normally required. If breathing difficulties develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. Seek immediate medical attention.

Ingestion: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects, both acute and delayed: Prolonged or repeated contact may dry skin and cause irritation. Inhalation of oil mists or vapors generated at elevated temperatures may cause respiratory irritation. Accidental ingestion can result in minor irritation of the digestive tract, nausea and diarrhea.

Notes to Physician: Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.
When using high-pressure equipment, injection of product under the skin can occur. In this case, the casualty should be sent immediately to the hospital. Do not wait for symptoms to develop. High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. These injuries often require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury. Early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

SECTION 5: Firefighting measures

NFPA 704: National Fire Protection Association

Health: 0 **Flammability:** 1 **Instability:** 0

0 = minimal hazard
1 = slight hazard
2 = moderate hazard
3 = severe hazard
4 = extreme hazard

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Specific hazards arising from the chemical

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of sulfur, nitrogen or phosphorus may also be formed.

Special protective actions for fire-fighters: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental release measures

RCC-CW000747

Personal precautions, protective equipment and emergency procedures: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods and material for containment and cleaning up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

SECTION 7: Handling and storage

Precautions for safe handling: Keep away from flames and hot surfaces. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8). Spills will produce very slippery surfaces. High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

SECTION 8: Exposure controls/personal protection

Occupational exposure limits The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

Substance	ACGIH	OSHA	Mexico	Phillips 66
Distillates, petroleum, hydrotreated heavy paraffinic	TWA-8hr: 5 mg/m^3 STEL: 10 mg/m^3 as Oil Mist, if Generated	---	---	---

State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Biological occupational exposure limits
None.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established

exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of skin protection is not normally required; however, good industrial hygiene practice suggests the use of gloves or other appropriate skin protection whenever working with chemicals. Suggested protective materials: Nitrile rubber

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and chemical properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	No data
Physical form of product:	Liquid
Odor:	Petroleum
Odor threshold:	No data
pH:	Not applicable
Melting / freezing point:	-34.6 °F / -37 °C
Initial boiling point and boiling range:	No data
Flash point:	> 437 °F / > 225 °C
Method:	Cleveland Open Cup (COC), ASTM D92
Evaporation Rate (nBuAc=1):	No data
Flammability (solid, gas):	Not applicable
Upper Explosive Limits (vol % in air):	No data
Lower Explosive Limits (vol % in air):	No data
Vapor pressure:	<1 mm Hg
Vapor density:	>1 (air = 1)
Relative density:	0.878 @ 60ºF (15.6ºC) (water = 1)
Solubility(ies):	Negligible
Partition coefficient n-octanol /water (log KOW):	No data
Autoignition temperature:	No data
Decomposition temperature:	No data
Viscosity:	9.5 cSt @ 100°C; 62 cSt @ 40°C
Molecular weight:	No data

Other information

Particle Size:	No data
Pour point:	-49 °F / -45 °C
Bulk density	7.32 lbs/gal

SECTION 10: Stability and reactivity

Reactivity: Not chemically reactive.

Chemical stability: Stable under normal ambient and anticipated conditions of use.

Possibility of Hazardous Reactions: Hazardous reactions not anticipated.

Conditions to Avoid: Extended exposure to high temperatures can cause decomposition. Avoid all possible sources of ignition.

Incompatible Materials: Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

SECTION 11: Toxicological information

Information on Toxicological Effects

Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful		>5 mg/L (mist, estimated);
Dermal	Unlikely to be harmful		> 2 g/kg (estimated)
Oral	Unlikely to be harmful		> 5 g/kg (estimated)

Likely Routes of Exposure: Inhalation, eye contact, skin contact

Aspiration Hazard: Not expected to be an aspiration hazard

Skin Corrosion/Irritation: Not expected to be irritating. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation.

Skin Sensitization: No information available on the mixture, however none of the components have been classified for skin sensitization (or are below the concentration threshold for classification).

Respiratory Sensitization: No information available.

Specific target organ toxicity - Single exposure: No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Specific target organ toxicity - Repeated exposure: No information available on the mixture, however none of the components have been classified for target organ toxicity (or are below the concentration threshold for classification).

Carcinogenicity: No information available on the mixture, however none of the components have been classified for carcinogenicity (or are below the concentration threshold for classification).

Germ Cell Mutagenicity: No information available on the mixture, however none of the components have been classified for germ cell mutagenicity (or are below the concentration threshold for classification).

Reproductive Toxicity: No information available on the mixture, however none of the components have been classified for reproductive toxicity (or are below the concentration threshold for classification).

Information on Toxicological Effects of Components

Distillates, petroleum, hydrotreated heavy paraffinic

Carcinogenicity Information : This oil has been highly refined by a variety of processes to reduce aromatics and improve performance characteristics. It meets the IP-346 criteria of less than 3 percent PAH's and is not considered a carcinogen by the International Agency for Research on Cancer.

SECTION 12: Ecological information

GHS Classification:
No classified hazards

Toxicity: All acute aquatic toxicity studies on samples of lubricant base oils show acute toxicity values greater than 100 mg/L for

invertebrates, algae and fish. These tests were carried out on water accommodated fractions and the results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon compositions.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable, but since they can be degraded by microorganisms, they are regarded as inherently biodegradable.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material are greater than 5.3, and therefore regarded as having the potential to bioaccumulate. In practice, metabolic processes may reduce bioconcentration.

Mobility in Soil: Volatilization to air is not expected to be a significant fate process due to the low vapor pressure of this material. In water, base oils will float and spread over the surface at a rate dependent upon viscosity. There will be significant removal of hydrocarbons from the water by sediment adsorption. In soil and sediment, hydrocarbon components will show low mobility with adsorption to sediments being the predominant physical process. The main fate process is expected to be slow biodegradation of the hydrocarbon constituents in soil and sediment.

Other adverse effects: None anticipated.

SECTION 13: Disposal considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations. This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste and is not believed to exhibit characteristics of hazardous waste. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the SDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.This material under most intended uses would become "Used Oil" due to contamination by physical or chemical impurities. Whenever possible, Recycle used oil in accordance with applicable federal and state or local regulations. Container contents should be completely used and containers should be emptied prior to discard.

SECTION 14: Transport information

UN Number: Not regulated
UN proper shipping name: None
Transport hazard class(es): None
Packing Group: None
Environmental Hazard(s): This product does not meet the DOT/UN/IMDG/IMO criteria of a marine pollutant
Special precautions for user: If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil)
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable

SECTION 15: Regulatory information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds)
This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CERCLA/SARA - Section 313 and 40 CFR 372
This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Substance	Concentration[1]	de minimis
Zinc Compound(s)	1-2	1.0%

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

EPA (CERCLA) Reportable Quantity (in pounds)
This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65

WARNING. This product can expose you to chemicals including Naphthalene (CASRN 91-20-3) which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

International Inventories
TSCA (United States): All ingredients are on the inventory or exempt from listing.
All components are either on the DSL, or are exempt from DSL listing requirements.

SECTION 16: Other information

Issue date	Previous Issue Date:	SDS Number	Status:
08-Sep-2021	03-Aug-2021	832001	FINAL

Revised Sections or Basis for Revision:
Product Name / Synonyms (Section 1); Address (Section 1)

Mexican NOM-018-STPS-2015:
The information within is considered correct but is not exhaustive and will be used for guidance only, which is based on the current knowledge of the substance or mixture and is applicable to the appropriate safety precautions for the product.

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; HPR = Hazardous Products Regulations; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:
The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

SAFETY DATA SHEET

Version 8.5
Revision Date 07/23/2022
Print Date 08/25/2022

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sodium cyanide

Product Number : 71431
Brand : Sigma-Aldrich
Index-No. : 006-007-00-5
CAS-No. : 143-33-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Corrosive to Metals (Category 1), H290
Acute toxicity, Oral (Category 1), H300
Acute toxicity, Inhalation (Category 1), H330
Acute toxicity, Dermal (Category 1), H310
Specific target organ toxicity - repeated exposure (Category 1), Thyroid, H372
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Pictogram

Signal Word Danger

Hazard statement(s)

H290	May be corrosive to metals.
H300 + H310 + H330	Fatal if swallowed, in contact with skin or if inhaled.
H372	Causes damage to organs (Thyroid) through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P234	Keep only in original container.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P262	Do not get in eyes, on skin, or on clothing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P302 + P350 + P310	IF ON SKIN: Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/ physician.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P314	Get medical advice/ attention if you feel unwell.
P362	Take off contaminated clothing and wash before reuse.
P390	Absorb spillage to prevent material damage.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Contact with acids liberates very toxic gas.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	CNNa
Molecular weight	:	49.01 g/mol
CAS-No.	:	143-33-9
EC-No.	:	205-599-4
Index-No.	:	006-007-00-5

Component	Classification	Concentration
sodium cyanide		
	Met. Corr. 1; Acute Tox. 1;	<= 100 %

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	Skin Corr. 1; Eye Dam. 1; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H290, H300, H330, H310, H314, H318, H372, H400, H410 M-Factor - Aquatic Acute: 10 - Aquatic Chronic: 1	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Sodium oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
No metal containers.
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.
Do not store near acids.

Storage class
Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
sodium cyanide	143-33-9	C	4.7 ppm 5 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation		
		C	5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Danger of cutaneous absorption		
		PEL	5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Body Protection

protective clothing

Respiratory protection

required when dusts are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Color: white
b)	Odor	odorless

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

c)	Odor Threshold	Not applicable
d)	pH	11.0 - 12.0 at 49.0 g/l at 25 °C (77 °F)
e)	Melting point/freezing point	Melting point/range: 563.7 °C (1046.7 °F) - lit.
f)	Initial boiling point and boiling range	1,500 °C 2,732 °F at 1.013 hPa
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	1 hPa at 817 °C (1503 °F)
l)	Vapor density	No data available
m)	Density	1.59 kg/m3 at 20 °C (68 °F)
	Relative density	No data available
n)	Water solubility	370 g/l at 20 °C (68 °F) - completely soluble
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Dissociation constant ca.9.36 at 20 °C (68 °F) - OECD Test Guideline 112

SECTION 10: Stability and reactivity

10.1 Reactivity

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.
Contact with acids liberates very toxic gas.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Risk of explosion with:
chlorates

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

nitrites
nitrates
Oxidizing agents
Release of:
Hydrogen cyanide (hydrocyanic acid)
Violent reactions possible with:
Nitric acid
urea
Carbon dioxide (CO2)
(in the presence of atmospheric oxygen and/or moisture)
Release of:
Hydrogen cyanide (hydrocyanic acid)
Generates dangerous gases or fumes in contact with:
alkali salts
Acids
Water
Release of:
Hydrogen cyanide (hydrocyanic acid)
Generates dangerous gases or fumes in contact with:
Acids

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Aluminum, Metals, Zinc

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - 5.09 mg/kg
Remarks: (ECHA)
LC50 Inhalation - Rat - male - 1 h - 63 ppm - gas

(OECD Test Guideline 403)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: hydrogen cyanide
LD50 Dermal - Rabbit - female - 7.35 mg/kg
Remarks: (ECHA)
LD50 Dermal - Rabbit - 10.4 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity).
Behavioral:Tremor.
Lungs, Thorax, or Respiration:Dyspnea.
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: US-EPA
Result: negative

Test Type: Chromosome aberration test
Species: Rat

Application Route: Oral
Method: US-EPA
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure. - Thyroid

Aspiration hazard
No data available

11.2 Additional Information

RTECS: VZ7525000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Gasterosteus aculeatus - 0.0988 mg/l - 96 h Remarks: (referred to cyanide ions) (ECHA)

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - Chironomus riparius (harlequin fly) - 0.012 mg/l - 48 h (OECD Test Guideline 202)
	semi-static test NOEC - Chironomus riparius (harlequin fly) - 0.006 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	EC50 - Nitzschia closterium - 0.051 mg/l - 72 h
Toxicity to bacteria	EC50 - Bacteria - 4.9 mg/l - 6 h Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 42 d Result: ca.99 % - Inherently biodegradable. Remarks: (ECHA)
Chemical Oxygen Demand (COD)	816 mg/g Remarks: (IUCLID)
Ratio BOD/ThBOD	6 %

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 1689 Class: 6.1 Packing group: I
Proper shipping name: Sodium cyanide, solid
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

IMDG
UN number: 1689 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: SODIUM CYANIDE, SOLID
Marine pollutant : yes

IATA
UN number: 1689 Class: 6.1 Packing group: I
Proper shipping name: Sodium cyanide, solid

SECTION 15: Regulatory information

SARA 302 Components

	CAS-No.	Revision Date
sodium cyanide	143-33-9	1993-02-16

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
sodium cyanide	143-33-9	1993-02-16

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.5 Revision Date: 07/23/2022 Print Date: 08/25/2022

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Chemical Resistant Coated 30 oz.
Description	:	Plasticised PVC coated fabric on polyester
Recommended use	:	land fill, pond liner, storm water runoff, oil storage municipal wastewater ponds, containment, floor coverinngs
Restrictions on use	:	Used for recommended use.
Company	:	Value Vinyls 301 E. Trinity Blvd. Grand Prairie, TX 75050
Telephone	:	877-716-6651
Emergency telephone	:	877-716-6651

SECTION 2. HAZARDS IDENTIFICATION

Hazard Classification

Not classified as hazardous.
NON-HAZARDOUS SUBSTANCE.
NON-DANGEROUS GOODS.
Hazard classification according to the criteria of NOHSC.
Dangerous goods classification according to the Korea Dangerous Goods Code.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Components

COMPONENTS	CAS NO
POLYETHYLENE TEREPHTHALATE	25038-59-9
POLY VINYL CHLORIDE	9002-86-2
Ethylene Acrylate Copolymer	
CALCIUM CARBONATE	1317-65-3
BARIUM ZINC ORGANIC COMPLEX	006865-35-6
CARBON BLACK	1333-86-4

SECTION 4. FIRST-AID MEASURES

Eye contact	:	Not applicable
Ingestion	:	Not applicable
Inhalation	:	Not applicable
Skin Contact	:	Not applicable

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Extinguishing measures to suit surroundings
Unsuitable extinguishing media	:	No data available
Special hazards arising from the substance or mixture	:	In case of fires, hazardous combustion gases are formed: Carbon monoxide(CO); Hydrogen chloride (HCl)
Advice for firefighters	:	Use self-contained breathing apparatus. Wear protective clothing.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures	:	If material is unused, pick up and dispose of as a non-hazardous material.

SECTION 7. HANDLING AND STORAGE

Handling Precautions	:	None
Technical measures and storage conditions	:	Protect from heat and direct sunlight. Avoid fuel oil.
Requirements for storage rooms and vessels	:	No special measures required.
Advice on storage assembly	:	Non known
Specific end use(s)	:	No data available

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls	:	None

Personal protective equipment

Respiratory protection	:	In the case of insufficient ventilation, wear suitable respiratory equipment. Make sure there is good local exhaust ventilation during hot air welding.
Eye / face protection	:	No data avilable
Hand protection	:	No data avilable
Enviromental exposure controls	:	No data avilable

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Form / Color	:	Film & Sheet Various, depending on coloration
Odor	:	Odorless
Odor threshold	:	No data available
pH value	:	No data available
Boiling point / boiling range	:	No data available
Melting point / melting range	:	No data available
Decomposition point / Decomposition range	:	No data available
Flash point	:	No data available
Auto-ignition temperature	:	No data available
Oxidizing properties	:	No data available
Explosive properties	:	No data available
Flammability (solid, gas)	:	No data available
Lower flammability or explosive limits	:	No data available
Upper flammability or explosive limits	:	No data available
Vapor pressure	:	No data available
Vapor density	:	No data available
Evaporation rate	:	No data available
Relative density	:	No data available
Density	:	No data available
Solubility in water	:	No data available
Solubility(ies)	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Viscosity No data available	:	No data available

Other information

Burning behavior	:	Flammable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No data available
Chemical stability	:	No data available
Possible of hazardous reactions	:	No data available
Conditions to avoid	:	None, if handled according to order
Incompatible materials	:	No hazardous reactions when stored and handled according to prescribed instruction.
Hazardous decomposition products	:	No data available

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	:	No data available
Acute dermal toxicity	:	No data available
Acute inhalational toxicity	:	No data available
Skin corrosion/irritation	:	No data available
Serious eye damage/irritation	:	No data available
Respiratory or skin sensitization	:	No data available
Germ cell mutagenicity	:	No data available
Reproduction toxicity	:	No data available
Carcinogenicity	:	No data available
STOT-single exposure	:	No data available
STOT-repeated exposure	:	No data available
Aspiration hazard	:	No data available
Other information	:	No health-damaging effects to be expected if used properly.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Fish toxicity	:	No data available
Daphnia toxicity	:	No data available
Algae toxicity	:	No data available
Bacteria toxicity	:	No data available

Persistence and degradability

Physico-chemical eliminability remarks	:	If used properly, this product does not cause problems, on the strength of previous.
Bioaccumulative potential	:	No data available
Mobility in soil	:	No data available
Results of PBT and vPvB assessment	:	No data available
Other adverse effects	:	No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Product

Waste should be disposed of through a licensed waste operator.
A final decision must be made in agreement with the regional waste disposal company.
May be taken to household waste disposal or incineration plant,
but care for official regulations.

Packaging

Dispose of in accordance with federal, state and local regulations.

SECTION 14. TRANSPORT INFORMATION

Transport ADR/RID/ADN

The product is not subject to ADR/RID/ADN regulations.

Transport IMDG

The product is not subject to IMDG regulations.

Transport ICAO-TI / IATA

The product is not subject to ICAO-TI / IATA regulations.

Other information

No data available.

Environmental hazards

Information on environmental hazards, if relevant, please see 14.1 - 14.3.

Special precautions for user

No data available.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture.

US regulations / EU regulations / Korea regulations

Adhere to the national sanitary and occupational safety regulations when using this product.

Chemical safety assessment

No data available.

SECTION 16. OTHER INFORMATION

Revision Date : 2016.3.3.

HUDBAY

ATTACHMENT B

SDS – Laboratory Chemicals

SAFETY DATA SHEET

Version 8.4
Revision Date 07/29/2021
Print Date 07/31/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Acetic acid

Product Number : W200603
Brand : Aldrich
Index-No. : 607-002-00-6
CAS-No. : 64-19-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Skin corrosion (Category 1A), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Hazard statement(s)

H226	Flammable liquid and vapor.
H314	Causes severe skin burns and eye damage.

Precautionary statement(s)

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Lachrymator.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Glacial acetic acid
Formula	:	$C_2H_4O_2$
Molecular weight	:	60.05 g/mol
CAS-No.	:	64-19-7
EC-No.	:	200-580-7
Index-No.	:	607-002-00-6

Component	Classification	Concentration
acetic acid		
	Flam. Liq. 3; Skin Corr. 1A; Eye Dam. 1; H226, H314, H318 Concentration limits: 10 - < 25 %: Eye Irrit. 2, H319; 10 - < 25 %: Skin	<= 100 %

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

RCC-CW000770

	Irrit. 2, H315; 25 - < 90 %: Skin Corr. 1B, H314; >= 90 %: Skin Corr. 1A, H314; >= 90 %: 3, H226;	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® H^+, Merck Art. No. 101595). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Component	CAS-No.	Value	Control parameters	Basis
acetic acid	64-19-7	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
		STEL	15 ppm	USA. ACGIH Threshold Limit Values (TLV)
		TWA	10 ppm 25 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	15 ppm 37 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	10 ppm 25 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	10 ppm 25 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		PEL	10 ppm 25 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		C	40 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	15 ppm 37 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Butoject® (KCL 898)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Latex gloves
Minimum layer thickness: 0.6 mm
Break through time: 30 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	stinging
c)	Odor Threshold	0.2 ppm
d)	pH	2.5 at 50 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/range: 16.2 °C (61.2 °F) - lit.
f)	Initial boiling point and boiling range	117 - 118 °C (243 - 244 °F)
g)	Flash point	39 °C (102 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	Not applicable
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 19.9 %(V) Lower explosion limit: 4 %(V)
k)	Vapor pressure	20.79 hPa at 25 °C (77 °F)
l)	Vapor density	2.07
m)	Density	1.049 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	602.9 g/l at 25 °C (77 °F) at 1,013 hPa - completely soluble
o)	Partition coefficient: n-octanol/water	log Pow: -0.17 at 25 °C (77 °F) - Bioaccumulation is not expected., (ECHA)
p)	Autoignition temperature	463 °C (865 °F)

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

q)	Decomposition temperature	Distillable in an undecomposed state at normal pressure.
r)	Viscosity	1.17 mm2/s at 20 °C (68 °F) -
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	28.8 mN/m at 10.0 °C (50.0 °F)
Relative vapor density	2.07

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Risk of explosion with:
peroxi compounds
perchloric acid
fuming sulfuric acid
phosphorus halides
hydrogen peroxide
chromium(VI) oxide
potassium permanganate
Peroxides
Strong oxidizing agents
Risk of ignition or formation of inflammable gases or vapours with:
Iron
Zinc
magnesium
Mild steel
Possible formation of:
Hydrogen
Violent reactions possible with:
strong alkalis
Aldehydes
alkali hydroxides
nonmetallic halides
ethanolamine
Acetaldehyde
Alcohols
halogen-halogen compounds
chlorosulfonic acid
chromosulfuric acid
Potassium hydroxide
Nitric acid

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

10.4 Conditions to avoid
Heating.

10.5 Incompatible materials
various metals

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 3,310 mg/kg
Remarks: (RTECS)
LC50 Inhalation - Mouse - 4 h - 2,819 mg/l
Remarks: (RTECS)
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Causes burns. - 4 h
(OECD Test Guideline 404)
Remarks: (IUCLID)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes burns. - 4 h
(OECD Test Guideline 405)
Remarks: (IUCLID)
Causes serious eye damage.

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Test Type: Micronucleus test
Species: Rat
Cell type: Bone marrow
Application Route: inhalation (vapor)
Method: Mutagenicity (micronucleus test)
Result: negative

Carcinogenicity

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

No data available

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: AF1225000
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Ingestion or inhalation of concentrated acetic acid causes damage to tissues of the respiratory and digestive tracts. Symptoms include: hematemesis, bloody diarrhea, edema and/or perforation of the esophagus and pylorus, pancreatitis, hematuria, anuria, uremia, albuminuria, hemolysis, convulsions, bronchitis, pulmonary edema, pneumonia, cardiovascular collapse, shock, and death. Direct contact or exposure to high concentrations of vapor with skin or eyes can cause: erythema, blisters, tissue destruction with slow healing, skin blackening, hyperkeratosis, fissures, corneal erosion, opacification, iritis, conjunctivitis, and possible blindness.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - > 1,000 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - > 1,000 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - Skeletonema costatum - > 1,000 mg/l - 72 h (ISO 10253)

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Toxicity to bacteria	EC5 - Pseudomonas putida - 2,850 mg/l - 16 h Remarks: neutral (maximum permissible toxic concentration) (Lit.)
	microtox test EC50 - Photobacterium phosphoreum - 11 mg/l - 15 min Remarks: (IUCLID)

12.2 Persistence and degradability

Biodegradability	Result: 99 % - Readily biodegradable. (OECD Test Guideline 301D) Remarks: (HSDB)
	Result: 95 % - Readily eliminated from water (OECD Test Guideline 302B)
Biochemical Oxygen Demand (BOD)	880 mg/g Remarks: (Lit.)
Ratio BOD/ThBOD	76 % Remarks: (IUCLID)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 2789 Class: 8 (3) Packing group: II
Proper shipping name: Acetic acid, glacial
Reportable Quantity (RQ): 5000 lbs
Poison Inhalation Hazard: No

IMDG

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

UN number: 2789 Class: 8 (3) Packing group: II EMS-No: F-E, S-C
Proper shipping name: ACETIC ACID, GLACIAL

IATA
UN number: 2789 Class: 8 (3) Packing group: II
Proper shipping name: Acetic acid, glacial

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.4 Revision Date: 07/29/2021 Print Date: 07/31/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

1. Identification

Product identifier **Acetone**

Other means of identification

Product code 0120001

Manufacturer information Superior Industrial Solutions, Inc.
1402 North Capitol Avenue, Suite #100
Indianapolis, IN 46202 US
General Information: (317) 781-4400
Chemical Emergency: (317) 781-4470
Website: www.relyonsuperior.com
SDS Request: SDSInfo@relyonsuperior.com

Recommended use Solvent

Recommended restrictions None known.

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 2
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Specific target organ toxicity, single exposure	Category 3 respiratory tract irritation
	Specific target organ toxicity, single exposure	Category 3 narcotic effects

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement

H225	Highly flammable liquid and vapor.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.

Precautionary statement

Prevention

P262	Do not get in eyes, on skin, or on clothing.
P261	Avoid breathing vapors or mist.
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/eye protection/face protection.

RCC-CW000780

Response

P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P311	Call a POISON CENTER or doctor/physician.
P303 + P361 + P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P304 + P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P312	Call a poison center/doctor if you feel unwell.
P305 + P351 + P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/attention.
P370 + P378	In case of fire: Use appropriate media to extinguish.

Storage

P235	Keep cool.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
2-Propanone		67-64-1	100

4. First-aid measures

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Skin contact	Take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritatior occurs: Get medical advice/attention. Wash contaminated clothing before reuse.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical advice/attention if you feel unwell.
Most important symptoms/effects, acute and delayed	May cause drowsiness or dizziness. Headache. Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. Skin irritation. May cause redness and pain.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Thermal burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.
General information	Take off all contaminated clothing immediately. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Alcohol resistant foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Vapors may form explosive mixtures with air. Vapors may travel considerable distance to a source of ignition and flash back. During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	Highly flammable liquid and vapor.

RCC-CW000781

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Wear appropriate protective equipment and clothing during clean-up. Avoid breathing mist/vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material. Take precautionary measures against static discharge. Use only non-sparking tools. This product is miscible in water.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Do not handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Explosion-proof general and local exhaust ventilation. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. Do not taste or swallow. Avoid breathing mist/vapors. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep away from heat, sparks and open flame. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in a cool, dry place out of direct sunlight. Store in tightly closed container. Store in a well-ventilated place. Keep in an area equipped with sprinklers. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
Acetone	PEL	2400 mg/m3
		1000 ppm

Components	Type	Value
2-Propanone (CAS 67-64-1)	PEL	2400 mg/m3
		1000 ppm

US. ACGIH Threshold Limit Values

Material	Type	Value
Acetone	STEL	500 ppm
	TWA	250 ppm

Components	Type	Value
2-Propanone (CAS 67-64-1)	STEL	500 ppm
	TWA	250 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
Acetone	TWA	590 mg/m3
		250 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
2-Propanone (CAS 67-64-1)	TWA	590 mg/m3
		250 ppm

Biological limit values

ACGIH Biological Exposure Indices

Material	Value	Determinant	Specimen	Sampling Time
2-Propanone (CAS 67-64-1)	25 mg/l	Acetone	Urine	*

* - For sampling details, please see the source document.

Appropriate engineering controls Explosion-proof general and local exhaust ventilation. Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash station and safety shower.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles). Face shield is recommended, if splashing is possible.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Chemical respirator with organic vapor cartridge.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations When using do not smoke. Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Clear.

Physical state Liquid.

Color Colorless.

Odor Pungent.

pH Not available.

Melting point/freezing point Not determined

Initial boiling point and boiling range 132.8 °F (56 °C) estimated

Flash point -4.0 °F (-20.0 °C) Pensky-Martens Closed Cup

Upper/lower flammability or explosive limits

Flammability limit - lower (%) 2.5 % estimated

Flammability limit - upper (%) 12.8 % estimated

Vapor pressure 181 mm Hg at 20°C

Vapor density > 1 (Air = 1)

Solubility(ies)

Solubility (water) Soluble

Auto-ignition temperature	Not determined
Other information	
Pounds per gallon	6.6331 lb/gal
Specific gravity	0.796

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions. Stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid heat, sparks, open flames and other ignition sources. Suitable precautions should be utilized if using this product at temperatures above the flash point. Contact with incompatible materials.
Incompatible materials	Acids. Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause drowsiness or dizziness. Headache. Nausea, vomiting. May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.
Ingestion	Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	May cause drowsiness or dizziness. Headache. Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity In high concentrations, vapors are anesthetic and may cause headache, fatigue, dizziness and central nervous system effects. Harmful if swallowed.

Components	Species	Test Results
2-Propanone (CAS 67-64-1)		
Acute		
Dermal		
LD50	Rabbit	20000 mg/kg
Inhalation		
LC50	Rat	50.1 mg/l, 8 Hours

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

RCC-CW000784

Specific target organ toxicity - single exposure May cause respiratory irritation. May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
2-Propanone (CAS 67-64-1)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	10294 - 17704 mg/l, 48 hours
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	4740 - 6330 mg/l, 96 hours

Persistence and degradability No data is available on the degradability of any ingredients in the mixture.

Bioaccumulative potential

Partition coefficient n-octanol / water (log Kow)

2-Propanone	-0.24

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D001: Waste Flammable material with a flash point <140 F
D018: Waste Benzene
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste U List: Reference

2-Propanone (CAS 67-64-1)	U002

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT NON-BULK

UN number	UN1090
Proper shipping name	Acetone
Hazard class	3
Packing group	II
Reportable quantity	5000
ERG code	127

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA) Restrictions of Use

None known

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

2-Propanone (CAS 67-64-1)	Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes
Classified hazard categories	Flammable (gases, aerosols, liquids, or solids) Acute toxicity (any route of exposure) Skin corrosion or irritation Serious eye damage or eye irritation Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA)	Contains component(s) regulated under the Safe Drinking Water Act.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2) and Chemical Code Number

2-Propanone (CAS 67-64-1)	6532

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

2-Propanone (CAS 67-64-1)	35 %WV

DEA Exempt Chemical Mixtures Code Number

2-Propanone (CAS 67-64-1)	6532

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

2-Propanone (CAS 67-64-1)	Low priority

US state regulations

California Proposition 65

WARNING: This product can expose you to chemicals including Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Acetaldehyde (CAS 75-07-0)	Listed: April 1, 1988
Benzene (CAS 71-43-2)	Listed: February 27, 1987
Cumene (CAS 98-82-8)	Listed: April 6, 2010

California Proposition 65 - CRT: Listed date/Developmental toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997
Methanol (CAS 67-56-1)	Listed: March 16, 2012
Toluene (CAS 108-88-3)	Listed: January 1, 1991

California Proposition 65 - CRT: Listed date/Male reproductive toxin

Benzene (CAS 71-43-2)	Listed: December 26, 1997

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

2-Propanone (CAS 67-64-1)

RCC-CW000786

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 12-05-2014

Revision date 05-12-2021

Version # 04

Disclaimer Superior Industrial Solutions, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's sole responsibility to determine whether the particular purpose and use of the product is proper, suitable and safe, and to ensure safe conditions for handling, storage and disposal of the product, and the user assumes all liability for loss, injury, damage or expense arising out if its use. This information is based on data available to us and is accurate to the best of our knowledge at thetime of printing. However, no representation or warranty is expressed or implied, including warranties of merchantability or fitness for a particular purpose, regarding the accuracy or completeness of the information contained herein. All materials may present known and unknownhazards and should be used with caution. Buyer assumes all risk and liabilities arising out of these hazards. Buyer accepts and uses this material on these conditions.

Revision information This document has undergone significant changes and should be reviewed in its entirety.

RCC-CW000787

MATHESON
The Gas Professionals

Safety Data Sheet

Material Name: ACETYLENE, DISSOLVED **SDS ID: MAT00280**

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name
ACETYLENE, DISSOLVED
Synonyms
ACETYLENE; ETHYNE; WELDING GAS; ACETYLEN; ETHINE; NARCYLEN; VINYLENE; UN 1001; C2H2;
Chemical Family
Hydrocarbons, aliphatic
Product Use
Industrial and Specialty Gas Applications.
Restrictions on Use
None known.
Details of the supplier of the safety data sheet
MATHESON TRI-GAS, INC.
3 Mountainview Road
Warren, NJ 07059
General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.
Flammable Gases - Category 1
Gases Under Pressure - Dissolved gas
Specific Target Organ Toxicity - Single Exposure - Category 3 (central nervous system.)
GHS Label Elements
Symbol(s)

Signal Word
Danger
Hazard Statement(s)
Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May cause drowsiness or dizziness.
May displace oxygen and cause rapid suffocation.
Precautionary Statement(s)
Prevention
Keep away from heat/sparks/open flame/hot surfaces - No smoking.
Use only outdoors or in a well-ventilated area.
Avoid breathing dust/fume/gas/mist/vapors/spray.
Response
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Eliminate all ignition sources if safe to do so.
IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor if you feel unwell.

Storage
Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Protect from sunlight.
Disposal
Dispose of contents/container in accordance with local/regional/national/international regulations.
Other Hazards
Rapid release of compressed gas may cause frostbite. Explosive with or without contact with air.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
74-86-2	ACETYLENE, DISSOLVED	100

Section 4 - FIRST AID MEASURES

Inhalation
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.
Skin
Wash exposed skin with soap and water.
Eyes
Flush eyes with plenty of water.
Ingestion
If swallowed, get medical attention.
Most Important Symptoms/Effects
Acute
Frostbite, suffocation, Depression of central nervous system
Delayed
No information on significant adverse effects.
Note to Physicians
For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media
Suitable Extinguishing Media
carbon dioxide, regular dry chemical, Large fires: Use regular foam or flood with fine water spray.
Unsuitable Extinguishing Media
None known.
Special Hazards Arising from the Chemical
Severe explosion hazard. Vapor/air mixtures are explosive. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.
Hazardous Combustion Products
Oxides of carbon.
Fire Fighting Measures
Move container from fire area if it can be done without risk. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped

immediately. For smaller tanks or cylinders, extinguish and isolate from other flammables. Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 500 meters (1/3 mile). Consider downwind evacuation if material is leaking. Stop flow of gas.

Special Protective Equipment and Precautions for Firefighters

Wear personal protective clothing and equipment such as self-contained breathing apparatus (SCBA) for protection against possible exposure.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up

Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304).

Environmental Precautions

Avoid release to the environment.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Keep away from heat/sparks/open flame/hot surfaces - No smoking. Use only outdoors or in a well-ventilated area. Avoid breathing dust/fume/gas/mist/vapors/spray.

Conditions for Safe Storage, Including any Incompatibilities

Store in a well-ventilated place. Keep container tightly closed.
Store locked up.
Protect from sunlight.
Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.

Incompatible Materials

metals, halogens, oxidizing materials, metal carbide, reducing agents, halo carbons

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

ACETYLENE, DISSOLVED	**74-86-2**
ACGIH:	(See Appendix F: Minimal Oxygen Content, explosion hazard)
NIOSH:	2500 ppm Ceiling ; 2662 mg/m3 Ceiling

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)

There are no biological limit values for any of this product's components.

Engineering Controls

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eye/face protection

Eye protection not required, but recommended.

Skin Protection
Protective clothing is not required.
Respiratory Protection
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Glove Recommendations
Protective gloves are not required, but recommended.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Not available	**Physical State**	gas
Odor	sweet odor	**Color**	colorless
Odor Threshold	Not available	**pH**	Not available
Melting Point	Not available	**Boiling Point**	Not available
Boiling Point Range	Not available	**Freezing point**	Not available
Evaporation Rate	Not available	**Flammability (solid, gas)**	Not available
Autoignition Temperature	305 °C (581 °F)	**Flash Point**	Not available
Lower Explosive Limit	2.5 %	**Decomposition temperature**	Not available
Upper Explosive Limit	100 %	**Vapor Pressure**	760 mmHg @ -84 °C
Vapor Density (air=1)	0.9	**Specific Gravity (water=1)**	Not available
Water Solubility	0.94 % (@ 25 °C)	**Partition coefficient: n-octanol/water**	2691.53
Viscosity	0.01 cp	**Kinematic viscosity**	Not available
Solubility (Other)	Not available	**Bioconcentration Factor (BCF)**	3.48
Density	1.1747 g/L at 0 °C	**Henry's Law Constant**	0.00277024 atm-m3/mole
KOC	4508.17 (estimated from water solubility)	**Physical Form**	gas
Sublimation	-84 °C (-119 °F)	**Molecular Formula**	H-C-C-H
Molecular Weight	26.04		

Solvent Solubility
Soluble
acetone, Benzene, chloroform, ether

Section 10 - STABILITY AND REACTIVITY

Chemical Stability
May decompose violently on heating. May explode when heated.
Possibility of Hazardous Reactions
Polymerizes with evolution of heat. Avoid contact with curing agents, accelerators, and/or initiators.
Conditions to Avoid
Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.
Incompatible Materials
metals, halogens, oxidizing materials, metal carbide, reducing agents, halo carbons
Hazardous decomposition products
Oxides of carbon

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure
Inhalation
nausea, vomiting, chest pain, wheezing, headache, drowsiness, dizziness, loss of coordination, bluish skin color, suffocation, lung congestion, coma
Skin Contact
rash
Eye Contact
no information on significant adverse effects
Ingestion
ingestion of a gas is unlikely
Acute and Chronic Toxicity
Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and no selected endpoints have been identified.
Product Toxicity Data
Acute Toxicity Estimate
No data available.
Immediate Effects
Frostbite, suffocation, Depression of central nervous system
Delayed Effects
No information on significant adverse effects.
Irritation/Corrosivity Data
No data available.
Respiratory Sensitization
No data available.
Dermal Sensitization
No data available.
Component Carcinogenicity
None of this product's components are listed by ACGIH, IARC, NTP, DFG or OSHA.
Germ Cell Mutagenicity
No data available.
Tumorigenic Data
No data available

Reproductive Toxicity
No data available.
Specific Target Organ Toxicity - Single Exposure
Category 3. central nervous system
Specific Target Organ Toxicity - Repeated Exposure
Aspiration hazard
No data available.
Medical Conditions Aggravated by Exposure
No data available.
Additional Data
Stimulants such as epinephrine may induce ventricular fibrillation.

Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity
No LOLI ecotoxicity data are available for this product's components.
Persistence and Degradability
No information available for the product.
Bioaccumulative Potential
No information available for the product.
Mobility
No information available for the product.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. D003.
Component Waste Numbers
The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

US DOT Information:
Shipping Name: ACETYLENE, DISSOLVED
Hazard Class: 2.1
UN/NA #: UN1001
Required Label(s): 2.1

TDG Information:
Shipping Name: ACETYLENE, DISSOLVED
Hazard Class: 2.1
UN#: UN1001
Required Label(s): 2.1
International Bulk Chemical Code
This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations
None of this product's components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories
Flammable; Gas Under Pressure; Specific Target Organ Toxicity

U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
ACETYLENE, DISSOLVED	**74-86-2**	Yes	Yes	Yes	Yes	Yes

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)
Not listed under California Proposition 65.

Component Analysis - Inventory
ACETYLENE, DISSOLVED (74-86-2)

US	CA	AU	CN	EU	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2
Yes	DSL	Yes	Yes	EIN	Yes	Yes	Yes	No

KR - REACH CCA	MX	NZ	PH	TH-TECI	TW, CN	VN (Draft)
No	Yes	Yes	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION

NFPA Ratings
Health: 1 Fire: 4 Instability: 3
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Summary of Changes
Updated: 05/01/2015

Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; KR REACH CCA - Korea Registration and Evaluation of Chemical Substances Chemical Control Act; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; Ne- Non-specific; NFPA

- National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL – Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TH-TECI - Thailand - FDA Existing Chemicals Inventory (TECI); TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada).

Other Information

Disclaimer:

Matheson Tri-Gas, Inc. makes no express or implied warranties, guarantees or representations regarding the product or the information herein, including but not limited to any implied warranty or merchantability or fitness for use. Matheson Tri-Gas, Inc. shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use or reliance upon the information herein.

SAFETY DATA SHEET

Revision Date 15-October-2020 **WHMIS - Hazardous Products Regulations (SOR/2015-17)** **Revision Number** 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name Ag/AgCl Reference Electrode Filling Solution

Product No 900011

Pure substance/mixture Mixture

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Use as laboratory reagent

Uses advised against No Information available

Importer/Distributor
Fisher Scientific
112 Colonnade Road,
Ottawa, ON K2E 7L6,
Canada
Tel: 1-800-234-7437

Manufacturer, Importer, Supplier
Thermo Fisher Scientific©
Water and Lab Products
22 Alpha Road
Chelmsford, MA 01824, USA
1-978-232-6000

E-mail address info.water@thermo.com

Made in USA

Emergency Telephone 24 Hour Emergency Phone Number
CHEMTREC®
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: 1-703-527-3887
(collect calls accepted)

RCC-CW000796

2. HAZARDS IDENTIFICATION

Classification

WHMIS 2015 Classification Classified as hazardous under the Hazardous Products Regulations (SOR/2015-17)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2A

Label Elements

Signal Word
Warning

Hazard Statements
Causes skin irritation
Causes serious eye irritation

Precautionary Statements

Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Avoid release to the environment

Response
IF ON SKIN: Wash with plenty of soap and water
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If skin irritation occurs: Get medical advice/attention
If eye irritation persists: Get medical advice/attention
Take off contaminated clothing
Collect spillage

Disposal
Dispose of contents/container to an approved waste disposal plant

Other Information

Harmful to aquatic life with long lasting effects
No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No	Weight %
Water	7732-18-5	60 - 70%
Potassium chloride	7447-40-7	20 - 30%
Silver nitrate	7761-88-8	0.1 - 1.0%

Triton™ X-100	9002-93-1	<0.1%

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

First aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Protection of First-aiders Use personal protective equipment as required. See section 8 for more information. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms and effects, both acute and delayed

Most important symptoms/effects None reasonably foreseeable

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
No information available

Specific Hazards Arising from the Chemical
No information available.

Explosion Data
Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required.
Environmental Precautions Do not flush into surface water or sanitary sewer system.

Methods and Material for Containment and Cleaning Up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning Up Soak up with inert absorbent material. Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for Safe Handling

Handling Wear personal protective equipment/face protection
Ensure adequate ventilation
Do not get in eyes, on skin, or on clothing
Avoid ingestion and inhalation

Conditions for Safe Storage, Including any Incompatibilities

Storage Keep container tightly closed in a dry and well-ventilated place
Store at room temperature in the original container
Protect from direct sunlight

Incompatible Products No information available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Component	Alberta	British Columbia	Ontario TWAEV	Quebec	ACGIH TLV	OSHA PEL	NIOSH IDLH
Silver nitrate	TWA: 0.01 mg/m³	TWA: 0.01 mg/m³ STEL: 0.03 mg/m³	TWA: 0.01 mg/m³	TWA: 0.01 mg/m³	TWA: 0.01 mg/m³	(Vacated) TWA: 0.01 mg/m³	IDLH: 10 mg/m³ TWA: 0.01 mg/m³

Legend
ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value
OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits
NIOSH IDLH: *NIOSH - National Institute for Occupational Safety and Health IDLH - Immediately Dangerous to Life or Health*

Appropriate engineering controls

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location

Individual protection measures, such as personal protective equipment

Eye/face Protection Wear chemical splash goggles and face shield. If splashes are likely to occur:. Face protection shield.

Skin and Body Protection Wear protective gloves/protective clothing.

Respiratory Protection None under normal use conditions. In case of inadequate ventilation wear respiratory protection.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State Liquid
Appearance Clear
Odor None

Odor Threshold	No information available
pH	6.75
PH Range	5.0 - 9.0

Property	**Values**	**Remarks • Method**
Melting point/freezing point	No information available	
Boiling Point/Range	~ 100 °C / 212 °F	
Flash Point (High in °C)	N/A	
Evaporation Rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor Density	No information available	
Specific Gravity	No information available	
Water Solubility	Soluble in water	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition Temperature	-	
Decomposition Temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive Properties	No information available	
Oxidizing Properties	No information available	

Other Information

Softening Point	No information available
Molecular Weight	No information available
VOC Content(%)	No information available
Density	No Information available
Bulk Density	No information available

10. STABILITY AND REACTIVITY

Reactivity
No Information available

Chemical Stability
Stable under normal conditions

Possibility of Hazardous Reactions
None under normal processing

Conditions to Avoid
Extremes of temperature and direct sunlight.

Incompatible Materials
No information available

Hazardous Decomposition Products
Thermal decomposition can lead to release of irritating gases and vapors.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation No information available

Eye Contact No information available

Skin Contact No information available

Ingestion No information available

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water 7732-18-5	LD50 > 90 mL/kg (Rat)	-	-
Potassium chloride 7447-40-7	LD50 = 2600 mg/kg (Rat)	-	-
Silver nitrate 7761-88-8	LD50 = 1173 mg/kg (Rat)	-	-
Triton™ X-100 9002-93-1	LD50 = 1800 mg/kg (Rat)	-	-

Information on Toxicological Effects

Symptoms No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available

Mutagenic Effects No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed
Potassium chloride	7447-40-7	Not listed	Not listed	Not listed	Not listed
Silver nitrate	7761-88-8	Not listed	Not listed	Not listed	Not listed
Triton™ X-100	9002-93-1	Not listed	Not listed	Not listed	Not listed

Reproductive Effects No information available

STOT - single exposure No information available

STOT - repeated exposure No information available

Aspiration hazard No information available

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral) 8329 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment

Component	Freshwater Algae	Freshwater Fish	Water Flea
Potassium chloride 7447-40-7	EC50: = 2500 mg/L, 72h (Desmodesmus subspicatus)	LC50: = 1060 mg/L, 96h static (Lepomis macrochirus) LC50: 750 - 1020 mg/L, 96h static (Pimephales promelas)	EC50: = 83 mg/L, 48h Static (Daphnia magna) EC50: = 825 mg/L, 48h (Daphnia magna)
Silver nitrate	-	LC50: 0.009 - 0.02 mg/L, 96h	EC50: 0.0008 - 0.0011 mg/L, 48h

7761-88-8		flow-through (Lepomis macrochirus) LC50: 0.00512 - 0.00787 mg/L, 96h semi-static (Poecilia reticulata) LC50: = 0.0027 mg/L, 96h semi-static (Cyprinus carpio) LC50: = 0.009 mg/L, 96h (Pimephales promelas) LC50: 0.0064 - 0.0106 mg/L, 96h semi-static (Pimephales promelas) LC50: 0.00181 - 0.00214 mg/L, 96h static (Pimephales promelas) LC50: 0.00452 - 0.00638 mg/L, 96h flow-through (Pimephales promelas) LC50: 0.00839 - 0.1802 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 0.0075 mg/L, 96h semi-static (Oncorhynchus mykiss) LC50: 0.001339 - 0.001637 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: 0.05 - 0.07 mg/L, 96h static (Lepomis macrochirus) LC50: 0.0242 - 0.0484 mg/L, 96h semi-static (Lepomis macrochirus)	Static (Daphnia magna) EC50: 0.0008 - 0.001 mg/L, 48h Flow through (Daphnia magna) EC50: = 0.0006 mg/L, 48h (Daphnia magna)

Persistence and Degradability
No information available

Bioaccumulation/ Accumulation
No information available

Mobility
No information available

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste Disposal Methods Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point.

Component	CAWAST
Silver nitrate 7761-88-8	Toxic

14. TRANSPORT INFORMATION

TDG Not regulated

DOT Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

CANINV	Complies
United States of America Inventory	Complies
EINECS/ELINCS	Does not Comply
ENCS	Does not Comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:
CANINV/ DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
USINV/ TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japanese Existing and New Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

Canada

SDS in compliance with provisions of information as set out in Canadian Standard - Part 4, Schedule 1 and 2 of the Hazardous Products Regulations (HPR) and meets the requirements of the HPR (Paragraph 13(1)(a) of the Hazardous Products Act (HPA)).

Component	Canada - National Pollutant Release Inventory (NPRI)	Canadian Environmental Protection Agency (CEPA) - List of Toxic Substances	Canada's Chemicals Management Plan (CEPA)
Silver nitrate	Part 1, Group A Substance		
Triton™ X-100	Part 1, Group A Substance		

16. OTHER INFORMATION

Prepared By	Regulatory Affairs
Prepared For	Thermo Fisher Scientific Inc.©
Issue Date	No information available
Revision Date	15-October-2020
Reason for revision	SDS sections updated.

Disclaimer
IMPORTANT: The information contained in this SDS is correct to the best of our knowledge as of the issue date (or subsequent revision date, if any), and is to be used only as a guide. This SDS does not constitute a guarantee (express or implied) of any kind and we make no warranties of any kind as to the accuracy or completeness of the information contained herein or the merchantability or fitness of the product or this information for a particular purpose. It is the responsibility of each individual buyer/user to determine the suitability of this information and the product for its intended purposes. Product sales are subject to Thermo Fisher Scientifics standard terms and conditions of sale. This information relates only to the designated product as shipped and may not be valid if the product is used in combination with any other materials or is not used in accordance with our instructions, or is altered in any way. It is the responsibility of the buyer/user to ensure that its activities comply with all applicable government requirements. Since conditions of use of the product are not under direct control of Thermo Fisher Scientific, it is the duty of the buyer/user to determine the necessary conditions for the safe use of the product. Thermo Fisher Scientific will not be liable for any injuries or damages resulting from handling, use, misuse or contact with the product.

End of Safety Data Sheet

Safety Data Sheet

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Revision date: 28.05.2015 *Version: 1.0* *Print date: 31.05.2015*

SECTION 1: Identification

Product identifier

Trade name/designation:	Isopropyl acohol 70% v/v
Product No.:	BDH7999
Substance name:	2-Propanol (≥ 50%)
CAS No.:	67-63-0
INDEX No.:	000-000-00-0
REACH registration No.:	Not yet communicated down the supply chain.
Other means of identification:	

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses:	General chemical reagent

Details of the supplier of the safety data sheet

VWR International, LLC

Street	100 Matsonford Road
Postal code/city	Radnor, PA 19087-8660
Telephone	610-386-1700
E-mail	www.vwr.com

Emergency telephone

Telephone	+1-800-424-9300 (Chemtrec, 24 hrs/day, 7 days/week, USA)

VWR International Co.

Street	2360 Argentia Road
Postal code/city	Mississauga, ON, L5N 5Z7
Telephone	800-932-5000
E-mail	www.vwr.com

Emergency telephone

Telephone	+1-613-996-6666 (Canutec, 24 hrs/day, 7 days/week, Canada)

SECTION 2: Hazards identification

Classification of the substance or mixture

Classification according GHS

Hazard classes and hazard categories	Hazard statements
Flammable liquid, category 2	H225
Eye irritation, category 2	H319
Specific target organ toxicity (single exposure), category 3, narcotic effect	H336

Classification according to Directive 67/548/EEC or 1999/45/EC

F	Highly flammable	R11
Xi	Irritant	R36
		R67

Label elements

Labelling according GHS

Hazard pictograms

Signal word: Danger

Hazard statements	
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Precautionary statements	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Labelling (67/548/EEC or 1999/45/EC)

Hazard symbols

F, Xi

R-phrases	
R11	Highly flammable.
R36	Irritating to eyes.
R67	Vapours may cause drowsiness and dizziness.

S-phrases	
S7	Keep container tightly closed.
S16	Keep away from sources of ignition - No smoking.
S24/25	Avoid contact with skin and eyes.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Other hazards

SVHC No

SECTION 3: Composition / information on ingredients

Hazardous ingredients Classification according to the OSHA Hazard Communication Standard 29 CFR 1910.1200

Substance name	Concentration	Product identifier	Hazard classes and hazard categories
2-Propanol	>50%	CAS No.: EC No.: REACH No.: Not yet communicated down the supply chain.	Flammable liquid, category 2 - H225 Eye irritation, category 2 - H319 Specific target organ toxicity (single exposure), category 3, narcotic effect - H336

Hazardous ingredients Classification according to 67/548/EEC

Substance name	Concentration	Product identifier	Hazard classes and hazard categories
2-Propanol	>50%	CAS No.: EC No.: REACH No.: Not yet communicated down the supply chain.	F, Highly flammable, R11 Xi, Irritant, R36 R67

SECTION 4: First aid measures

General information

When in doubt or if symptoms are observed, get medical advice. If unconscious place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person or a person with cramps. Change contaminated, saturated clothing. Do not leave affected person unattended.

After inhalation

Remove casualty to fresh air and keep warm and at rest. If breathing is irregular or stopped, administer artificial respiration. In case of respiratory tract irritation, consult a physician.

In case of skin contact

After contact with skin, wash immediately with plenty of water and soap. Remove contaminated, saturated clothing immediately. In case of skin reactions, consult a physician.

After eye contact

In case of contact with eyes flush immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart and consult an ophthalmologist. Protect uninjured eye. Remove contact lenses, if present and easy to do. Continue rinsing.

In case of ingestion

If accidentally swallowed rinse the mouth with plenty of water (only if the person is conscious) and obtain immediate medical attention. Do NOT induce vomiting. Give nothing to eat or drink.

Most important symptoms and effects, both acute and delayed

no data available

Indication of any immediate medical attention and special treatment needed

no data available

Self-protection of the first aider

First aider: Pay attention to self-protection!

Information to physician

no data available

SECTION 5: Firefighting measures

Extinguishing media

Suitable extinguishing media

Water spray ABC-powder Carbon dioxide (CO2) Nitrogen

Extinguishing media which must not be used for safety reasons

no restriction

Special hazards arising from the substance or mixture

In case of fire may be liberated: Carbon dioxide (CO2) Carbon monoxide

Advice for firefighters

DO NOT fight fire when fire reaches explosives. In case of fire: Wear self-contained breathing apparatus.

Additional information

Do not allow run-off from fire-fighting to enter drains or water courses. Do not inhale explosion and combustion gases. Use caution when applying carbon dioxide in confined spaces. Carbon dioxide can displace oxygen. Use water spray jet to protect personnel and to cool endangered containers.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Avoid generation of dust. Do not breathe dust/fume/gas/mist/vapours/spray. Provide adequate ventilation. Remove all sources of ignition. Use personal protection equipment. The accumulation in lowlying or closen rooms can cause increased danger of fire and explosion. The vapour of the product is heavier than air and may accumulate below ground level, in pits, channels and basements in higher concentration. In case of major fire and large quantities: Remove persons to safety.

Environmental precautions

Do not allow to enter into surface water or drains. Make sure spills can be contained, e.g. in sump pallets or kerbed areas. Discharge into the environment must be avoided.

Methods and material for containment and cleaning up

Spilled product must never be returned to the original container for recycling. Prevent spread over a wide area (e.g. by containment or oil barriers). Soak up inert absorbent and dispose as waste requiring special attention.

Additional information

Clear spills immediately.

SECTION 7: Handling and storage

Precautions for safe handling

Avoid: Inhalation Avoid contact with skin and eyes. Use extractor hood (laboratory). If handled uncovered, arrangements with local exhaust ventilation have to be used. If local exhaust ventilation is not possible or not sufficient, the entire working area must be ventilated by technical means. Keep away from sources of ignition. - No smoking. Usual measures for fire prevention. Take precautionary measures against static discharges. Protect from moisture.

Conditions for safe storage, including any incompatibilities

storage temperature: 15-25 °C

Storage class: 3

Keep container tightly closed in a cool, well-ventilated place. Always close containers tightly after the removal of product. Store product under (gas): Protective gas, dry Do not allow contact with air.

Specific end use(s)

no data available

SECTION 8: Exposure controls/personal protection

Control parameters

Ingredient (Designation)	Regulatory information	Country	Limit value type (country of origin)	Limit value	Remark
2-Propanol	OSHA	US	LTV	980 mg/m³ - 400 ppm	
2-Propanol	NIOSH	US	LTV	980 mg/m³ - 400 ppm	
2-Propanol	NIOSH	US	STV	1225 mg/m³ - 500 ppm	15 minutes average value

Exposure controls

Appropriate engineering controls

Technical measures and the application of suitable work processes have priority over personal protection equipment. If handled uncovered, arrangements with local exhaust ventilation have to be used.

Personal protection equipment

Wear suitable protective clothing. When handling with chemical substances, protective clothing with CE-labels including the four control digits must be worn. For the protection against direct skin contact, body protective clothing is essential (in addition to the usual working clothes).

Eye/face protection

Eye glasses with side protection DIN-/EN-Norms: DIN EN 166

Recommendation: VWR 111-0432

Skin protection

When handling with chemical substances, protective gloves must be worn with the CE-label including the four control digits. Recommended glove articles DIN-/EN-Norms: DIN EN 374 In the case of wanting to use the gloves again, clean them before taking off and air them well.

<u>By short-term hand contact</u>

Suitable material:	NBR (Nitrile rubber)
Thickness of the glove material:	0,12 mm
Breakthrough time (maximum wearing time):	51 min
Recommended glove articles:	VWR 112-0998

<u>By long-term hand contact</u>

Suitable material:	NBR (Nitrile rubber)
Thickness of the glove material:	0,38 mm
Breakthrough time (maximum wearing time):	> 480 min
Recommended glove articles:	VWR 112-3717 / 112-1381

Respiratory protection

Respiratory protection necessary at: aerosol or mist formation

Suitable respiratory protection apparatus:	Full-/half-/quarter-face masks (DIN EN 136/140)
Recommendation:	VWR 111-0206
Suitable material:	A2B2E2K2P3
Recommendation:	VWR 111-0059

Additional information

Wash hands before breaks and after work. Avoid contact with skin and eyes. When using do not eat, drink or smoke. Provide eye shower and label its location conspicuously.

Environmental exposure controls

no data available

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

(a) Appearance	
Physical state:	liquid
Colour:	colourless
(b) Odour:	no data available
(c) Odour threshold:	no data available

Safety relevant basic data

(d) pH:	no data available
(e) Melting point/freezing point:	no data available
(f) Initial boiling point and boiling range:	no data available
(g) Flash point:	17 °C
(h) Evaporation rate:	no data available
(i) Flammability (solid, gas):	Highly flammable liquid and vapour.
(j) Upper/lower flammability or explosive limits	
Lower explosion limit:	no data available
Upper explosion limit:	no data available
(k) Vapour pressure:	no data available
(l) Vapour density:	no data available
(m) Relative density:	0.8 - 0.92 g/cm³ (20 °C)
(n) Solubility(ies)	
at 20 °C:	no data available
Soluble (g/L) in:	no data available
(o) Partition coefficient: n-octanol/water:	no data available
(p) Auto-ignition temperature:	no data available
(q) Decomposition temperature:	no data available
(r) Viscosity	
Kinematic viscosity:	no data available
Dynamic viscosity:	no data available
(s) Explosive properties:	not applicable
(t) Oxidising properties:	not applicable

Other information

Bulk density:	no data available
Refraction index:	no data available

Dissociation constant:	no data available
Surface tension:	no data available
Henry constant:	no data available

SECTION 10: Stability and reactivity

Reactivity

no data available

Chemical stability

no data available

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Incompatible materials

no data available

Hazardous decomposition products

no data available

Additional information

no data available

SECTION 11: Toxicological information

Information on toxicological effects

Acute effects

Acute oral toxicity:
LD50 (oral. Rat): 5045 mg/kg (RTECS) (anhydrous)

Acute dermal toxicity:
LD50 (dermal. Rabbit): 12800 mg/kg (RTECS) (anhydrous)

Acute inhalation toxicity:
no data available

Irritant and corrosive effects

Primary irritation to the skin:
not applicable

Irritation to eyes:
Causes serious eye irritation.

Irritation to respiratory tract:
not applicable

Respiratory or skin sensitisation
In case of skin contact: not sensitising
After inhalation: not sensitising

STOT-single exposure
May cause drowsiness or dizziness.

STOT-repeated exposure
not applicable

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)
Carcinogenicity
No indication of human carcinogenicity.

Germ cell mutagenicity
No indications of human germ cell mutagenicity exist.

Reproductive toxicity
No indications of human reproductive toxicity exist.

Aspiration hazard
not applicable

Other adverse effects
no data available

Additional information
no data available

SECTION 12: Ecological information

Ecotoxicity

Acute (short-term) fish toxicity:
no data available

Chronic (long-term) fish toxicity:
no data available

Acute (short-term) daphnia toxicity:
no data available

Chronic (long-term) daphnia toxicity:
no data available

Acute (short-term) algae toxicity:
no data available

Chronic (long-term) algae toxicity:
no data available

Persistence and degradability
no data available

Bioaccumulative potential
Partition coefficient: n-octanol/water: no data available

Mobility in soil:
no data available

Results of PBT/vPvB assessment
no data available

Other adverse effects
no data available

SECTION 13: Disposal considerations

Waste treatment methods

Appropriate disposal / Product
Dispose according to local legislation. Consult the appropriate local waste disposal expert about waste disposal.

Waste code product: no data available

Appropriate disposal / Package
Dispose according to local legislation. Handle contaminated packages in the same way as the substance itself.

Additional information
no data available

SECTION 14: Transport information

Land transport (ADR/RID/DOT)

UN-No.:	1219
Proper Shipping Name:	ISOPROPANOL
Class(es):	3
Classification code:	F1
Hazard label(s):	3
Packing group:	II
Environmental hazards:	No
Special precautions for user:	
Hazard identification number (Kemler No.):	33
Tunnel restriction code:	D/E (Passage forbidden through tunnels of category D when carried in bulk or in tanks. Passage forbidden through tunnels of category E.)

Sea transport (IMDG)

UN-No.:	1219
Proper Shipping Name:	ISOPROPANOL
Class(es):	3
Classification code:	
Hazard label(s):	3
Packing group:	II
Environmental hazards:	No
MARINE POLLUTANT:	No
Special precautions for user:	
Segregation group:	-

EmS-No. F-E S-D
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
not relevant

Air transport (ICAO-TI / IATA-DGR)

UN-No.:	1219
Proper Shipping Name:	ISOPROPANOL
Class(es):	3
Classification code:	F1
Hazard label(s):	3
Packing group:	II
Special precautions for user	not relevant

SECTION 15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

General rules

Water hazard class (WGK): slightly hazardous to water (WGK 1)

California Prop 65 Components

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Chemical Safety Assessment

no data available

SECTION 16: Other information

Abbreviations and acronyms

ACGIH - American Conference of Governmental Industrial Hygiensts
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
AGS - Committee on Hazardous Substances (Ausschuss für Gefahrstoffe)
CLP - Regulation on Classification, Labelling and Packaging of Substances and Mixtures
DFG - German Research Foundation (Deutsche Forschungsgemeinschaft)
DOT – U.S. Department of Transportation
Gestis - Information system on hazardous substances of the German Social Accident Insurance (Gefahrstoffinformationssystem der Deutschen Gesetzlichen Unfallversicherung)
IATA-DGR - International Air Transport Association-Dangerous Goods Regulations
ICAO-TI - International Civil Aviation Organization-Technical Instructions
IMDG - International Maritime Code for Dangerous Goods
LTV - Long Term Value
NIOSH - National Institute for Occupational Safety and Health
OSHA - Occupational Safety & Health Administration
PBT - Persistent, Bioaccumulative and Toxic
RID - Regulation concerning the International Carriage of Dangerous Goods by Rail
STV - Short Term Value
SVHC - Substances of Very High Concern
vPvB - very Persistent, very Bioaccumulative

Additional information

Indication of changes: general update

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

SAFETY DATA SHEET

Creation Date 08-Jul-2009 **Revision Date** 31-Dec-2020 **Revision Number** 8

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description:	**Ammonium hydrogen difluoride**
Cat No. :	**A/5280/62, A/5280/70, A/5280/53**
Synonyms	Ammonium bifluoride
CAS-No	1341-49-7
EC-No.	215-676-4
Molecular Formula	H5 F2 N
Reach Registration Number	-

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use	Laboratory chemicals.
Sector of use	SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites
Product category	PC21 - Laboratory chemicals
Process categories	PROC15 - Use as a laboratory reagent
Environmental release category	ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
Uses advised against	No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

Chemtrec US: (800) 424-9300
Chemtrec EU: 001 (202) 483-7616
Tel: 01509 231166

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Based on available data, the classification criteria are not met

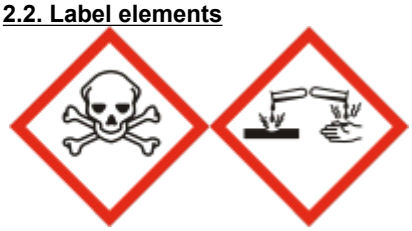
Health hazards

Acute oral toxicity	Category 3 (H301)
Skin Corrosion/Irritation	Category 1 B (H314)
Serious Eye Damage/Eye Irritation	Category 1 (H318)

Environmental hazards
Based on available data, the classification criteria are not met

Full text of Hazard Statements: see section 16

2.2. Label elements



Signal Word **Danger**

Hazard Statements
H301 - Toxic if swallowed
H314 - Causes severe skin burns and eye damage

Precautionary Statements
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P330 + P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower

2.3. Other hazards

In accordance with Annex XIII of the REACH Regulation, inorganic substances do not require assessment

Toxic to terrestrial vertebrates

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Ammonium bifluoride	1341-49-7	215-676-4	>95	Acute Tox. 3 (H301) Skin Corr. 1B (H314) Eye Dam. 1 (H318)

Component	Specific concentration limits	M-Factor	Component notes

	(SCL's)		
Ammonium bifluoride	Eye Irrit. 2 :: 0.1%<=C<1% Skin Corr. 1B :: C>=1% Skin Irrit. 2 :: 0.1%<=C<1%	-	-

Reach Registration Number	-

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

4.2. Most important symptoms and effects, both acute and delayed

Causes burns by all exposure routes. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. CO_2, dry chemical, dry sand, alcohol-resistant foam.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

The product causes burns of eyes, skin and mucous membranes.

Hazardous Combustion Products
Hydrogen fluoride, Ammonia.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Evacuate personnel to safe areas. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid dust formation.

6.2. Environmental precautions

Should not be released into the environment.

6.3. Methods and material for containment and cleaning up

Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not ingest. If swallowed then seek immediate medical assistance. Do not breathe (dust, vapor, mist, gas). Avoid dust formation.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2. Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from moisture. Corrosives area. Store under an inert atmosphere.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 6.1D

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits

List source(s): **UK** - EH40/2005 Work Exposure Limits, Third edition. Published 2018.

Component	The United Kingdom	European Union	Ireland
Ammonium bifluoride	STEL: 7.5 mg/m³ 15 min TWA: 2.5 mg/m³ 8 hr		

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

Derived No Effect Level (DNEL) Workers

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				
Inhalation		3.8 mg/m³		2.3 mg/m³

Predicted No Effect Concentration (PNEC) No information available.

Fresh water	1.3 mg/L
Microorganisms in sewage treatment	76 mg/L
Soil (Agriculture)	22 mg/kg

8.2. Exposure controls

Engineering Measures
Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Natural rubber Nitrile rubber Neoprene PVC	See manufacturers recommendations	-	EN 374	(minimum requirement)

Skin and body protection Long sleeved clothing

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly
Large scale/emergency use	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced **Recommended Filter type:** Particulates filter conforming to EN 143
Small scale/Laboratory use	Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. **Recommended half mask:-** Particle filtering: EN149:2001 When RPE is used a face piece Fit Test should be conducted
Environmental exposure controls	No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Solid	
Appearance	White	
Odor	pungent	
Odor Threshold	No data available	
Melting Point/Range	125 °C / 257 °F	
Softening Point	No data available	
Boiling Point/Range	230 °C / 446 °F	@ 760 mmHg
Flammability (liquid)	Not applicable	Solid
Flammability (solid,gas)	No information available	
Explosion Limits	No data available	
Flash Point	No information available	**Method -** No information available
Autoignition Temperature	No data available	
Decomposition Temperature	> 230°C	
pH	3.5	5% aq. solution
Viscosity	Not applicable	Solid
Water Solubility	630 g/L (20°C)	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Vapor Pressure	1 hPa @ 20 °C	
Density / Specific Gravity	1.50	
Bulk Density	No data available	
Vapor Density	Not applicable	Solid
Particle characteristics	No data available	

9.2. Other information

Molecular Formula	H5 F2 N
Molecular Weight	57.04
Evaporation Rate	Not applicable - Solid

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Hygroscopic.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions None under normal processing.

10.4. Conditions to avoid

Avoid dust formation. Incompatible products. Excess heat. Exposure to moisture. Exposure to moist air or water.

10.5. Incompatible materials

Strong acids. Strong bases.

10.6. Hazardous decomposition products

Hydrogen fluoride. Ammonia.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

(a) acute toxicity;
Oral Category 3
Dermal Based on available data, the classification criteria are not met
Inhalation Based on available data, the classification criteria are not met

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ammonium bifluoride	LD50 = 130 mg/kg (Rat)	-	-

(b) skin corrosion/irritation; Category 1 B

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;
Respiratory Based on available data, the classification criteria are not met
Skin Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; Based on available data, the classification criteria are not met

(f) carcinogenicity; Based on available data, the classification criteria are not met

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; Based on available data, the classification criteria are not met

(h) STOT-single exposure; Based on available data, the classification criteria are not met

(i) STOT-repeated exposure; Based on available data, the classification criteria are not met

Target Organs	None known.
(j) aspiration hazard;	Not applicable Solid
Symptoms / effects,both acute and delayed	Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated.

11.2. Information on other hazards

Endocrine Disrupting Properties	Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecotoxicity effects	Do not empty into drains. .

12.2. Persistence and degradability

Persistence	Soluble in water, Persistence is unlikely, based on information available.
Degradability	Not relevant for inorganic substances.

12.3. Bioaccumulative potential	Bioaccumulation is unlikely
12.4. Mobility in soil	The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility. Highly mobile in soils
12.5. Results of PBT and vPvB assessment	In accordance with Annex XIII of the REACH Regulation, inorganic substances do not require assessment.

12.6. Endocrine disrupting properties

Endocrine Disruptor Information	This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects

Persistent Organic Pollutant	This product does not contain any known or suspected substance
Ozone Depletion Potential	This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products	Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.
Contaminated Packaging	Dispose of this container to hazardous or special waste collection point.
European Waste Catalogue (EWC)	According to the European Waste Catalog, Waste Codes are not product specific, but

application specific.

Other Information Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Do not flush to sewer. Large amounts will affect pH and harm aquatic organisms.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

14.1. UN number	UN1727
14.2. UN proper shipping name	AMMONIUM HYDROGENDIFLUORIDE, SOLID
14.3. Transport hazard class(es)	8
14.4. Packing group	II

ADR

14.1. UN number	UN1727
14.2. UN proper shipping name	AMMONIUM HYDROGENDIFLUORIDE, SOLID
14.3. Transport hazard class(es)	8
14.4. Packing group	II

IATA

14.1. UN number	UN1727
14.2. UN proper shipping name	AMMONIUM HYDROGENDIFLUORIDE, SOLID
14.3. Transport hazard class(es)	8
14.4. Packing group	II

14.5. Environmental hazards No hazards identified

14.6. Special precautions for user No special precautions required

14.7. Maritime transport in bulk according to IMO instruments Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories
X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Australia (AICS), Korea (ECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Ammonium bifluoride	215-676-4	-		X	X	-	X	X	X	X	KE-01679

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals
Not applicable

National Regulations

WGK Classification See table for values

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class

Ammonium bifluoride	WGK1	

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3
H301 - Toxic if swallowed
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC (volatile organic compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
First aid for chemical exposure, including the use of eye wash and safety showers.

Creation Date	08-Jul-2009
Revision Date	31-Dec-2020
Revision Summary	Update to CLP Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006 COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

SAFETY DATA SHEET
according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Revision Date 05/08/2020 Version 2.0

SECTION 1.Identification

Product identifier

Product number	AX1308
Product name	Ammonium Hydroxide OmniTrace Ultra™

Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Reagent for analysis

Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation | 400 Summit Drive | Burlington | Massachusetts 01803 | United States of America | General Inquiries: +1 800-645-5476 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) MilliporeSigma is a business of Merck KGaA, Darmstadt, Germany.
Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Skin corrosion, Category 1B, H314
Serious eye damage, Category 1, H318
Specific target organ systemic toxicity - single exposure, Category 3, Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS-Labeling

Hazard pictograms

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Signal Word
Danger

Hazard Statements
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary Statements
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER/doctor.
P321 Specific treatment (see supplemental first aid instructions on this label).
P363 Wash contaminated clothing before reuse.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. Composition/information on ingredients

Chemical nature Aqueous ammoniacal solution.

Hazardous ingredients

Chemical name (Concentration)
CAS-No.
ammonia solution (>= 10 % - < 30 %)
1336-21-6
Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures

Description of first-aid measures

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

General advice
First aider needs to protect himself.

Inhalation
After inhalation: fresh air. Call in physician.

Skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

Eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

Ingestion
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation!). Call a physician immediately. Do not attempt to neutralize.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
Risk of blindness!
Irritation and corrosion, Cough, Shortness of breath
bronchitis, gastric pain, Bloody vomiting, Nausea, collapse, shock, Unconsciousness

Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture
Not combustible.
Ammonia solution itself is not flammable, but can form an ignitable ammonia/air-mixture by outgassing.
Ambient fire may liberate hazardous vapors.
Fire may cause evolution of:
nitrogen oxides

Advice for firefighters

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Special protective equipment for fire-fighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Cool closed containers exposed to fire with water spray. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Ensure adequate ventilation. Avoid substance contact. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

Environmental precautions

Do not let product enter drains.

Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills.
Observe possible material restrictions (see sections 7 and 10).
Take up with liquid-absorbent and neutralizing material (e.g. Chemizorb® OH^-, Art. No. 101596). Dispose of properly. Clean up affected area.

SECTION 7. Handling and storage

Precautions for safe handling

Observe label precautions.

Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers
No metal containers.

Tightly closed.

Store at room temperature.

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Components

Basis	Value	Threshold limits	Remarks
ammonia solution 1336-21-6			
ACGIH	Time Weighted Average (TWA):	25 ppm	
	Short Term Exposure Limit (STEL):	35 ppm	
NIOSH/GUIDE	Recommended exposure limit (REL):	25 ppm 18 mg/m³	
	Short Term Exposure Limit (STEL):	35 ppm 27 mg/m³	
OSHA_TRANS	PEL:	50 ppm 35 mg/m³	
Z1A	Short Term Exposure Limit (STEL):	35 ppm 27 mg/m³	

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures

Immediately change contaminated clothing. Apply skin- protective barrier cream.
Wash hands and face after working with substance.

Eye/face protection

Tightly fitting safety goggles

Hand protection

full contact:

Glove material:	butyl-rubber
Glove thickness:	0.7 mm
Break through time:	480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0.40 mm
Break through time:	240 min

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 898 Butoject® (full contact), KCL 730 Camatril® -Velours (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment:
protective clothing

Respiratory protection
required when vapors/aerosols are generated.
Recommended Filter type: Filter K (acc. to DIN 3181) for NH_3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are performed according to the instructions of the producer.
These measures have to be properly documented.

SECTION 9. Physical and chemical properties

Physical state	liquid
Color	clear
Odor	ammoniacal
Odor Threshold	No information available.
pH	alkaline
Melting point	No information available.
Boiling point	No information available.
Flash point	No information available.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	No information available.

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Upper explosion limit	No information available.
Vapor pressure	No information available.
Relative vapor density	No information available.
Density	No information available.
Relative density	No information available.
Water solubility	at 68 °F (20 °C) soluble
Partition coefficient: n-octanol/water	No information available.
Autoignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	Not classified as explosive.
Oxidizing properties	none
Minimum ignition energy	380 - 680 mJ

SECTION 10. Stability and reactivity

Reactivity

See below

Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .
Ammonia solution itself is not flammable, but can form an ignitable ammonia/air-mixture by outgassing.

Possibility of hazardous reactions

Exothermic reaction with:

Acetaldehyde, Acrolein, Alkaline earth metals, halides, Bromine, halogen-halogen compounds, hydrogen bromide, Hydrogen chloride gas, dimethylsulfate, nitrogen oxides, Fluorine, Hydrogen fluoride, chlorates, carbon dioxide, mercaptans, nitryl compounds, Phosgene, platinum, Acids, sulfur dioxide, hydrogen sulfide

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Risk of explosion with:

antimony hydride, Calcium, Chlorine, azides, halogen oxides, auric salts, halogens, iodine, perchlorates, sodium hypochlorite, Oxidizing agents, Mercury, mercury compounds, Oxygen, sulfur, silver, silver salt, silver oxide, nitrogen trichloride, hydrogen peroxide, Chlorites

Risk of ignition or formation of inflammable gases or vapors with:

boron compounds, chromyl chloride, Oxides of phosphorus, Nitric acid, silicon compounds

Conditions to avoid

no information available

Incompatible materials

Aluminum, Lead, Copper, various metals, metal alloys, Nickel, silver, Zinc

Hazardous decomposition products

in the event of fire: See section 5.

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Eye contact, Skin contact

Acute oral toxicity
Symptoms: Bloody vomiting, gastric pain, If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Acute inhalation toxicity

Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Inhalation may lead to the formation of oedemas in the respiratory tract.

Skin irritation
Dermatitis Necrosis
Mixture causes burns.

Eye irritation
Mixture causes serious eye damage. Risk of blindness!

Specific target organ systemic toxicity - single exposure
May cause respiratory irritation.
Target Organs: Respiratory system

Specific target organ systemic toxicity - repeated exposure

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Further information
Systemic effects:
Nausea, shock, Shortness of breath, bronchitis, collapse, Unconsciousness
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

Components

ammonia solution
No information available.

SECTION 12. Ecological information

Ecotoxicity
No information available.

Persistence and degradability
No information available.

Bioaccumulative potential
No information available.

Mobility in soil
No information available.

Additional ecological information
Harmful effect due to pH shift. Forms corrosive mixtures with water even if diluted.
Discharge into the environment must be avoided.

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Components

ammonia solution

Substance does not meets the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

UN number	UN 2672
Proper shipping name	AMMONIA SOLUTION
Class	8
Packing group	III
Environmentally hazardous	--

Air transport (IATA)

UN number	UN 2672
Proper shipping name	AMMONIA SOLUTION
Class	8
Packing group	III
Environmentally hazardous	--
Special precautions for user	no

Sea transport (IMDG)

UN number	UN 2672
Proper shipping name	AMMONIA SOLUTION
Class	8
Packing group	III

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Environmentally hazardous	--
Special precautions for user	yes
EmS	F-A S-B

SECTION 15. Regulatory information

United States of America

SARA 313
The following components are subject to reporting levels established by SARA Title III, Section 313:
Components
ammonia solution 1336-21-6 *22 %*

SARA 302
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

Clean Water Act
The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:
Components
ammonia solution
The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:
Components
ammonia solution
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

DEA List I
Not listed

DEA List II
Not listed

US State Regulations

Massachusetts Right To Know
Components
ammonia solution

Pennsylvania Right To Know
Components
ammonia solution

New Jersey Right To Know
Components
ammonia solution

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

California Prop 65 Components
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

TSCA:	All components of the product are listed in the TSCA-inventory.
DSL:	All components of this product are on the Canadian DSL

SECTION 16. Other information

Training advice
Provide adequate information, instruction and training for operators.

Labeling
Hazard pictograms

Signal Word
Danger

Hazard Statements
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary Statements
Prevention
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Full text of H-Statements referred to under sections 2 and 3.

H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.

Key or legend to abbreviations and acronyms used in the safety data sheet
Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Revision Date05/08/2020

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.
All rights reserved. Millipore and the "M" Mark are registered trademarks of Merck KGaA, Darmstadt, Germany.

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.0
Revision Date 03.06.2021
Print Date 16.06.2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Ammonium nitrate solution 1 mol/l acc. to DIN 19730

Product Number : 1.02596
Catalogue No. : 102596
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : Millipore (Canada) Ltd.
2149 Winston Park Dr. , Oakville
ONTARIO L6H 6J8
CANADA

Telephone : +1 905 829 9500
Fax : +1 905 829 9500

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with Hazardous Products Regulations (HPR) (SOR/2015-17)

Oxidizing liquids (Category 3), H272

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H272 May intensify fire; oxidizer.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220	Keep away from clothing and other combustible materials.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

- none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration *
Ammonium nitrate			
CAS-No. EC-No. Registration number	6484-52-2 229-347-8 01-2119490981-27-XXXX	Ox. Sol. 3; Eye Irrit. 2A; H272, H319	>= 5 - < 10 %
* Weight %			

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Not combustible.
Has a fire-promoting effect due to release of oxygen.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Do not store near combustible materials.

Recommended storage temperature see product label.
Storage class (TRGS 510): 5.1B: Oxidizing hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

---

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.

Control of environmental exposure
Do not let product enter drains.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	odorless
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	100 °C 212 °F at 1,013 hPa
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

10.3 Possibility of hazardous reactions

Violent reactions possible with:
The generally known reaction partners of water.
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid

no information available
no information available

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Acute toxicity estimate Oral - > 5,000 mg/kg
(Calculation method)
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Components

Ammonium nitrate

Acute toxicity
LD50 Oral - Rat - male and female - 2,950 mg/kg
(OECD Test Guideline 401)
Symptoms: Nausea, Vomiting, Diarrhea, Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.
LC50 Inhalation - Rat - 4 h - > 88.8 mg/l
Remarks: (IUCLID)
Symptoms: Symptoms may be delayed., mucosal irritations
LD50 Dermal - Rat - male and female - > 5,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes. - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Remarks: (IUCLID)

Carcinogenicity
No data available

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
Acute oral toxicity - Nausea, Vomiting, Diarrhea, Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.
Acute inhalation toxicity - Symptoms may be delayed., mucosal irritations

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Biological effects:
Depending on the concentration, phosphorus and/or nitrogen compounds may contribute to the eutrophication of drinking- water supplies.
Hazard for drinking water supplies.
Further information on ecology
Discharge into the environment must be avoided.

Components

Ammonium nitrate

Toxicity to fish	semi-static test LC50 - Cyprinus carpio (Carp) - 447 mg/l - 48 h Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 490 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	static test ErC50 - diatoms - > 1,700 mg/l - 10 Days Remarks: (in analogy to similar products) The value is given in analogy to the following substances: potassium nitrate
Toxicity to bacteria	EC50 - activated sludge - > 1,000 mg/l - 3 h (OECD Test Guideline 209) Remarks: (in analogy to similar products) The value is given in analogy to the following substances: sodium nitrate

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

TDG
Not regulated as a dangerous good

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.0 Revision Date: 03.06.2021 Print Date: 16.06.2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.4
Revision Date 08/21/2021
Print Date 08/24/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Antimony standard solution traceable to SRM from NIST Sb2O3 in HCl 2 mol/l 1000 mg/l Sb Certipur®

Product Number : 1.70204
Catalogue No. : 170204
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Corrosive to Metals (Category 1), H290
Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H290 May be corrosive to metals.
H351 Suspected of causing cancer.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P234	Keep only in original container.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P390	Absorb spillage to prevent material damage.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
Hydrochloric Acid			
CAS-No. EC-No. Index-No. Registration number	7647-01-0 231-595-7 017-002-01-X 01-2119484862-27-XXXX	Met. Corr. 1; Skin Corr. 1B; Eye Dam. 1; STOT SE 3; H290, H314, H318, H335 Concentration limits: >= 0.1 %: Met. Corr. 1, H290; >= 25 %: Skin Corr. 1B, H314; 10 - < 25 %: Skin Irrit. 2, H315; 10 - < 25 %: Eye Irrit. 2, H319; >= 10 %: STOT SE 3, H335;	>= 5 - < 10 %
Antimony trioxide			
CAS-No. EC-No. Index-No.	1309-64-4 215-175-0 051-005-00-X	Carc. 2; Aquatic Acute 3; H351, H402	>= 0.1 - < 1 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas
Not combustible.
Ambient fire may liberate hazardous vapours.
Fire may cause evolution of:
Hydrogen chloride gas

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet.Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.Advice for emergency responders:Protective equipment see section 8.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills.Observe possible material restrictions (see sections 7 and 10).Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® H^+, Merck Art. No. 101595). Dispose of properly. Clean up affected area.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Observe label precautions.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
No metal or light-weight-metal containers.
Tightly closed.

Recommended storage temperature see product label.

Storage class
Storage class (TRGS 510): 8B: Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Hydrochloric Acid	7647-01-0	C	2 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

		C	5 ppm 7 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5 ppm 7 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		C	5 ppm 7 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		PEL	0.3 ppm 0.45 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		C	2 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
Antimony trioxide	1309-64-4	TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Suspected human carcinogen		
		TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits
		PEL	0.5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Respiratory protection
required when vapours/aerosols are generated.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	slight
c)	Odor Threshold	No data available
d)	pH	ca.0 at 20 °C (68 °F)
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	ca.1.033 g/cm3 at 20 °C (68 °F)
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

s) Explosive properties Not classified as explosive.

t) Oxidizing properties none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
No data available

10.3 Possibility of hazardous reactions
Generates dangerous gases or fumes in contact with:
Metals
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Metals, metal alloys

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

No data available

Skin corrosion/irritation
Possible damages: slight irritation

Serious eye damage/eye irritation
Possible damages: slight irritation

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Antimony trioxide)

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

irritant effects
However, when the product is handled appropriately, hazardous effects are unlikely to occur.

Handle in accordance with good industrial hygiene and safety practice.

Components

Hydrochloric Acid

Acute toxicity
Oral: No data available
Inhalation: Cough Difficulty in breathing
Inhalation: absorption
Inhalation: Corrosive to respiratory system.
Symptoms: mucosal irritations, Cough, Shortness of breath, Inhalation may lead to the formation of oedemas in the respiratory tract., Possible damages:, damage of respiratory tract, tissue damage
Dermal: No data available

Skin corrosion/irritation
Skin - reconstructed human epidermis (RhE)
Result: Corrosive
(OECD Test Guideline 431)

Serious eye damage/eye irritation
Eyes - Bovine cornea
Result: Corrosive
(OECD Test Guideline 437)

Respiratory or skin sensitization
Maximization Test - Guinea pig

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Result: Conflicting results have been seen in different studies.

Carcinogenicity
Carcinogenicity - Did not show carcinogenic effects in animal experiments. (IUCLID)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.
The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.
Acute inhalation toxicity - mucosal irritations, Cough, Shortness of breath, Inhalation may lead to the formation of oedemas in the respiratory tract., Possible damages:, damage of respiratory tract, tissue damage

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.**Aspiration hazard**
No aspiration toxicity classification

Antimony trioxide

Acute toxicity
LD50 Oral - Rat - > 34,600 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity).
Skin and Appendages: Other: Hair.
(RTECS)
LC50 Inhalation - Rat - male and female - 4 h - > 5.2 mg/l
(OECD Test Guideline 403)
LD50 Dermal - Rabbit - > 8,300 mg/kg
Remarks: (ECHA)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 7 Days
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
No data available

Carcinogenicity
Suspected of causing cancer.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Harmful effect due to pH shift.
Hazard for drinking water supplies.
Discharge into the environment must be avoided.
No data available

Components

Hydrochloric Acid
No data available

Toxicity to fish	LC50 - Gambusia affinis (Mosquito fish) - 282 mg/l - 96 h Remarks: (IUCLID)

Antimony trioxide

Toxicity to fish	static test LC50 - Pimephales promelas (fathead minnow) - 14.4 mg/l - 96 h Remarks: (ECHA)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (green algae) - > 36.6 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 1789 Class: 8 Packing group: II
Proper shipping name: Hydrochloric acid
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 1789 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: HYDROCHLORIC ACID

IATA
UN number: 1789 Class: 8 Packing group: II
Proper shipping name: Hydrochloric acid

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Hydrochloric Acid	7647-01-0	2013-02-08

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.4 Revision Date: 08/21/2021 Print Date: 08/24/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Argon

Airgas
an Air Liquide company

Section 1. Identification

GHS product identifier : Argon

Chemical name : Argon

Other means of identification : Argon-40; Argon, isotope of mass 40; 40Ar; ARGON; Argon,Welding Quality; ARGON, COMPRESSED

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : Argon-40; Argon, isotope of mass 40; 40Ar; ARGON; Argon,Welding Quality; ARGON, COMPRESSED

SDS # : 001004

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas
SIMPLE ASPHYXIANTS

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Not applicable.

Response : Not applicable.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Supplemental label elements : Keep container tightly closed. Use only with adequate ventilation. Do not enter storage areas and confined spaces unless adequately ventilated.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Argon

Other means of identification : Argon-40; Argon, isotope of mass 40; 40Ar; ARGON; Argon,Welding Quality; ARGON, COMPRESSED

Product code : 001004

CAS number/other identifiers

CAS number : 7440-37-1

Ingredient name	%	CAS number
Argon	100	7440-37-1

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards. Acts as a simple asphyxiant.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Section 7. Handling and storage

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Argon	**ACGIH TLV (United States, 3/2017). Oxygen Depletion [Asphyxiant].**

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Section 8. Exposure controls/personal protection

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : The gas can cause asphyxiation without warning by replacing the oxygen in the air. Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas.

Color : Colorless.

Odor : Odorless.

Odor threshold : Not available.

pH : Not available.

Melting point : -189.2°C (-308.6°F)

Boiling point : -185.9°C (-302.6°F)

Critical temperature : -122.4°C (-188.3°F)

Flash point : [Product does not sustain combustion.]

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : 1.66 (Air = 1)

Specific Volume (ft^3/lb) : 9.7087

Gas Density (lb/ft^3) : 0.103

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : 0.74

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 39.95 g/mole

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Do not allow gas to accumulate in low or confined areas.

Incompatible materials : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards. Acts as a simple asphyxiant.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Section 11. Toxicological information

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Argon	0.74	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1006	UN1006	UN1006	UN1006	UN1006
UN proper shipping name	ARGON, COMPRESSED	ARGON, COMPRESSED	ARGON, COMPRESSED	ARGON, COMPRESSED	ARGON, COMPRESSED
Transport hazard class(es)	2.2	2.2	2.2	2.2	2.2
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Limited quantity**
No

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
Passenger Carrying Road or Rail Index 75
Special provisions 42

IATA : **Quantity limitation** No

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Section 15. Regulatory information

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS)**: Not determined.
Japan inventory (ISHL): Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Thailand : Not determined.

Turkey : Not determined.

United States : This material is listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	/	0
Flammability		0
Physical hazards		3

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
GASES UNDER PRESSURE - Compressed gas SIMPLE ASPHYXIANTS	Expert judgment Expert judgment

History

Date of printing : 1/5/2021

Date of issue/Date of revision : 1/5/2021

Date of previous issue : 8/25/2020

Version : 1.05

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

Section 16. Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Creation Date 22-Dec-2009 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Arsenic(III) oxide**

Cat No. : **43488**

CAS-No 1327-53-3
Synonyms Arsenic trioxide

Recommended Use Laboratory chemicals.
Uses advised against .
Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 2
Skin Corrosion/Irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Carcinogenicity	Category 1A
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver, Kidney, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Fatal if swallowed

Causes severe skin burns and eye damage
May cause respiratory irritation
May cause cancer
May cause damage to organs

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
Rinse mouth
Do NOT induce vomiting
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
Other hazards
May cause pulmonary edema.
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Arsenic trioxide	1327-53-3	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation	Remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately.
Most important symptoms and effects	Causes burns by all exposure routes. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	CO_2, dry chemical, dry sand, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
arsenic oxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
4	0	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Avoid dust formation.
Environmental Precautions	Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. Should not be released into the environment.
Methods for Containment and Clean Up	Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling	Use only under a chemical fume hood. Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Do not ingest. If swallowed then seek immediate medical assistance. Do not breathe dust. Avoid dust formation. Wash hands before breaks and immediately after handling the product.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Arsenic trioxide	TWA: 0.01 mg/m³		IDLH: 5 mg/m³ Ceiling: 0.002 mg/m³	TWA: 0.01 mg/m³

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
NIOSH IDLH: *NIOSH - National Institute for Occupational Safety and Health*

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Beige
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	312.3 °C / 594.1 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	66 mmHg @ 312 °C
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	O3 As2
Molecular Weight	197.84

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products arsenic oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Arsenic trioxide	LD50 = 20 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes burns by all exposure routes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Arsenic trioxide	1327-53-3	Group 1	Known	A1	X	A1

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system Central nervous system (CNS)
STOT - repeated exposure Liver Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following

substances which are hazardous for the environment. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Arsenic trioxide	Not listed	LC50: > 1000 mg/L, 96h static (Oncorhynchus mykiss) LC50: 18.8 - 21.4 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: = 135 mg/L, 96h (Pimephales promelas)	EC50 = 31.43 mg/L 60 min EC50 = 33.39 mg/L 30 min EC50 = 43.56 mg/L 15 min EC50 = 73.73 mg/L 5 min	EC50 = 0.038 mg/L 24h EC50 = 0.96 mg/L 96h EC50 = 0.038 mg/L 24h

Persistence and Degradability May persist based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Arsenic trioxide	18.1

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN1561
Proper Shipping Name ARSENIC TRIOXIDE
Hazard Class 6.1
Packing Group II

TDG

UN-No UN1561
Proper Shipping Name ARSENIC TRIOXIDE
Hazard Class 6.1
Packing Group II

IATA

UN-No UN1561
Proper Shipping Name ARSENIC TRIOXIDE
Hazard Class 6.1
Packing Group II

IMDG/IMO

UN-No UN1561
Proper Shipping Name ARSENIC TRIOXIDE
Hazard Class 6.1
Packing Group II

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Arsenic trioxide	1327-53-3	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

RCC-CW000876

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Arsenic trioxide	1327-53-3	X	-	215-481-4	X	X	X	X	KE-09858

U.S. Federal Regulations

SARA 313 Not applicable

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Arsenic trioxide	1327-53-3	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Arsenic trioxide	X	1 lb	X	-

Clean Air Act Not applicable

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Arsenic trioxide	X		-

OSHA - Occupational Safety and Health Administration Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Arsenic trioxide	10 µg/m^3 TWA 5 µg/m^3 Action Level	-

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Arsenic trioxide	1 lb	1 lb

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Arsenic trioxide	1327-53-3	Carcinogen Developmental	0.06 µg/day 10 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Arsenic trioxide	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By	Health, Safety and Environmental Department Email: tech@alfa.com www.alfa.com
Creation Date	22-Dec-2009
Revision Date	14-Feb-2020
Print Date	14-Feb-2020
Revision Summary	SDS authoring systems update, replaces ChemGes SDS No. 1327-53-3/2.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Safety Data Sheet

According to Hazardous Products Regulation (SOR/2015-17)

Revision date: 18.03.2020	*Version: 6.1*	*Print date: 18.03.2020*

SECTION 1: Identification

Product identifier

Trade name/designation:	Ascarite® 20-30 mesh
Product No.:	08890
Synonymes:	none/none
CAS No.:	81133-20-2
Other means of identification:	

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use:	For Further Manufacturing Use Only
Uses advised against:	Not for Human or Animal Drug Use

Details of the supplier of the safety data sheet

Supplier

VWR International

Street	2360 Argentia Road
Postal code/City	Mississauga, Ontario Canada L5N 5Z7
Telephone	+1-800-932-5000 toll-free within US/Canada
Telefax:	+1-610-728-2103

Emergency phone number

Telephone +1-613-996-6666 (Canutec, 24 hrs/day, 7 days/week, Canada)

Preparation Information

VWR International - Product Information Compliance

E-mail sds@vwr.com

SECTION 2: Hazard identification

2.1 Classification of the substance or mixture

Classification according to Hazardous Products Regulation (SOR/2015-17)

Hazard classes and hazard categories	Hazard statements
Substance or mixture corrosive to metals, category 1	H290
Skin corrosion, category 1A	H314

2.2 Label elements

Labelling in accordance with (SOR/2015-17)

Hazard pictograms

Signal word: Danger

Hazard statements	
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Precautionary Statements	
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P310	IF exposed or concerned: Immediately call a POISON CENTER/doctor.

Hazards not otherwise classified (HNOC)

none/none

SECTION 3: Composition / information on ingredients

3.1 Substances

not applicable

3.2 Mixtures

Hazardous ingredients GHS Classification in accordance with (SOR/2015-17)

Substance name	Concentration	Identifier	Hazard classes and hazard categories
no data available			

SECTION 4: First aid measures

4.1 General information

When in doubt or if symptoms are observed, get medical advice. If unconscious place in recovery position and seek medical advice. Never give anything by mouth to an unconscious person or a person with cramps. Change contaminated, saturated clothing. Do not leave affected person unattended.

In case of inhalation

Remove casualty to fresh air and keep warm and at rest. If breathing is irregular or stopped, administer artificial respiration. In case of respiratory tract irritation, consult a physician.

In case of skin contact

After contact with skin, wash immediately with plenty of water and soap. Remove contaminated, saturated clothing immediately. In case of skin reactions, consult a physician.

After eye contact

In case of contact with eyes flush immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart and consult an ophthalmologist. Protect uninjured eye. Remove contact lenses, if present and easy to do. Continue rinsing.

In case of ingestion

If accidentally swallowed rinse the mouth with plenty of water (only if the person is conscious) and obtain immediate medical attention. Do NOT induce vomiting. Give nothing to eat or drink.

4.2 Most important symptoms/effects, acute and delayed

no data available

4.3 Indication of any immediate medical attention and special treatment needed

no data available

4.4 Self-protection of the first aider

First aider: Pay attention to self-protection!

4.5 Information to physician

no data available

SECTION 5: Fire fighting measures

5.1 Extinguishing media

Suitable extinguishing media

no data available

Extinguishing media which must not be used for safety reasons

no data available

5.2 Specific hazards arising from the chemical

no data available

5.3 Advice for firefighters

no data available

Additional information

no data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

In case of major fire and large quantities: Remove persons to safety. Use personal protection equipment. Stop leak if safe to do so. Eliminate all ignition sources if safe to do so.

6.2 Environmental precautions

Do not allow to enter into surface water or drains. Discharge into the environment must be avoided. Ensure waste is collected and contained.

6.3 Methods and material for containment and cleaning up

Spilled product must never be returned to the original container for recycling. Clean contaminated articles and floor according to the environmental legislation. Collect in closed and suitable containers for disposal.

6.4 Additional information

Clear spills immediately.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

All work processes must always be designed so that the following is as low as possible:
Inhalation
skin contact
Eye contact
Use extractor hood (laboratory).
If handled uncovered, arrangements with local exhaust ventilation have to be used.
If local exhaust ventilation is not possible or not sufficient, the entire working area must be ventilated by technical means.

7.2 Conditions for safe storage, including any incompatibilities

Recommended storage temperature: no data available
Keep container tightly closed and in a well-ventilated place. Keep/Store only in original container.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Does not contain substances above concentration limits fixing an occupational exposure limit.

8.2 Engineering controls

Appropriate engineering controls
no data available

Personal protection equipment (PPE)
no data available

Eye/face protection
no data available

Skin protection
no data available

Respiratory protection
no data available

Additional information
no data available

Environmental exposure controls
no data available

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

(a) Appearance	
Physical state:	no data available
Color:	no data available
(b) Odour:	no data available
(c) Odour threshold:	no data available

Safety relevant basic data

(d) pH:	no data available
(e) Melting point/freezing point:	no data available
(f) Initial boiling point and boiling range:	no data available
(g) Flash point:	no data available
(h) Evaporation rate:	no data available
(i) Flammability (solid, gas):	not applicable
(j) Flammability or explosive limits	
Lower explosion limit:	no data available
Upper explosion limit:	no data available
(k) Vapour pressure:	no data available
(l) Vapour density:	no data available
(m) Relative density:	no data available
(n) Solubility(ies)	
Water solubility (g/L):	no data available
Soluble (g/L) in Ethanol:	no data available
(o) Partition coefficient: n-octanol/water:	no data available
(p) Auto-ignition temperature:	no data available
(q) Decomposition temperature:	no data available
(r) Viscosity	
Kinematic viscosity:	no data available
Dynamic viscosity:	no data available
(s) Explosive properties:	not applicable
(t) Oxidising properties:	not applicable

9.2 Other information

Bulk density:	no data available
Refraction index:	no data available
Dissociation constant:	no data available
Surface tension:	no data available
Henry's Law Constant:	no data available

SECTION 10: Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

no data available

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

no data available

10.6 Hazardous decomposition products

no data available

10.7 Additional information

no data available

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute effects

Acute oral toxicity:
no data available

Acute dermal toxicity:
no data available

Acute inhalation toxicity:
no data available

Irritant and corrosive effects

Primary irritation to the skin:
Causes severe skin burns and eye damage.

Irritation to eyes:
Causes serious eye damage.

Irritation to respiratory tract:
not applicable

Respiratory or skin sensitization

In case of skin contact: not sensitising
In case of inhalation: not sensitising

STOT-single exposure

not applicable

STOT-repeated exposure

not applicable

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)

Carcinogenicity

The table below indicates whether each agency has listed any ingredient as a carcinogen.

no data available	ACGIH	IARC	NTP	OSHA

Germ cell mutagenicity

No indications of human germ cell mutagenicity exist.

Reproductive toxicity

No indications of human reproductive toxicity exist.

Aspiration hazard

not applicable

Other adverse effects

no data available

Additional information

no data available

SECTION 12: Ecological information

12.1 Ecotoxicity

Fish toxicity:

no data available

Daphnia toxicity:

no data available

Algae toxicity:

no data available

Bacteria toxicity:

no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water: no data available

12.4 Mobility in soil:

no data available

12.5 Results of PBT/vPvB assessment

no data available

12.6 Other adverse effects

no data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Appropriate disposal / Product

Dispose according to legislation. Consult the appropriate local waste disposal expert about waste disposal.

Waste code product: no data available

Appropriate disposal / Package

Dispose according to legislation. Handle contaminated packages in the same way as the substance itself.

Additional information

no data available

SECTION 14: Transport information

Land transport (TDG)

UN-No.:	1823
Proper Shipping Name:	SODIUM HYDROXIDE, SOLID
Class(es):	8
Packing group:	II
Environmental hazards:	No
Marine pollutant:	No
Special precautions for user:	

Sea transport (IMDG)

UN-No.:	1823
Proper Shipping Name:	SODIUM HYDROXIDE, SOLID
Class(es):	8
Classification code:	
Hazard label(s):	8
Packing group:	II
Environmental hazards:	No
Marine pollutant:	No
Special precautions for user:	
Segregation group:	18
EmS-No.	F-A S-B

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
not relevant

Air transport (ICAO-TI / IATA-DGR)

UN-No.:	1823
Proper Shipping Name:	SODIUM HYDROXIDE, SOLID

Class(es):	8
Classification code:	
Hazard label(s):	8
Packing group:	II
Special precautions for user:	

SECTION 15: Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

Domestic Substance List:

SECTION 16: Other information

Abbreviations and acronyms

ACGIH - American Conference of Governmental Industrial Hygiensts
DOT - Department of Transportation
IARC - International Agency for Research on Cancer
IATA-DGR - International Air Transport Association-Dangerous Goods Regulations
ICAO-TI - International Civil Aviation Organization-Technical Instructions
IMDG - International Maritime Code for Dangerous Goods
LTV - Long Term Value
NIOSH - National Institute for Occupational Safety and Health
NTP - National Toxicology Program
OSHA - Occupational Safety & Health Administration
PBT - Persistent, Bioaccumulative and Toxic
PEL - Permissible Exposure Limit
STV - Short Term Value
SVHC - Substances of Very High Concern
TDG - Transport of Dangerous Goods
TLV - Threshold Limit Value
vPvB - very Persistent, very Bioaccumulative

Additional information

Indication of changes: general update

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guidance. The information in this document is based on the present state knowledge and is applicable to the product with regard to appropriate safty precautions. It does not represent any guarantee of the properties of the product. VWR International and his Affiliates shall not be held liable for any damage resulting from handling.

SAFETY DATA SHEET

Creation Date 30-Oct-2009 **Revision Date** 22-Dec-2020 **Revision Number** 9

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description: Barium chloride dihydrate
Cat No. : **423450000; 423450025; 423450050; 423455000**
CAS-No 10326-27-9
Molecular Formula Ba Cl2 . 2 H2 O
Reach Registration Number -

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Sector of use SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites
Product category PC21 - Laboratory chemicals
Process categories PROC15 - Use as a laboratory reagent
Environmental release category ERC6a - Industrial use resulting in manufacture of another substance (use of intermediates)
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Based on available data, the classification criteria are not met

Health hazards

Acute oral toxicity	Category 3 (H301)
Acute Inhalation Toxicity - Dusts and Mists	Category 4 (H332)
Serious Eye Damage/Eye Irritation	Category 2 (H319)

Environmental hazards
Based on available data, the classification criteria are not met

Full text of Hazard Statements: see section 16

2.2. Label elements

Signal Word **Danger**

Hazard Statements
H301 - Toxic if swallowed
H332 - Harmful if inhaled
H319 - Causes serious eye irritation

Precautionary Statements
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P280 - Wear eye protection/ face protection
P337 + P313 - If eye irritation persists: Get medical advice/attention

2.3. Other hazards

Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB)

Toxic to terrestrial vertebrates

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Barium chloride	10361-37-2	EEC No. 233-788-1	-	Acute Tox. 3 (H301) Acute Tox. 4 (H332) Eye Irrit. 2 (H319)
Barium Chloride dihydrate	10326-27-9		>95	Acute Tox. 3 (H301) Acute Tox. 4 (H332) Eye Irrit. 2 (H319)

Reach Registration Number	-

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

4.2. Most important symptoms and effects, both acute and delayed

None reasonably foreseeable.

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Hydrogen chloride gas.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

6.2. Environmental precautions

Should not be released into the environment.

6.3. Methods and material for containment and cleaning up

Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Use only under a chemical fume hood. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 6.1D

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **EU** - Commission Directive (EU) 2019/1831 of 24 October 2019 establishing a fifth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC and amending Commission Directive 2000/39/EC **UK** - EH40/2005 Work Exposure Limits, Third edition. Published 2018.

Component	The United Kingdom	European Union	Ireland
Barium chloride	STEL: 1.5 mg/m³ 15 min TWA: 0.5 mg/m³ 8 hr	TWA: 0.5 mg/m³ (8hr)	
Barium Chloride dihydrate	STEL: 1.5 mg/m³ 15 min TWA: 0.5 mg/m³ 8 hr	TWA: 0.5 mg/m³ (8hr)	

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

Derived No Effect Level (DNEL) See table for values

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				43.2 mg/kg bw/d
Inhalation				8.8 mg/m³

Predicted No Effect Concentration (PNEC) No information available.

Fresh water	0.174 mg/L
Fresh water sediment	908 mg/kg dw
Microorganisms in sewage treatment	94.3 mg/L
Soil (Agriculture)	314.9 mg/kg dw

8.2. Exposure controls

Engineering Measures
Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Natural rubber Nitrile rubber Neoprene PVC	See manufacturers recommendations	-	EN 374	(minimum requirement)

Skin and body protection Long sleeved clothing

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

Large scale/emergency use	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced **Recommended Filter type:** Particulates filter conforming to EN 143
Small scale/Laboratory use	Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. **Recommended half mask:-** Particle filtering: EN149:2001 When RPE is used a face piece Fit Test should be conducted
Environmental exposure controls	No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Solid	
Appearance	White	
Odor	Odorless	
Odor Threshold	No data available	
Melting Point/Range	962 °C / 1763.6 °F	
Softening Point	No data available	
Boiling Point/Range	1560 °C / 2840 °F	
Flammability (liquid)	Not applicable	Solid
Flammability (solid,gas)	No information available	
Explosion Limits	No data available	
Flash Point	No information available	**Method -** No information available
Autoignition Temperature	No data available	
Decomposition Temperature	> 100°C	
pH	5-8	5% aq.solution
Viscosity	Not applicable	Solid
Water Solubility	Soluble	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Vapor Pressure	No data available	
Density / Specific Gravity	3.1 g/cm3 @20°C	
Bulk Density	No data available	
Vapor Density	Not applicable	Solid
Particle characteristics	No data available	

9.2. Other information

Molecular Formula	Ba Cl2 . 2 H2 O
Molecular Weight	244.28
Evaporation Rate	Not applicable - Solid

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions None under normal processing.

10.4. Conditions to avoid

Incompatible products. Excess heat.

10.5. Incompatible materials

Strong oxidizing agents. Acids.

10.6. Hazardous decomposition products

Hydrogen chloride gas.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

(a) acute toxicity;
Oral No data available
Dermal No data available
Inhalation No data available

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Barium chloride	LD50 = 118 mg/kg (Rat)	-	-
Barium Chloride dihydrate	LD50 = 100mg/kg (ATE) 118mg/kg (rat) (anhydrous - IUCLID)	-	LD50 > 1.1 mg/L

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

Not mutagenic in AMES Test

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; Not applicable
Solid

Symptoms / effects,both acute and delayed No information available.

11.2. Information on other hazards

Endocrine Disrupting Properties Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity
Ecotoxicity effects Do not empty into drains.

Component	Freshwater Fish	Water Flea	Freshwater Algae
Barium chloride		EC50: = 14.5 mg/L, 48h (Daphnia magna)	
Barium Chloride dihydrate	LC50 >152 mg/L/96h (Danio rerio)		

12.2. Persistence and degradability
Persistence Soluble in water, Persistence is unlikely, based on information available.
Degradability Not relevant for inorganic substances.

12.3. Bioaccumulative potential Bioaccumulation is unlikely

12.4. Mobility in soil The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility. Highly mobile in soils

12.5. Results of PBT and vPvB assessment Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB).

12.6. Endocrine disrupting properties
Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects
Persistent Organic Pollutant This product does not contain any known or suspected substance
Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point.

European Waste Catalogue (EWC)	According to the European Waste Catalog, Waste Codes are not product specific, but application specific.
Other Information	Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

14.1. UN number	UN1564
14.2. UN proper shipping name	Barium compound, n.o.s
Technical Shipping Name	Barium chloride dihydrate
14.3. Transport hazard class(es)	6.1
14.4. Packing group	III

ADR

14.1. UN number	UN1564
14.2. UN proper shipping name	Barium compound, n.o.s
Technical Shipping Name	Barium chloride dihydrate
14.3. Transport hazard class(es)	6.1
14.4. Packing group	III

IATA

14.1. UN number	UN1564
14.2. UN proper shipping name	Barium compound, n.o.s
Technical Shipping Name	Barium chloride dihydrate
14.3. Transport hazard class(es)	6.1
14.4. Packing group	III

14.5. Environmental hazards	No hazards identified
14.6. Special precautions for user	No special precautions required
14.7. Maritime transport in bulk according to IMO instruments	Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories

X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Australia (AICS), Korea (ECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Barium chloride	233-788-1	-		X	X	-	X	X	X	X	KE-02037
Barium Chloride dihydrate	-	-		-	-	-	X	X	X	X	-

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals

Not applicable

National Regulations

WGK Classification See table for values

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Barium chloride	WGK1	

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3
H301 - Toxic if swallowed
H332 - Harmful if inhaled
H319 - Causes serious eye irritation

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC (volatile organic compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
First aid for chemical exposure, including the use of eye wash and safety showers.

Creation Date 30-Oct-2009
Revision Date 22-Dec-2020
Revision Summary Update to CLP Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Bismuth Standard for ICP

Product Number : 05719
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : SIGMA-ALDRICH CANADA CO.
2149 WINSTON PARK DRIVE
OAKVILLE ON L6H 6J8
CANADA

Telephone : +1 905 829-9500
Fax : +1 905 829-9292

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with Hazardous Products Regulations (HPR) (SOR/2015-17)

Corrosive to metals (Category 1), H290
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statement(s)
P234 Keep only in original packaging.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration *
Nitric acid			
CAS-No. EC-No. Index-No. Registration number	7697-37-2 231-714-2 007-004-00-1 01-2119487297-23-XXXX	Ox. Liq. 2; Met. Corr. 1; Acute Tox. 1; Skin Corr. 1A; Eye Dam. 1; H272, H290, H330, H314, H318 Concentration limits: 1 - < 3 %: Eye Irrit. 2A, H319; 3 - < 5 %: 1, H318; >= 1 %: Met. Corr. 1, H290; 1 - < 5 %: Skin Irrit. 2, H315; >= 20 %: Skin Corr. 1A, H314; 5 - < 20 %: Skin Corr. 1B, H314; 65 - < 99 %: Ox. Liq. 3, H272; >= 99 %: Ox. Liq. 2, H272; <= 70 %: Acute Tox. 3, H331; > 70 %: Acute Tox. 1, H330;	>= 5 - < 10 %
* Weight percent			

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): 8B: Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Nitric acid	7697-37-2	TWA	2 ppm 5.2 mg/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
		STEL	4 ppm 10 mg/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
		TWA	2 ppm	Canada. British Columbia OEL
		STEL	4 ppm	Canada. British Columbia OEL
		TWAEV	2 ppm 5.2 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
		STEV	4 ppm 10 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
		TWA	2 ppm	USA. ACGIH Threshold Limit Values (TLV)
		STEL	4 ppm	USA. ACGIH Threshold Limit Values (TLV)

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Fluorine

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Large doses may cause: conversion of hemoglobin to methemoglobin, producing cyanosis; marked fall in blood pressure, leading to collapse, coma, and possibly death., Pulmonary edema. Effects may be delayed., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 2031 Class: 8 Packing group: II
Proper shipping name: Nitric acid
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 2031 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: NITRIC ACID

IATA
UN number: 2031 Class: 8 Packing group: II
Proper shipping name: Nitric acid

SECTION 15: Regulatory information

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

SECTION 16: Other information

Further information
Copyright 2018 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.2 Revision Date: 17.09.2019 Print Date: 08.01.2020

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.4
Revision Date 04/29/2021
Print Date 04/29/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Buffer solution (glycine/sodium chloride/hydrogen chloride), traceable to SRM from NIST and PTB pH 1.00 (25°C) Certipur®

Product Number : 1.09441
Catalogue No. : 109441
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES OF AMERICA (THE)

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Corrosive to Metals (Category 1), H290

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H290 May be corrosive to metals.

Precautionary statement(s)
P234 Keep only in original container.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

P390	Absorb spillage to prevent material damage.
P406	Store in corrosive resistant container with a resistant inner liner.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

No components need to be disclosed according to the applicable regulations.

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Not combustible.
Ambient fire may liberate hazardous vapours.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
none

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
No special precautionary measures necessary.

6.3 Methods and materials for containment and cleaning up
Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed.

Recommended storage temperature see product label.
Storage class (TRGS 510): 8B: Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.

Control of environmental exposure
No special precautionary measures necessary.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	characteristic
c)	Odor Threshold	No data available
d)	pH	1.0 at 25 °C (77 °F)
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
increased reactivity with:
Metals
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Metals

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity

Dermal: No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available**Specific target organ toxicity - repeated exposure**
No data available

Aspiration hazard
No data available

11.2 Additional Information
Not available

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No ecological problems are to be expected when the product is handled and used with due care and attention.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 1789 Class: 8 Packing group: III
Proper shipping name: Hydrochloric acid
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 1789 Class: 8 Packing group: III EMS-No: F-A, S-B
Proper shipping name: HYDROCHLORIC ACID

IATA
UN number: 1789 Class: 8 Packing group: III
Proper shipping name: Hydrochloric acid

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.4 Revision Date: 04/29/2021 Print Date: 04/29/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.5
Revision Date 07/28/2021
Print Date 08/17/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Buffer Solution pH 2.00 (25 GRAD C) Certipur®

Product Number : 1.99012
Catalogue No. : 199012
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

No components need to be disclosed according to the applicable regulations.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air. Consult doctor if feeling unwell.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most).

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed.

Recommended storage temperature see product label.
Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	odorless
c)	Odor Threshold	Not applicable
d)	pH	2.0 at 25 °C (77 °F)
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.00 g/cm3 at 20 °C (68 °F)
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	Not applicable

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.5 Revision Date: 07/28/2021 Print Date: 08/17/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.4
Revision Date 28.01.2021
Print Date 31.01.2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Buffer solution (citric acid/sodium hydroxide/hydrogen chloride), traceable to SRM from NIST and PTB pH 3.00 (25°C) Certipur®

Product Number : 1.09444
Catalogue No. : 109444
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : Millipore (Canada) Ltd.
2149 Winston Park Dr. , Oakville
ONTARIO L6H 6J8
CANADA

Telephone : +1 905 829 9500
Fax : +1 905 829 9500

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

- none

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 3: Composition/information on ingredients

3.2 Mixtures

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air. Consult doctor if feeling unwell.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most).

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® H^+, Merck Art. No. 101595). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Store at +15°C to +25°C.
Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	odorless
c)	Odor Threshold	Not applicable
d)	pH	3.0 at 25 °C (77 °F)
e)	Melting point/freezing point	Melting point: -1 °C (30 °F)
f)	Initial boiling point and boiling range	101 °C 214 °F at 1,013 hPa
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	23 hPa at 20 °C (68 °F)
l)	Vapor density	No data available
m)	Relative density	ca.1.0 g/cm³ at 20 °C (68 °F)
n)	Water solubility	soluble
o)	Partition coefficient:	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	n-octanol/water	
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Respiratory or skin sensitization

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information
Not available

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and loc No mixing with other waste. Handle uncleaned containers like the product See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

TDG
Not regulated as a dangerous good

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.4 Revision Date: 28.01.2021 Print Date: 31.01.2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.2
Revision Date 14.03.2021
Print Date 03.04.2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Buffer solution (citric acid/sodium hydroxide/hydrogen chloride) traceable to SRM from NIST and PTB pH 4.00 (25°C) Certipur®

Product Number : 1.99064
Catalogue No. : 199064
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : Millipore (Canada) Ltd.
2149 Winston Park Dr. , Oakville
ONTARIO L6H 6J8
CANADA

Telephone : +1 905 829 9500
Fax : +1 905 829 9500

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

- none

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 3: Composition/information on ingredients

3.2 Mixtures

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air. Consult doctor if feeling unwell.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most).

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® H^+, Merck Art. No. 101595). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed.

Recommended storage temperature see product label.
Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	4.0 at 25 °C (77 °F)
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
The generally known reaction partners of water.
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information
Not available

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

TDG
Not regulated as a dangerous good

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.2 Revision Date: 14.03.2021 Print Date: 03.04.2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.2
Revision Date 03/14/2021
Print Date 04/03/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Buffer solution (di-sodium hydrogen phosphate/potassium dihydrogen phosphate), traceable to SRM from NIST and PTB pH 7.00 (20°C) Certipur®

Product Number : 1.09439
Catalogue No. : 109439
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

No components need to be disclosed according to the applicable regulations.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
none

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
No special precautionary measures necessary.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

6.3 Methods and materials for containment and cleaning up
Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed.

Recommended storage temperature see product label.
Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

Respiratory protection
Not required; except in case of aerosol formation.

Control of environmental exposure
No special precautionary measures necessary.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	odorless
c)	Odor Threshold	Not applicable
d)	pH	7.0 at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point: -5 °C (23 °F)
f)	Initial boiling point and boiling range	109 °C 228 °F at 1,013 hPa
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information
Not available

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Depending on the concentration, phosphates may contribute to the eutrophication of water supplies.
No ecological problems are to be expected when the product is handled and used with due care and attention.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.2 Revision Date: 03/14/2021 Print Date: 04/03/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.5
Revision Date 08/17/2021
Print Date 08/18/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Buffer solution pH 9.00 (25 GRAD C) Certipur®

Product Number : 1.99003
Catalogue No. : 199003
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for development and research

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Reproductive toxicity (Category 1B), H360

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H360 May damage fertility or the unborn child.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	understood.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
boric acid			
CAS-No. EC-No. Index-No. Registration number	10043-35-3 233-139-2 005-007-00-2 01-2119486683-25-XXXX	Repr. 1B; H360 Concentration limits: >= 5.5 %: Repr. 1B, H360FD;	>= 0.1 - < 1 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
none

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.

6.2 Environmental precautions
No special precautionary measures necessary.

6.3 Methods and materials for containment and cleaning up
Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent and neutralising material (e.g. Chemizorb® OH^-, Merck Art. No. 101596). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed.

Recommended storage temperature see product label.

Storage class
Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
boric acid	10043-35-3	TWA	2 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		
		STEL	6 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Not classifiable as a human carcinogen		

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:KCL 741 Dermatril® L

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
No special precautionary measures necessary.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	odorless

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

c)	Odor Threshold	Not applicable
d)	pH	9.0 at 25 °C (77 °F)
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	100 °C 212 °F at 1,013 hPa
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.00 g/cm3 at 20 °C (68 °F)
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
May harm the unborn child.
May impair fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Components

boric acid

Acute toxicity
LD50 Oral - Rat - male and female - 3,450 mg/kg
Remarks: (ECHA)
LC50 Inhalation - Rat - male and female - 4 h - > 2.12 mg/l
(OECD Test Guideline 403)
LD50 Dermal - Rabbit - male and female - > 2,000 mg/kg
Remarks: (ECHA)
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
Buehler Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Result: negative
Remarks: (ECHA)
Test Type: Ames test
Test system: S. typhimurium
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Result: negative
Method: OECD Test Guideline 474
Species: Mouse - male and female
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
May damage fertility.
May damage the unborn child.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No ecological problems are to be expected when the product is handled and used with due care and attention.

Components

boric acid

Toxicity to fish	LC50 - Ptychocheilus lucius - 279 mg/l - 96 h Remarks: (ECOTOX Database)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 133 mg/l - 48 h

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.5 Revision Date: 08/17/2021 Print Date: 08/18/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 8.1
Revision Date 03/27/2021
Print Date 03/30/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Buffer solution (boric acid/potassium chloride/sodium hydroxide), traceable to SRM from NIST and PTB pH 10.00 (25°C) Certipur®

Product Number : 1.99004
Catalogue No. : 199004
Brand : Millipore

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Reagent for development and research

1.3 Details of the supplier of the safety data sheet

Company : EMD Millipore Corporation
400 Summit Drive
BURLINGTON MA 01803
UNITED STATES

Telephone : +1 800-645-5476

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component	Classification	Concentration

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

orthoboric acid, sodium salt (1:n)			
CAS-No.	13840-56-7	Repr. 1B; H360FD Concentration limits: >= 4.5 %: Repr. 1B, H360FD;	>= 0.1 - < 1 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
none

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Evacuate the danger area, observe emergency procedures, consult an expert.Advice for emergency responders:Protective equipment see section 8.
For personal protection see section 8.

6.2 Environmental precautions

No special precautionary measures necessary.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Observe label precautions.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed.

Recommended storage temperature see product label.
Storage class (TRGS 510): 12: Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Safety glasses

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Skin protection
not required

Respiratory protection
Not required; except in case of aerosol formation.

Control of environmental exposure
No special precautionary measures necessary.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	odorless
c)	Odor Threshold	Not applicable
d)	pH	10.0 at 25 °C (77 °F)
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	100 °C 212 °F at 1,013 hPa
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	Not applicable
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
No data available

10.3 Possibility of hazardous reactions
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available**Specific target organ toxicity - repeated exposure**
No data available

Aspiration hazard
No data available

11.2 Additional Information
Not available

Hazardous properties cannot be excluded, but are relatively improbable due to the low concentration of the dissolved substance(s).

Handle in accordance with good industrial hygiene and safety practice.

Components

orthoboric acid, sodium salt (1:n)

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity

Carcinogenicity

Reproductive toxicity
May damage the unborn child.
May damage fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

Components

orthoboric acid, sodium salt (1:n)
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.1 Revision Date: 03/27/2021 Print Date: 03/30/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Revision Date 03/16/2018 Version 1.4

SECTION 1.Identification

Product identifier

Product number	199021
Product name	Buffer Solution (boric acid, sodium hydroxide, potassium chloride) tracable to SRM from NIST and PTB pH 11.00 (25°C) Certipur®

Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Reagent for analysis

Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) MilliporeSigma is a business of Merck KGaA, Darmstadt, Germany.
Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS-Labeling

Not a dangerous substance according to GHS.

Other hazards

None known.

SECTION 3. Composition/information on ingredients

Chemical nature Aqueous solution of inorganic and organic compounds.

Hazardous ingredients

Chemical name (Concentration)
CAS-No.
orthoboric acid, sodium salt (1:n) (>= 0.1 % - < 1 %)
13840-56-7

Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures

Description of first-aid measures

Inhalation
After inhalation: fresh air.

Skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

Eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

Ingestion
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
We have no description of any toxic symptoms.

Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Fire-fighting measures

Extinguishing media
Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture
Not combustible.
Ambient fire may liberate hazardous vapors.

Advice for firefighters
Special protective equipment for fire-fighters
In the event of fire, wear self-contained breathing apparatus.

Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills.
Observe possible material restrictions (see sections 7 and 10).
Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. Handling and storage

Precautions for safe handling

Observe label precautions.

Conditions for safe storage, including any incompatibilities

Tightly closed.

Store at +15°C to +25°C (+59°F to +77°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Contains no substances with occupational exposure limit values.

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.

Eye/face protection
Safety glasses

Hand protection

full contact:

Glove material:	Nitrile rubber
Glove thickness:	0.11 mm
Break through time:	480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0.11 mm
Break through time:	480 min

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 741 Dermatril® L (full contact), KCL 741 Dermatril® L (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment:
protective clothing

Respiratory protection
Not required; except in case of aerosol formation.

SECTION 9. Physical and chemical properties

Physical state	liquid
Color	colorless
Odor	odorless
Odor Threshold	Not applicable
pH	11.0 at 77 °F (25 °C)
Melting point	No information available.
Boiling point	No information available.
Flash point	Not applicable
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	No information available.
Upper explosion limit	No information available.
Vapor pressure	No information available.
Relative vapor density	No information available.
Density	1.01 g/cm3 at 68 °F (20 °C)
Relative density	No information available.
Water solubility	at 68 °F (20 °C) soluble
Partition coefficient: n-octanol/water	No information available.
Autoignition temperature	No information available.

Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	Not classified as explosive.
Oxidizing properties	none

SECTION 10. Stability and reactivity

Reactivity
See below

Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

Possibility of hazardous reactions
Because of low concentration of the dissolved substance(s): none; exception: the generally known reaction partners of water.

Conditions to avoid
no information available

Incompatible materials
no information available

Hazardous decomposition products
no information available

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Eye contact, Skin contact

Specific target organ systemic toxicity - single exposure
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ systemic toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Further information

Hazardous properties cannot be excluded, but are relatively improbable due to the low concentration of the dissolved substance(s).
Handle in accordance with good industrial hygiene and safety practice.

Ingredients

orthoboric acid, sodium salt (1:n)
No information available.

SECTION 12. Ecological information

Ecotoxicity

No information available.

Persistence and degradability

No information available.

Bioaccumulative potential

No information available.

Mobility in soil

No information available.

Ingredients

orthoboric acid, sodium salt (1:n)
No information available.

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

Not classified as dangerous in the meaning of transport regulations.

Air transport (IATA)

Not classified as dangerous in the meaning of transport regulations.

Sea transport (IMDG)

Not classified as dangerous in the meaning of transport regulations.

SECTION 15. Regulatory information

United States of America

SARA 313

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 302

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

DEA List I

Not listed

DEA List II

Not listed

US State Regulations

Massachusetts Right To Know

Remarks

No components are subject to the Massachusetts Right to Know Act.

California Prop 65 Components

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

TSCA:	All components of the product are listed in the TSCA-inventory.
DSL:	All components of this product are on the Canadian DSL

SECTION 16. Other information

Training advice

Provide adequate information, instruction and training for operators.

Key or legend to abbreviations and acronyms used in the safety data sheet
Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Revision Date03/16/2018

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

All rights reserved. Millipore and the "M" Mark are registered trademarks of Merck KGaA, Darmstadt, Germany.

SAFETY DATA SHEET

Version 6.2
Revision Date 10/24/2019
Print Date 11/30/2019

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Cadmium

Product Number : 265454
Brand : Aldrich
CAS-No. : 7440-43-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Inhalation (Category 2), H330
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure (Category 1), H372
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Hazard statement(s)

H330	Fatal if inhaled.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Cd
Molecular weight	:	112.41 g/mol
CAS-No.	:	7440-43-9
EC-No.	:	231-152-8

Component	Classification	Concentration
Cadmium		
	Acute Tox. 2; Muta. 2; Carc. 1B; Repr. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H330, H341, H350, H361, H372, H400, H410 M-Factor - Aquatic Acute: 1,000 M-Factor - Aquatic Chronic: 1,000	<= 100 %

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Cadmium/cadmium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.
Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: light grey
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 320.9 °C (609.6 °F)
f)	Initial boiling point and boiling range	765 °C 1409 °F at 1013 hPa
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	8.650 g/cm3
n)	Water solubility	0.0023 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, acids

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Cadmium/cadmium oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2,330 mg/kg
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: EU9800000

Damage to the lungs., Kidney injury may occur., prolonged or repeated exposure can cause:, Vomiting, Diarrhoea, Lung irritation

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0.001 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.024 mg/l - 48 h
Toxicity to algae	static test EC50 - Selenastrum capricornutum (green algae) - 0.023 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation: Oncorhynchus mykiss (rainbow trout) - 72 d - 1.27 µg/l(Cadmium)

Bioconcentration factor (BCF): 55

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Cadmium	7440-43-9	

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Cadmium	7440-43-9	

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 16: Other information

Further information

Copyright 2018 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.2 Revision Date: 10/24/2019 Print Date: 11/30/2019

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

MATERIAL SAFETY DATA SHEET
Essentially Similar to U.S. Department of Labor Form OSHA
Revised 07/11/2013
HMIS Health-1 Flammability-4 Physical Hazard -1 Personal Protection x

SECTION I-Product Information

Manufacturer: A.V.W. Inc.
24 Hour Emergency Phone Number: 800-424-9300
Product Name: Blow Off Air Duster

Synonym(s): Blow Off Air Duster
Blow Off Auto Duster 3.5oz
8oz
Blow Off 152a Duster 3.5oz
8oz
10oz

Trade Name: 152a
Chemical Name: Ethane, 11,-Difluoro
FSPID: Front 152a
Model No: Blow Off 3.5 oz, Blow Off 8 oz, Blow Off 10oz.
CAS # Mixture
Product Use: Cleaning

SECTION II-Hazardous Identification

Emergency Overview DANGER
Flammable gas. Contents under pressure. Containers may explode when heated.
Potential short term health effects
Routes of exposure Eye, Skin contact, Inhalation.
Eyes Contact with liquid may cause frostbite.
Skin Contact with liquid may cause frostbite.
Inhalation Excessive intentional inhalation may cause respiratory tract irritation and central Nervous system effects (headache, dizziness). Vapors may cause dizziness or suffocation.
Ingestion Not a normal route of exposure.
Target organs Eyes. Skin. Respiratory system.
Chronic effects Prolonged or repeated exposure can cause drying, defatting and dermatitis.
Signs and symptoms Symptoms may include redness, dryness of the skin.
Odor, Color, Grade Clear, colorless with slight ethereal odor.
General Physical Form Gas
Immediate health, physical, and environmental hazards:
Closed containers exposed to heat from fire may build pressure and explode.
May cause frostbite. May cause target organ effects.

SECTION III-Composition on Ingredients

Component	CAS # 73-37-6	% by Wt	60-99%
1, 1-DIFLUOROETHANE			

SECTION IV-First Aid Measures

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Skin: Flush with cool water.
Wash affected area with soap and water. If signs/symptoms persist, get medical attention.

Eye contact: Immediately flush with large amounts of cool water. Remove contact lenses, if applicable, and continue flushing for 15 minutes. Obtain medical attention immediately.

Inhalation: If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. If breathing has stopped, trained personnel should administer CPR immediately.

Ingestion: Do not induce vomiting. Never give anything by mouth if victim is unconscious, or is convulsing. Obtain medical attention.

SECTION V-Firefighting Measures

Flammable Properties Flammable by WHMIS/OSHA criteria. Containers may explode when heated.

Autoignition temperature 849 °F

Flash Point: < 50 °F (Details: consumer aerosol does not exhibit a flame projection, therefore it is not determined to be flammble as defined in 16 CFR, Section 1500.3(c) (6) (viii).

Flammable Limits-LEL 3.9% volume

Flammable Limits-UEL 16.9% volume

Extinguishing media

Suitable extinguishing media

Small Fires: Dry chemical. Carbon dioxide. Water spray. Fog.

Unsuitable extinguishing media:

Not available

Protection of firefighters specific hazards arising from the chemical Contents under pressure. Pressurized container may explode when exposed to heat or flame. Cool containers with flooding quantities of water until well after fire is out.

Protective equipment for firefighters

Firefighters should wear full protective clothing including self contained breathing apparatus.

Hazardous combustionproducts

May include and are not limited to: Oxides of carbon. Fluoride gases.

Explosion data

Sensitivity to mechanical impact

Not available

Sensitivity to static discharge

Not available

SECTION VI-Accidental Release Measures

Accidental Release Measures

Refer to other sections of this MSDS for information regarding physical and health hazard, respiratory protection, ventilation, and personal protective equipment.
Evacuate unprotected and untrained personnel from hazard area.
The spill should be cleaned up by qualified personnel.
Remove all ignition sources such as flames, smoking materials, and electrical spark sources.
Use only non-sparking tools. Ventilate the area with fresh air. Close cylinder.
If the cylinder can't be closed, place in a well-ventilated area, preferably an operating exhaust hood, or if necessary outdoors. Dispose of collected material as soon as possible.

Personal precautions keep unnecessary personnel away. Do not touch or walk through spilled material.

Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
Keep people away from and upwind of spill/leak.

Methods for containment

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area).
Stop leak if you can do so without risk.
Prevent entry into waterways, sewers, basements or confined areas.

Methods for cleaning up

Before attempting clean up, refer to hazard data given above.
Remove sources of ignition.
Although the chance of a significant spill or leak is unlikely in aerosol containers, in the event of such an occurrence, absorb spilled material with a non-flammable absorbent such as sand or vermiculite.

SECTON VII-Handling and Storage

Handling: Do not eat, drink or smoke when using this product.
Wash exposed areas thoroughly with soap and water.

Contents may be under pressure, open carefully.
Keep away from heat, sparks, open flam, pilot lights and other sources of ignition.
No smoking while handling this material. Avoid eye contact with vapors, mists, or spray.
Avoid breathing mists or aerosols of this product.
Use good industrial hygiene practices in handling this material.

Storage: Keep out of reach of children.
Do not store at temperatures above 49°C (120.2°F).
Keep away from heat, open flames or other sources of ignition.
Store away from acids. Keep container in well-ventilated area.

SECTION VIII-Exposure Controls/Personal Protection

Engineering Controls: Do not use in a confined area or areas with little or no air movement.
Use general dilution ventilation and/or control mist, vapor, or spray.
If ventilation is not adequate, use respiratory protection equipment

Personal protective equipment

Respiratory protection: Do not breathe vapors.
Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations:
Half face piece or full face pressure demand self-contained breathing apparatus.

Hand protection: If there is constant skin contact, rubber gloves are recommended.

Eye/Face protection: Avoid eye contact with vapors, mists, or spray.
The following eye protection(s) are recommended: Safety Glasses with side shields.

Skin protection: Wear insulated gloves to protect against frostbite.

General hygiene considerations:
Handle in accordance with good industrial hygiene and safety practice.
When using do not eat or drink.
Wash hands and face before breaks and immediately after handling product.

SECTION IX-Physical and Chemical Properties

Form: Liquefied gas
Color: colorless
Odor: slight, ethereal
Odor threshold: Not available
Ph: Not available
Physical state: Gas
Melting point: Not available
Freezing point: Not available
Boiling point/
Boiling range: -25°C (-13.00 °F)
Flash point: -50°C (-58.00 °F)
Vapor Pressure: 599.43 kPa @25°C
Pour Point: Not available
Specific gravity: 0.91
Relative density: 0.9 g/cc @2°C
Vapour density: 2.4 @25°C
Flammability limits in air,
Lower, % by volume 3.9
Flammability limits in air,
upper, % by volume 16.9
Octanol.wate coefficient Not available
Solubility (H20) Slightly
Auto-ignition temperature
454 °C (849.20 °F)
Percent volatile: 100

SECTION X-Stability and Reactivity

Chemical stability: Stable under recommended storage conditions.
Conditions to avoid: Aerosol containers are unstable at temperatures above 49°C (120.2°F).
Incompatibility: Alkaline materials. Alkaline earth metals.
Hazardous decomposition
Products: May include and are not limited to: Oxides of carbon. Fluoride gases.
Possibility of hazardous reactions:
Hazardous polymerization does not occur.

SECTION XI-Toxicological Information

Eye irritation Contact with liquid may cause frostbite.

Skin Contact with liquid may cause frostbite.

Inhalation Excessive intentional inhalation may cause respiratory tract irritation and central nervous system effects (headache, dizziness).
Vapors may cause dizziness or suffocation.
Ingestion Not a normal route of exposure.
Sensitization Non-hazardous by WHMIS/OSHA criteria
Chronic effects Non-hazardous by WHMIS/OSHA criteria
Carcinogenicity Non-hazardous by WHMIS/OSHA criteria
Mutagenicity Non-hazardous by WHMIS/OSHA criteria
Reproductive effects Non-hazardous by WHMIS/OSHA criteria
Teratogenicity Non-hazardous by WHMIS/OSHA criteria
Synergistic Materials Not Available

SECTION X11-Ecological Information

Ecotoxicity Not available
Environmental effects Product contains no ozone depleting CFCs
Aquatic toxicity Not available
Persistence / degradability
Not available
Bioaccumulation / accumulation
Not available
Partition coefficient Not available
Mobility in environmental media
Not available
Chemical fate information
Not available
Other adverse effects Not available

SECTION X111-Disposal Considerations

Waste Code: Not available
Disposal instructions Review federal, state/provincial, and local government requirements prior to disposal.
Waste from residues/unused
Not available
Contaminated packaging Not available

SECTION XIV – Transportation Information

U.S Department of Transportation (DOT) International Maritime Organization (IMO)
Basic shipping requirements:
1, 1-Difluoroethane
Transportation of Dangerous Goods (TDG – Canada)
Hazard class 2.1
UN number 1030
Additional Information:
DOT/IMO Label: FLAMMABLE GAS
Special Information: CARGO AIRCRAFT ONLY

IATA/CAO (Air)
Basic shipping requirements:
Proper shipping name: 1, 1-Difluoroethane
Hazard class: 2.1
UN number: 1030
Additional information:
Maximum net quantity Cargo aircraft only-150 kg maximum
Packaging (Forbidden on passenger aircraft)

SECTION XV-Regulatory Information

Occupational Safety and Health Administration (OSHA)
29 CFR 1910.1200 hazardous
Yes
CERCLA (Superfund) reportable quantity
None
Superfund Amendments and Reauthorization Act of 1986 (SARA)
Hazard categories

Immediate Hazard	Yes
Delayed Hazard	No
Fire Hazard	Yes
Pressure Hazard	Yes
Reactivity Hazard	No

Section 302 extremely hazardous substances No
Section 311 hazardous chemical Yes
Clean Air Act (CAA) Not available
Clean Water Act (CWA)
Not available
WHMIS status Controlled
WHMIS classification Class A – Compressed Gas, Class B – Division 1 – Flammable Gas
State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.
Inventory name

Country(s) or region	Inventory
Canada	Domestic Substances List (DSL)
Canada	Non-Domestic Substances List (NDSL)
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory

SECTION XVI-Other Information

NFPA Hazard Classification

Health:	1
Flammability:	4
Reactivity:	1
Physical hazard:	0

HMIS Hazard Classification

Health:	1
Flammability:	4
Reactivity:	1
Protection:	X – See PPE section

SAFETY DATA SHEET

Issue Date 22-Jan-2020 **Revision Date** 22-Jan-2020 **Version** 1

1. IDENTIFICATION

Product identifier **Product Name** Chloride Standards(Aq)

Other means of identification

Product Code	IS-013, IC-013
UN/ID no.	Final product is not regulated.
Synonyms	None

Recommended use of the chemical and restrictions on use

Recommended Use	For Laboratory Use Only.
Uses advised against	No information available

Details of the supplier of the safety data sheet

Manufacturer Address
NSI Lab Solutions, Inc.
7212 ACC Blvd.
Raleigh, NC 27617

Emergency telephone number

Company Phone Number	800-234-7837
FAX	919-789-3019
Website	www.nsilabsolutions.com
E-mail address	nsi@nsilabsolutions.com
Emergency Telephone	919-349-7322

2. HAZARDS IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label elements

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health.

Appearance No information available **Physical state** Liquid **Odor** No information available

Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response
IF exposed or concerned: Get medical advice/attention

Precautionary Statements - Storage
Store locked up

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC) Not applicable

Other Information
Not applicable

Unknown acute toxicity 0 % of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
The product contains no substances which at their given concentration, are considered to be hazardous to health.

Chemical Name	CAS No.	Weight-%
Water	7732-18-5	98-99.9
Sodium chloride	7647-14-5	0-1

Refer to Certificate of Analysis for exact percentage concentration.

4. FIRST AID MEASURES

Description of first aid measures

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash skin with soap and water.

Inhalation Remove to fresh air.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects, both acute and delayed

Symptoms No information available.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media CAUTION: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical
No information available.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

Protective equipment and precautions for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Ensure adequate ventilation, especially in confined areas.

Environmental precautions

Environmental precautions See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Incompatible materials None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Water 7732-18-5	-	-	-
Sodium chloride 7647-14-5	-	-	-

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection No special technical protective measures are necessary.

Skin and body protection No special technical protective measures are necessary.

Respiratory protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Liquid

Appearance	No information available	**Odor**	No information available
Color	No information available	**Odor threshold**	No information available

Property	Values	Remarks • Method
pH	No information available	
Melting point / freezing point	No information available	
Boiling point / boiling range	No information available	
Flash point	No information available	
Evaporation rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit:	No information available	
Lower flammability limit:	No information available	
Vapor pressure	No information available	
Vapor density	No information available	
Relative density	No information available	
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	

Other Information

Softening point	No information available
Molecular weight	No information available
VOC Content (%)	No information available
Density	No information available
Bulk density	No information available

10. STABILITY AND REACTIVITY

Reactivity
No data available

Chemical stability
Stable under recommended storage conditions. **Possibility of Hazardous Reactions** None under normal processing.
Conditions to avoid
Extremes of temperature and direct sunlight.
Incompatible materials
None known based on information supplied.
Hazardous Decomposition Products
None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information	No data available
Inhalation	No data available.
Eye contact	No data available.
Skin contact	No data available.
Ingestion	No data available.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Water 7732-18-5		-	-
Sodium chloride 7647-14-5	-		-

Information on toxicological effects

Symptoms No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.
Germ cell mutagenicity No information available.
Carcinogenicity No components of this mixture at given concentrations are considered to be carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.
Reproductive toxicity No information available.
STOT - single exposure No information available.
STOT - repeated exposure No information available.
Aspiration hazard No information available.

Numerical measures of toxicity - Product Information

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral) 81,742.00

12. ECOLOGICAL INFORMATION

Ecotoxicity

0.25 % of the mixture consists of component(s) of unknown hazards to the aquatic environment

Chemical Name	Algae/aquatic plants	Fish	Crustacea
Water 7732-18-5	-	-	-
Sodium chloride 7647-14-5	-	-	-

Persistence and degradability

No information available.

Bioaccumulation

No information available.

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging

Do not reuse container.

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Water 7732-18-5	-	-	-	-
Sodium chloride 7647-14-5	-	-	-	-

Chemical Name	California Hazardous Waste Status
Water 7732-18-5	-
Sodium chloride 7647-14-5	-

14. TRANSPORT INFORMATION

DOT Not regulated
UN/ID no. Final product is not regulated.

IATA Not regulated
IMDG Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	No
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product, as supplied, does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

U.S. EPA Label Information
EPA Pesticide Registration Number Not applicable

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

NFPA	**Health hazards**	0	**Flammability**	0	**Instability**	0	**Physical and Chemical Properties** -
HMIS	**Health hazards**	0	**Flammability**	0	**Physical hazards**	0	**Personal protection** X

Issue Date 22-Jan-2020
Revision Date 22-Jan-2020
Revision Note
No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

RICCA CHEMICAL COMPANY®

Safety Data Sheet

Classified According to OSHA Hazard Communication Standard (HCS)

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: Hexavalent Chromium Standard, 100 ppm Cr^{6+}

Product Number: 2095

Other Identifying Product Numbers: 2095-16, 2095-4

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Ricca Chemical Company
Address: 448 West Fork Drive

Arlington, TX 76012 USA

Telephone: 888-467-4222

1.4. Emergency Telephone Number (24 hours)

CHEMTREC (USA)	800-424-9300
CHEMTREC (International)	1+ 703-527-3887

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

This product is not categorized as hazardous in any GHS hazard class.

2.2. GHS Label Elements

Pictograms: None Required.

Signal Word: None Required.

Hazard Statements: None Required.

Precautionary Statements: None Required.

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Water	H_2O	18.01 g/mol	7732-18-5	99.97
Potassium Dichromate	$K_2Cr_2O_7$	294.18 g/mol	7778-50-9	0.03

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: May cause irritation, redness, pain, and tearing.

Inhalation: Not expected to require first aid. If necessary, remove to fresh air.

Skin Contact: May cause irritation, redness, and pain.

Ingestion: Dilute immediately with water or milk. Induce vomiting. Call a physician.

4.2. Most Important Symptoms and Effects, Acute and Delayed

WARNING! Contains Hexavalent Chromium compound, which is a known carcinogen. Harmful if swallowed or absorbed through skin. Avoid ingestion and contact with skin, eyes, or clothing. May cause irritation to eyes and skin. Wash areas of contact with plenty of water. If ingested, dilute with water and induce vomiting. Call a physician. EYE CONTACT: May cause irritation, redness, pain, and tearing. SKIN CONTACT: May cause irritation, redness, and pain. CHRONIC EFFECTS / CARCINOGENICITY: Chronic poisoning can lead to liver damage.

4.3. Medical Attention or Special Treatment Needed

Not expected to require special treatment.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Use any means suitable for extinguishing surrounding fire (Water, water spray, foam, or dry chemical). If using water, do not allow water run off to enter sewer.

5.2. Specific Hazards Arising from the Substance or Mixture

Not considered to be a fire or explosion hazard. Contact with oxidizable substances may cause violent combustion.

5.3. Special Protective Equipment for Firefighters

Use protective clothing and breathing equipment appropriate for the surrounding fire.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear appropriate PPE for the size and nature of the spill. As a general rule, wear safety glasses and gloves.

6.2. Cleanup and Containment Methods and Materials

Do not flush to sewer. Absorb with suitable material. Containerize for disposal with a hazardous waste disposal facility. Dispose of in accordance with local regulations.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Potassium Dichromate (7778-50-9)	TWA	USA	5 µg/m³ TWA	U.S. - OSHA - Final PELs - Time Weighted Averages (TWAs)
Potassium Dichromate (7778-50-9)	PEL	USA	5 µg/m³ TWA (See 29 CFR 1910.1026, as Cr); 2.5 µg/m³ Action Level (as Cr)	U.S. - OSHA - Specifically Regulated Chemicals with PELs
Potassium Dichromate (7778-50-9)	PEL-Ceiling	USA	0.1 mg/m³ Ceiling (applies to any operations or sectors for which the Hexavalent Chromium standard [29 CFR 1910.1026] is stayed or is otherwise not in effect, as CrO3)	U.S. - OSHA - Final PELs - Ceiling Limits
Potassium Dichromate (7778-50-9)	TLV-TWA	USA	0.05 mg/m³ TWA (as Cr)	ACGIH - Threshold Limit Values - Time Weighted Averages (TLV-TWA)

8.2. Exposure Controls

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Chemical resistant gloves.

Eye Protection: Safety glasses or goggles.

8.3. Personal Protective Equipment

Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance: Orange liquid

Physical State: Liquid

Odor: Data not available.

Odor Threshold: Data not available.

pH: approximately 4

Melting/Freezing Point: 0.0°C

Initial Boiling Point/Range: 100°C - 100°C

Flash Point: Data not available.

Evaporation Rate: Data not available.

Flammability: Data not available.

Flammability/Explosive Limits: Data not available.

Vapor Pressure: Data not available.

Vapor Density: Data not available.

Relative Density: 1.00

Solubility: Miscible

Partition Coefficient: Data not available.

Auto-Ignition Temperature: Data not available.

Decomposition Temperature: Data not available.

Viscosity: Data not available.

Explosive Properties: Data not available.

Oxidizing Properties: Data not available.

Safety Data Sheet

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Stable under normal conditions of use and storage.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Reducing Agents, Acetone plus Sulfuric Acid, Boron plus Silicon, Ethylene Glycol, Iron, Hydrazine, and Hydroxylamine. Any combustible organic or other readily oxidizable material (paper, wood, sulfur, aluminum, or plastics).

10.4. Hazardous Decomposition Products

Will not occur.

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:

Not applicable.

Acute Toxicity - Dermal Exposure:

Not applicable.

Acute Toxicity - Inhalation Exposure:

Not applicable.

Acute Toxicity - Other Information:

LD50, Oral, Rat: 25 mg/kg (Potassium Dichromate), Behavioral and sensory effects noted. LD50, Dermal, Rabbit: 14 mg/kg (Potassium Dichromate) respiratory, gastrointestinal and skin effects noted.

Skin Corrosion and Irritation:

Not applicable.

Serious Eye Damage and Irritation:

Not applicable.

Respiratory Sensitization:

Not applicable.

Skin Sensitization:

Not applicable.

Germ Cell Mutagenicity:

Not applicable.

Carcinogenicity:

Not applicable.

Reproductive Toxicity:

Not applicable.

Specific Target Organ Toxicity from Single Exposure:

Not applicable.

Specific Target Organ Toxicity from Repeated Exposure:

Not applicable.

Aspiration Hazard:

Not applicable.

Additional Toxicology Information:

Data not available.

SECTION 12: Ecological Information

12.1. Ecotoxicity

Not applicable.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Data not available.

Safety Data Sheet

SECTION 14: Transportation Information

14.1. Transportation by Land-Department of Transportation (DOT, United States of America)

Not regulated according to DOT Regulations.

14.2. Transportation by Air - International Air Transport Association (IATA)

Not regulated according to IATA Dangerous Goods Regulations.

14.3 Transportation of Dangerous Goods (TDG, Canada)

Not regulated according to TDG Regulations.

Safety Data Sheet

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Potassium Dichromate (CAS # 7778-50-9): 5 µg/m3 TWA (See 29 CFR 1910.1026, as Cr); 2.5 µg/m3 Action Level (as Cr)

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Not listed.

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Potassium Dichromate (CAS # 7778-50-9): 10 lb final RQ; 4.54 kg final RQ

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Potassium Dichromate (CAS # 7778-50-9): 0.1 % de minimis concentration (except for Chromite ore mined in the Transvaal Region of South Africa and the unreacted ore component of the Chromite ore processing residue (COPR), Chemical Category N090)

15.5. Massachusetts Right-to-Know Substance List

Potassium Dichromate (CAS # 7778-50-9): Present

15.6. Pennsylvania Right-to-Know Hazardous Substances

Water (CAS # 7732-18-5): Present
Potassium Dichromate (CAS # 7778-50-9): Environmental hazard
Potassium Dichromate (CAS # 7778-50-9): Environmental hazard; Special hazardous substance
Potassium Dichromate (CAS # 7778-50-9): Present

15.7. New Jersey Worker and Community Right-to-Know Components

Potassium Dichromate (CAS # 7778-50-9): carcinogen
Potassium Dichromate (CAS # 7778-50-9): carcinogen; mutagen
Potassium Dichromate (CAS # 7778-50-9): sn 1564
Potassium Dichromate (CAS # 7778-50-9): sn 2245
Potassium Dichromate (CAS # 7778-50-9): SN 2245 500 lb TPQ (Category Code N090)
Potassium Dichromate (CAS # 7778-50-9): sn 3575

15.8. California Proposition 65

Potassium Dichromate (CAS # 7778-50-9): 0.001 µg/day NSRL (inhalation)
Potassium Dichromate (CAS # 7778-50-9): carcinogen, 2/27/1987
Potassium Dichromate (CAS # 7778-50-9): developmental toxicity, 12/19/2008
Potassium Dichromate (CAS # 7778-50-9): female reproductive toxicity 12/19/08
Potassium Dichromate (CAS # 7778-50-9): male reproductive toxicity, 12/19/08

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Water (CAS # 7732-18-5): Present (DSL)
Potassium Dichromate (CAS # 7778-50-9): Present (DSL)

15.10. United States of America Toxic Substances Control Act (TSCA) List

Water (CAS # 7732-18-5): Present
Potassium Dichromate (CAS # 7778-50-9): Present [R]

Safety Data Sheet

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Water (CAS # 7732-18-5): 231-791-2
Water (CAS # 7732-18-5): 232-148-9
Potassium Dichromate (CAS # 7778-50-9): 231-906-6

SECTION 16: Other Information

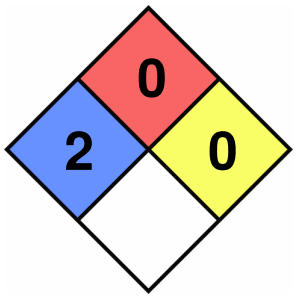
16.1. Full Text of Hazard Statements and Precautionary Statements

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.
Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.
Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.
Biohazardous Infectious Materials Hazard Class: Not Applicable.

16.3. National Fire Protection Association (NFPA) Rating

Health: 2
Flammability: 0
Reactivity: 0
Special Hazard:



16.4. Document Revision

Last Revision Date: 2020-06-17

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty , expressed or implied, is made and RICCA CHEMICAL COMPANY assumes no legal responsibility or liability whatsoever resulting from its use .

SAFETY DATA SHEET

Version 6.1
Revision Date 16.07.2021
Print Date 20.07.2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Cobalt Standard for ICP

Product Number : 30329
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : MilliporeSigma Canada Ltd
2149 WINSTON PARK DRIVE
OAKVILLE ON L6H 6J8
CANADA

Telephone : +1 905 829-9500
Fax : +1 905 829-9292

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA)
+1-703-527-3887 CHEMTREC (International)
24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with Hazardous Products Regulations (HPR) (SOR/2015-17)

Corrosive to Metals (Category 1), H290
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Respiratory sensitization (Category 1), H334
Skin sensitization (Category 1), H317
Carcinogenicity, Inhalation (Category 1B), H350
Reproductive toxicity (Category 1B), H360
Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Pictogram	
Signal word	Danger

Hazard statement(s)

H290	May be corrosive to metals.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H350	May cause cancer by inhalation.
H360	May damage fertility or the unborn child.
H402	Harmful to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P234	Keep only in original packaging.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P302 + P352	IF ON SKIN: Wash with plenty of water.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.
P390	Absorb spillage to prevent material damage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

Sensitizing components:
Cobalt(II) nitrate
May produce an allergic reaction.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

- none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Component		Classification	Concentration *
nitric acid			
CAS-No. EC-No. Index-No. Registration number	7697-37-2 231-714-2 007-004-00-1 01-2119487297-23-XXXX	Ox. Liq. 2; Met. Corr. 1; Acute Tox. 3; Skin Corr. 1A; Eye Dam. 1; H272, H290, H331, H314, H318 Concentration limits: >= 1 %: Met. Corr. 1, H290; 0 - < 70.0001 %: Acute Tox. 3, H331; >= 70.0001 %: Acute Tox. 1, H330; >= 20 %: Skin Corr. 1A, H314; 5 - < 20 %: Skin Corr. 1B, H314; 65 - < 99 %: Ox. Liq. 3, H272; >= 99 %: Ox. Liq. 2, H272; >= 3 %: Eye Dam. 1, H318; 1 - < 3 %: Eye Irrit. 2, H319; 1 - < 5 %: Skin Irrit. 2, H315;	>= 3 - < 5 %
* Weight %			
Cobalt(II) nitrate			
CAS-No. EC-No. Index-No.	10141-05-6 233-402-1 027-009-00-2	Ox. Sol. 2; Acute Tox. 4; Eye Dam. 1; Resp. Sens. 1; Skin Sens. 1; Muta. 2; Carc. 1B; Repr. 1B; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H272, H302, H318, H334, H317, H341, H350, H360, H373, H400, H410 Concentration limits: >= 0.01 %: Carc. 1B, H350i; M-Factor - Aquatic Acute: 10 - Aquatic Chronic: 1	>= 0.1 - < 1 %
* Weight %			

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nitrogen oxides (NOx)
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
No metal containers.
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
nitric acid	7697-37-2	TWA	2 ppm 5.2 mg/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
		STEL	4 ppm 10 mg/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
		TWA	2 ppm	Canada. British Columbia OEL
		STEL	4 ppm	Canada. British Columbia OEL
		STEV	4 ppm 10 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
		TWAEV	2 ppm 5.2 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
		TWA	2 ppm	USA. ACGIH Threshold Limit Values

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

				(TLV)
		STEL	4 ppm	USA. ACGIH Threshold Limit Values (TLV)
Cobalt(II) nitrate	10141-05-6	TWA	0.02 mg/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
Remarks				
		TWAEV	0.02 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
	Sensitizer Carcinogenic effect detected in animals. Results of studies relating to the carcinogenocity of these substances in animals are not necessarily applicable to humans.			
		TWA	0.02 mg/m3	Canada. British Columbia OEL
	Substance with specific evidence of sensitization by dermal route Substance with specific evidence of sensitization by respiratory route IARC '2B' applies to substances deemed possibly carcinogenic to humans.			
		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
required

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.030 g/cm3
	Relative density	No data available
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

10.3 Possibility of hazardous reactions
Violent reactions possible with:
The generally known reaction partners of water.

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Amines, Strong bases, MetalsMetals

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Oral: No data available
Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.

Inhalation: No data available

Acute toxicity estimate Inhalation - 4 h - > 40 mg/l
(Calculation method)
Symptoms: Possible symptoms:, mucosal irritations
Dermal: No data available

Skin corrosion/irritation
Mixture causes skin irritation.

Serious eye damage/eye irritation
Mixture causes serious eye damage.

Respiratory or skin sensitization
Mixture may cause allergy or asthma symptoms or breathing difficulties if inhaled. Mixture may cause an allergic skin reaction.

Germ cell mutagenicity
No data available

Carcinogenicity

Possible carcinogen.

Reproductive toxicity
May harm the unborn child.
May impair fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

Components

nitric acid

Acute toxicity
Oral: No data available
Acute toxicity estimate Inhalation - 4 h - 2.5 mg/l
(Expert judgment)
Dermal: No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Causes severe burns.
Remarks: (IUCLID)
Causes poorly healing wounds.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes burns.
Remarks: (IUCLID)
Causes serious eye damage.

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Cobalt(II) nitrate

Acute toxicity
LD50 Oral - Rat - male and female - 978 mg/kg
(OECD Test Guideline 401)
Remarks: (in analogy to similar compounds)
The value is given in analogy to the following substances: Cobaltous nitrate, hexahydrate
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes serious eye damage.
(OECD Test Guideline 405)

Respiratory or skin sensitization
May cause allergic skin reaction. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
May cause allergy or asthma symptoms or breathing difficulties if inhaled. Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Germ cell mutagenicity
Suspected of causing genetic defects.

Carcinogenicity
May cause cancer by inhalation.

Reproductive toxicity
May damage the unborn child.
May damage fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Inhalation - May cause damage to organs through prolonged or repeated exposure.
- Lungs

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

Components

nitric acid
No data available

Cobalt(II) nitrate

Toxicity to fish	semi-static test LC50 - Pimephales promelas (fathead minnow) - 1.866 mg/l - 96 h (US-EPA)
Toxicity to daphnia and other aquatic invertebrates	static test LC50 - Ceriodaphnia dubia (water flea) - 0.39 mg/l - 48 h (US-EPA)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata - 0.095 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test EC50 - activated sludge - 120 mg/l - 30 min (OECD Test Guideline 209)

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

TDG
UN number: 3264 Class: 8 Packing group: III
Proper shipping name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (nitric acid)
Labels: 8
ERG Code: 154
Marine pollutant: no

IMDG
UN number: 3264 Class: 8 Packing group: III EMS-No: F-A, S-B
Proper shipping name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (nitric acid)

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

IATA
UN number: 3264 Class: 8 Packing group: III
Proper shipping name: Corrosive liquid, acidic, inorganic, n.o.s. (nitric acid)

SECTION 15: Regulatory information

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.1 Revision Date: 16.07.2021 Print Date: 20.07.2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

RICCA CHEMICAL COMPANY®

Safety Data Sheet

Classified According to OSHA Hazard Communication Standard (HCS)

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: Conductivity Standard, 10 µS/cm at 25°C (4.7 ppm TDS as NaCl)

Product Number: 2236

Other Identifying Product Numbers: 2236-1, 2236-100P, 2236-16, 2236-1CT, 2236-2.5, 2236-20, 2236-32, 2236-4, 2236-5, R2236000-100A5, R2236000-20F1

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Ricca Chemical Company
Address: 448 West Fork Drive

Arlington, TX 76012 USA

Telephone: 888-467-4222

1.4. Emergency Telephone Number (24 hours)

CHEMTREC (USA)	800-424-9300
CHEMTREC (International)	1+ 703-527-3887

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

This product is not categorized as hazardous in any GHS hazard class.

2.2. GHS Label Elements

Pictograms: None Required.

Signal Word: None Required.

Hazard Statements: None Required.

Precautionary Statements: None Required.

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Water	H_2O	18.01 g/mol	7732-18-5	100.00
Sodium Chloride	NaCl	58.44 g/mol	7647-14-5	0.00

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: May cause irritation, redness, pain, and tearing.

Inhalation: Not expected to require first aid. If necessary, remove to fresh air.

Skin Contact: May cause irritation, redness, and pain.

Ingestion: Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

4.2. Most Important Symptoms and Effects, Acute and Delayed

Does not present any significant health hazards. May cause irritation. Wash areas of contact with water. EYE CONTACT: May cause irritation, rednes pain, and tearing. SKIN CONTACT: May cause irritation, redness, and pain.

4.3. Medical Attention or Special Treatment Needed

Not expected to require special treatment.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Use any means suitable for extinguishing surrounding fire.

5.2. Specific Hazards Arising from the Substance or Mixture

Not considered to be a fire or explosion hazard.

5.3. Special Protective Equipment for Firefighters

Use protective clothing and breathing equipment appropriate for the surrounding fire.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear appropriate PPE for the size and nature of the spill. As a general rule, wear safety glasses and gloves.

6.2. Cleanup and Containment Methods and Materials

Absorb with suitable material and dispose of in accordance with local regulations. Small amounts may be flushed to the sewer with excess water.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Data not available.				

8.2. Exposure Controls

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Chemical resistant gloves.

Eye Protection: Safety glasses or goggles.

8.3. Personal Protective Equipment

Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

Safety Data Sheet

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance: Colorless liquid
Physical State: Liquid
Odor: Data not available.
Odor Threshold: Data not available.
pH: 6.7 - 7.3
Melting/Freezing Point: 0.0°C
Initial Boiling Point/Range: 100°C - 100°C
Flash Point: Data not available.
Evaporation Rate: Data not available.
Flammability: Data not available.
Flammability/Explosive Limits: Data not available.
Vapor Pressure: Data not available.
Vapor Density: Data not available.
Relative Density: 1.00
Solubility: Miscible
Partition Coefficient: Data not available.
Auto-Ignition Temperature: Data not available.
Decomposition Temperature: Data not available.
Viscosity: Data not available.
Explosive Properties: Data not available.
Oxidizing Properties: Data not available.

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Stable under normal conditions of use and storage.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Strong oxidizing agents, Lithium, Bromine Trifluoride.

10.4. Hazardous Decomposition Products

Will not occur.

Safety Data Sheet

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:

Not applicable.

Acute Toxicity - Dermal Exposure:

Not applicable.

Acute Toxicity - Inhalation Exposure:

Not applicable.

Acute Toxicity - Other Information:

LD50, Oral, Rat: (Sodium Chloride) 3000 mg/kg, details of toxic effects not reported other than lethal dose value. LD50, Dermal, Rabbit: (Sodium Chloride) >10 gm/kg.

Skin Corrosion and Irritation:

Not applicable.

Serious Eye Damage and Irritation:

Not applicable.

Respiratory Sensitization:

Not applicable.

Skin Sensitization:

Not applicable.

Germ Cell Mutagenicity:

Not applicable.

Carcinogenicity:

Not applicable.

Reproductive Toxicity:

Not applicable.

Specific Target Organ Toxicity from Single Exposure:

Not applicable.

Specific Target Organ Toxicity from Repeated Exposure:

Not applicable.

Aspiration Hazard:

Not applicable.

Additional Toxicology Information:

Data not available.

Safety Data Sheet

SECTION 12: Ecological Information

12.1. Ecotoxicity

Not applicable.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Data not available.

SECTION 14: Transportation Information

14.1. Transportation by Land-Department of Transportation (DOT, United States of America)

Not regulated according to DOT Regulations.

14.2. Transportation by Air - International Air Transport Association (IATA)

Not regulated according to IATA Dangerous Goods Regulations.

14.3 Transportation of Dangerous Goods (TDG, Canada)

Not regulated according to TDG Regulations.

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Not listed.

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Not listed.

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Not listed.

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Not listed.

15.5. Massachusetts Right-to-Know Substance List

Not listed.

Safety Data Sheet

15.6. Pennsylvania Right-to-Know Hazardous Substances

Water (CAS # 7732-18-5): Present

15.7. New Jersey Worker and Community Right-to-Know Components

Not listed.

15.8. California Proposition 65

Not listed.

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Sodium Chloride (CAS # 7647-14-5): Present (DSL)
Water (CAS # 7732-18-5): Present (DSL)

15.10. United States of America Toxic Substances Control Act (TSCA) List

Sodium Chloride (CAS # 7647-14-5): Present
Water (CAS # 7732-18-5): Present

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Sodium Chloride (CAS # 7647-14-5): 231-598-3
Water (CAS # 7732-18-5): 231-791-2
Water (CAS # 7732-18-5): 232-148-9

SECTION 16: Other Information

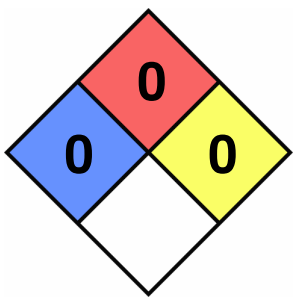
16.1. Full Text of Hazard Statements and Precautionary Statements

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.
Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.
Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.
Biohazardous Infectious Materials Hazard Class: Not Applicable.

16.3. National Fire Protection Association (NFPA) Rating

Health: 0
Flammability: 0
Reactivity: 0
Special Hazard:



Safety Data Sheet

16.4. Document Revision

Last Revision Date: 2020-11-02

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty, expressed or implied, is made and RICCA CHEMICAL COMPANY assumes no legal responsibility or liability whatsoever resulting from its use .

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 13.11.2020 *version number 20* *Revision: 13.11.2020*

*
SECTION 1: Identification of the substance/mixture and of the company/undertaking

***1.1 Product identifier**
***Trade name:** **CONDUCTIVITY STANDARD 100µS/cm @25°C**

***Article number:** CSKC100**
***Registration number**
A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
***1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
***Application of the substance / the mixture** Laboratory Chemicals

***1.3 Details of the supplier of the safety data sheet**
***Manufacturer/Supplier:**
Reagecon Diagnostics Ltd.
Shannon Free Zone,
Shannon,
Co. Clare,
Ireland.
Tel +353 61 472622
Fax +353 61 472642

***Further information obtainable by contacting:** sds@reagecon.ie**
***1.4 Emergency telephone number:**
For Hazardous Materials [or Dangerous Goods] Incident
Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC
For Ireland call +(353)-19014670
For Outside Ireland call +1 703-741-5970 / 1-800-424-9300 CCN849800

*
SECTION 2: Hazards identification

***2.1 Classification of the substance or mixture**
***Classification according to Regulation (EC) No 1272/2008**
The product is not classified, according to the CLP regulation.

***2.2 Label elements**
***Labelling according to Regulation (EC) No 1272/2008** Void
***Hazard pictograms** Void
***Signal word** Void
***Hazard statements** Void
***2.3 Other hazards**
***Results of PBT and vPvB assessment**
***PBT:** Not applicable.
***vPvB:** Not applicable.

*
SECTION 3: Composition/information on ingredients

***3.1 Chemical characterisation: Substances**
***CAS No. Description**
PURIFIED WATER
***Identification number(s)**
***EC number:** 231-791-2**
***3.2 Chemical characterisation: Mixtures**
***Description:** Mixture of substances listed below with nonhazardous additions.

***Dangerous components:** Void

(Contd. on page 2)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 13.11.2020 *version number 20* *Revision: 13.11.2020*

Trade name: CONDUCTIVITY STANDARD 100µS/cm @25°C

(Contd. of page 1)

***Additional information:** For the wording of the listed hazard phrases refer to section 16.*

SECTION 4: First aid measures

***4.1 Description of first aid measures**
***General information:** No special measures required.*
***After inhalation:**
Provide fresh air, warmth and rest. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Obtain medical attention if any discomfort continues.
***After skin contact:** Generally the product does not irritate the skin.*
***After eye contact:**
Promptly wash eyes with plenty of water for up to 15 minutes. Open eyes wide apart and rinse well to remove any contact lenses. Do not remove contact lenses by hand. Continue to rinse. Get medical attention if symptoms persist.
***After swallowing:** If symptoms persist consult doctor.*
***4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.*
***4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

*
SECTION 5: Firefighting measures

***5.1 Extinguishing media**
***Suitable extinguishing agents:**
Indications shall be given whether any extinguishing media are inappropriate for a particular situation involving the substance or mixture
Use fire extinguishing methods suitable to surrounding conditions.
***5.2 Special hazards arising from the substance or mixture** No further relevant information available.*
***5.3 Advice for firefighters**
***Protective equipment:**
Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers

SECTION 6: Accidental release measures

***6.1 Personal precautions, protective equipment and emergency procedures** Not required.*
***6.2 Environmental precautions:**
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
***6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
***6.4 Reference to other sections**
No dangerous substances are released.
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

***7.1 Precautions for safe handling** No special measures required.*
***Information about fire - and explosion protection:** No special measures required.*

(Contd. on page 3)

RCC-CW001023

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 13.11.2020 *version number 20* *Revision: 13.11.2020*

Trade name: CONDUCTIVITY STANDARD 100µS/cm @25°C

(Contd. of page 2)

***7.2 Conditions for safe storage, including any incompatibilities**
***Storage:**
***Requirements to be met by storerooms and receptacles:** No special requirements.
***Information about storage in one common storage facility:** Not required.
***Further information about storage conditions:** None.
***7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

***8.1 Control parameters**
***Ingredients with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
***Additional information:** The lists valid during the making were used as basis.

***8.2 Exposure controls**
***Personal protective equipment:**
***General protective and hygienic measures:**
The usual precautionary measures are to be adhered to when handling chemicals.
***Respiratory protection:**
Not required.
Use suitable respiratory protective device in case of insufficient ventilation.
***Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Always ensure that gloves are inspected before use.
Selection of protective gloves must include consideration of the penetration times along with rates of diffusion and degradation. The selected glove should comply with the specifications of EU Directive 89/686/EEC and the standard EN374 derived from it.
***Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.
Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.
***Penetration time of glove material**
In the absence of data above, the exact break through time has to be sourced from the manufacturer of the protective gloves and has to be observed.

(Contd. on page 4)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 13.11.2020 version number 20 Revision: 13.11.2020

Trade name: CONDUCTIVITY STANDARD 100µS/cm @25°C

(Contd. of page 3)

*Eye protection:

Goggles recommended during refilling: Use equipment for eye protection tested and approved under appropriate government standards
such as NIOSH (US) or EN 166(EU)

*Engineering Controls: No further data; see item 7.

*
SECTION 9: Physical and chemical properties

*9.1 Information on basic physical and chemical properties	
*General Information	
*Appearance:	
Form:	Liquid
Colour:	According to product specification Colourless
*Odour:	Characteristic
*Odour threshold:	Not determined.
*pH-value:	Not determined.
*Change in condition	
Melting point/freezing point:	0 °C
Initial boiling point and boiling range:	62 °C
*Flash point:	Not applicable.
*Flammability (solid, gas):	Not applicable.
*Decomposition temperature:	Not determined.
*Auto-ignition temperature:	Product is not selfigniting.
*Explosive properties:	Product does not present an explosion hazard.
*Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
*Vapour pressure at 20 °C:	23 hPa
*Density at 20 °C:	1.05734 g/cm³
*Relative density	Not determined.
*Vapour density	Not determined.
*Evaporation rate	Not determined.
*Solubility/ miscibility with	
water:	Fully miscible.
*Partition coefficient: n-octanol/water:	Not determined.
*Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
*9.2 Other information	No further relevant information available.

SECTION 10: Stability and reactivity

*10.1 Reactivity No further relevant information available.
*10.2 Chemical stability
*Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.
*10.3 Possibility of hazardous reactions No dangerous reactions known.

(Contd. on page 5)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 13.11.2020 version number 20 Revision: 13.11.2020

Trade name: CONDUCTIVITY STANDARD 100µS/cm @25°C

(Contd. of page 4)

*10.4 **Conditions to avoid** No further relevant information available.
*10.5 **Incompatible materials:** No further relevant information available.
*10.6 **Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

*11.1 **Information on toxicological effects**
***Acute toxicity** Based on available data, the classification criteria are not met.
***Primary irritant effect:**
***Skin corrosion/irritation** Based on available data, the classification criteria are not met.
***Serious eye damage/irritation** Based on available data, the classification criteria are not met.
***Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
***Germ cell mutagenicity** Based on available data, the classification criteria are not met.
***Carcinogenicity** Based on available data, the classification criteria are not met.
***Reproductive toxicity** Based on available data, the classification criteria are not met.
***STOT-single exposure** Based on available data, the classification criteria are not met.
***STOT-repeated exposure** Based on available data, the classification criteria are not met.
***Aspiration hazard** Based on available data, the classification criteria are not met.

*

SECTION 12: Ecological information

*12.1 **Toxicity**
***Aquatic toxicity:** No further relevant information available.
*12.2 **Persistence and degradability** No further relevant information available.
*12.3 **Bioaccumulative potential** No further relevant information available.
*12.4 **Mobility in soil** No further relevant information available.
***Additional ecological information:**
***General notes:**
Water danger class 3 (German Regulation) (Self-assessment): extremely hazardous for water
Do not allow product to reach ground water, water course or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
*12.5 **Results of PBT and vPvB assessment**
***PBT:** Not applicable.
***vPvB:** Not applicable.
*12.6 **Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

*13.1 **Waste treatment methods**
***Recommendation** Smaller quantities can be disposed of with household waste.

***Uncleaned packaging:**
***Recommendation:** Disposal must be made according to official regulations.
***Recommended cleansing agents:** Water, if necessary together with cleansing agents.

*

SECTION 14: Transport information

*14.1 **UN-Number**	
***ADR, ADN, IMDG, IATA**	Void
*14.2 **UN proper shipping name**	
***ADR, ADN, IMDG, IATA**	Void

(Contd. on page 6)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 13.11.2020 version number 20 Revision: 13.11.2020

Trade name: CONDUCTIVITY STANDARD 100µS/cm @25°C

(Contd. of page 5)

***14.3 Transport hazard class(es)**	
***ADR, ADN, IMDG, IATA** ***Class**	Void
***14.4 Packing group** ***ADR, IMDG, IATA**	Void
***14.5 Environmental hazards:** ***Marine pollutant:**	No
***14.6 Special precautions for user**	Not applicable.
***14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
***Transport/Additional information:**	Not dangerous according to the above specifications.
***UN "Model Regulation":**	Void

*
SECTION 15: Regulatory information

***15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

***Directive 2012/18/EU**
***Named dangerous substances - ANNEX I** None of the ingredients is listed.

***National regulations:**

***Waterhazard class:** Water danger class 3 (Self-assessment): extremely hazardous for water.
***15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

***Department issuing SDS:** Health and Safety
***Contact:** sds@reagecon.ie
***Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
REACH (Registration, Evaluation, Authorisation and restriction of Chemicals)
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
***NO**

SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier
Product Name Conductivity Solution, 1000 µS/cm 1L

Other means of identification
Product Code(s) 25M3A2000-1000

Safety data sheet number M02101

Recommended use of the chemical and restrictions on use
Recommended Use Standard solution.
Uses advised against None.
Restrictions on use None.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number
+1(303) 623-5716 - 24 Hour Service

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Signal word
None

Hazard statements
The product contains no substances which at their given concentration, are considered to be hazardous to health

Other Hazards Known
None

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
Not applicable

Mixture

4. FIRST AID MEASURES

Description of first aid measures

General advice No hazards which require special first aid measures. Use first aid treatment according to the nature of the injury.

Inhalation Remove to fresh air.

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash skin with soap and water.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects, both acute and delayed

Symptoms See Section 11 for additional Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Caution: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical No information available.

Hazardous combustion products This material will not burn.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Ensure adequate ventilation.

Environmental precautions

Environmental precautions See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hand Protection Wear suitable gloves.

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin and body protection No special protective equipment required.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Liquid
Appearance aqueous solution
Color colorless
Odor None
Odor threshold No data available

Property	Values	Remarks • Method
Molecular weight	No data available	
pH	7.0	
Melting point/freezing point	0 °C / 32 °F	
Boiling point / boiling range	100 °C / 212 °F	
Evaporation rate	1 (water = 1)	
Vapor pressure	23.702 mm Hg / 3.16 kPa at 25 °C / 77 °F	
Relative vapor density	0.62	
Specific gravity (water = 1 / air = 1)	0.99	
Partition Coefficient (n-octanol/water)	Not applicable	
Soil Organic Carbon-Water Partition Coefficient	Not applicable	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	No data available	
Kinematic viscosity	No data available	

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
Acid	Soluble	> 1000 mg/L	25 °C / 77 °F

Other information

Metal Corrosivity

Steel Corrosion Rate No data available
Aluminum Corrosion Rate No data available

Volatile Organic Compounds (VOC) Content

Explosive properties

Upper explosion limit	No data available
Lower explosion limit	No data available

Flammable properties

Flash point	No data available

Flammability Limit in Air

Upper flammability limit:	No data available
Lower flammability limit:	No data available

Oxidizing properties	No data available.
Bulk density	No data available

10. STABILITY AND REACTIVITY

Reactivity
Not applicable.

Chemical stability
Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

Possibility of hazardous reactions
None under normal processing.

Hazardous polymerization
None under normal processing.

Conditions to avoid
None known based on information supplied.

Incompatible materials
Strong oxidizing agents, strong acids, and strong bases.

Hazardous decomposition products
None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation	No known effect based on information supplied.
Eye contact	No known effect based on information supplied.
Skin contact	No known effect based on information supplied.
Ingestion	No known effect based on information supplied.

Symptoms No information available.

Acute toxicity
Based on available data, the classification criteria are not met

Product Acute Toxicity Data
No data available.

Ingredient Acute Toxicity Data
No data available.

Unknown Acute Toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

ATEmix (oral)	No information available
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	No information available
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Skin corrosion/irritation
Based on available data, the classification criteria are not met.

Product Skin Corrosion/Irritation Data
No data available.

Ingredient Skin Corrosion/Irritation Data
No data available.

Serious eye damage/irritation
Based on available data, the classification criteria are not met.

Product Serious Eye Damage/Eye Irritation Data
No data available.

Ingredient Eye Damage/Eye Irritation Data
No data available.

Respiratory or skin sensitization
Based on available data, the classification criteria are not met.

Product Sensitization Data
No data available.

Ingredient Sensitization Data
No data available.

STOT - single exposure
Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Single Exposure Data
No data available.

Ingredient Specific Target Organ Toxicity Single Exposure Data
No data available.

STOT - repeated exposure

Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Repeat Dose Data
No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data
No data available.

Carcinogenicity
Based on available data, the classification criteria are not met.

Product Carcinogenicity Data
No data available.

Ingredient Carcinogenicity Data
No data available.

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Germ cell mutagenicity
Based on available data, the classification criteria are not met.

Product Germ Cell Mutagenicity *invitro* Data
No data available.

Ingredient Germ Cell Mutagenicity *invitro* Data
No data available.

Product Germ Cell Mutagenicity *invivo* Data
No data available.

Ingredient Germ Cell Mutagenicity *invivo* Data
No data available.

Reproductive toxicity
Based on available data, the classification criteria are not met.

Product Reproductive Toxicity Data
No data available.

Ingredient Reproductive Toxicity Data
No data available.

Aspiration hazard
Based on available data, the classification criteria are not met.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Unknown aquatic toxicity 0 % of the mixture consists of component(s) of unknown hazards to the aquatic environment.

Product Ecological Data

Aquatic Acute Toxicity
No data available.

Aquatic Chronic Toxicity
No data available.

Ingredient Ecological Data

Aquatic Acute Toxicity
No data available.

Aquatic Chronic Toxicity
No data available.

Persistence and degradability

Product Biodegradability Data
No data available.

Bioaccumulation
MATERIAL DOES NOT BIOACCUMULATE
Product Bioaccumulation Data
No data available.

Partition Coefficient (n-octanol/water) Not applicable

Mobility

Soil Organic Carbon-Water Partition Coefficient Not applicable

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

Special instructions for disposal Open cold water tap completely, slowly pour the material to the drain. Flush system with plenty of water.

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG Not regulated

Note: No special precautions necessary.

Additional information
There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA	Complies
DSL/NDSL	Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL - Existing substances	Complies
PICCS	Complies
TCSI	Complies
AICS	Complies
NZIoC	Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	No
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated by state right-to-know regulations.

U.S. EPA Label Information

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments
None

Additional information

Global Automotive Declarable Substance List (GADSL)
Not applicable
NFPA and HMIS Classifications

NFPA	**Health hazards** - 0	**Flammability** - 0	**Instability** - 0	**Physical and chemical properties** -
HMIS	**Health hazards** - 0	**Flammability** - 0	**Physical hazards** - 0	**Personal protection** - X - I

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH	*Immediately Dangerous to Life or Health*
ACGIH	ACGIH (American Conference of Governmental Industrial Hygienists)
NDF	*no data*

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By	Hach Product Compliance Department
Issue Date	29-05-2020
Revision Date	10-Jan-2021

Revision Note None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

End of Safety Data Sheet

RICCA CHEMICAL COMPANY®

Safety Data Sheet

Classified According to OSHA Hazard Communication Standard (HCS)

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: Conductivity Standard, 10,000 µS/cm (10 mS/cm) at 25°C
5400 ppm TDS as NaCl

Product Number: 2246

Other Identifying Product Numbers: 2246-1, 2246-100P, 2246-16, 2246-20, 2246-32, 2246-5, R2246000-100A5, R2246000-20F1

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Ricca Chemical Company
Address: 448 West Fork Drive

Arlington, TX 76012 USA

Telephone: 888-467-4222

1.4. Emergency Telephone Number (24 hours)

CHEMTREC (USA)	800-424-9300
CHEMTREC (International)	1+ 703-527-3887

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

This product is not categorized as hazardous in any GHS hazard class.

2.2. GHS Label Elements

Pictograms: None Required.

Signal Word: None Required.

Safety Data Sheet

Hazard Statements: None Required.

Precautionary Statements: None Required.

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Water	H_2O	18.01 g/mol	7732-18-5	99.46
Sodium Chloride	NaCl	58.44 g/mol	7647-14-5	0.54

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: May cause irritation, redness, pain, and tearing.

Inhalation: Not expected to require first aid. If necessary, remove to fresh air.

Skin Contact: May cause irritation, redness, and pain.

Ingestion: Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

4.2. Most Important Symptoms and Effects, Acute and Delayed

Does not present any significant health hazards. May cause irritation. Wash areas of contact with water. EYE CONTACT: May cause irritation, rednes pain, and tearing. SKIN CONTACT: May cause irritation, redness, and pain.

4.3. Medical Attention or Special Treatment Needed

Not expected to require special treatment.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Use any means suitable for extinguishing surrounding fire.

5.2. Specific Hazards Arising from the Substance or Mixture

Not considered to be a fire or explosion hazard.

5.3. Special Protective Equipment for Firefighters

Use protective clothing and breathing equipment appropriate for the surrounding fire.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear appropriate PPE for the size and nature of the spill. As a general rule, wear safety glasses and gloves.

6.2. Cleanup and Containment Methods and Materials

Absorb with suitable material and dispose of in accordance with local regulations. Small amounts may be flushed to the sewer with excess water.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Data not available.				

8.2. Exposure Controls

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Chemical resistant gloves.

Eye Protection: Safety glasses or goggles.

8.3. Personal Protective Equipment

Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

Safety Data Sheet

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance: Colorless liquid
Physical State: Liquid
Odor: Odorless
Odor Threshold: Data not available.
pH: 6.7 - 7.3
Melting/Freezing Point: 0.0°C
Initial Boiling Point/Range: 100°C - 100°C
Flash Point: Data not available.
Evaporation Rate: Data not available.
Flammability: Data not available.
Flammability/Explosive Limits: Data not available.
Vapor Pressure: Not Applicable.
Vapor Density: Data not available.
Relative Density: 1.00
Solubility: Miscible
Partition Coefficient: Data not available.
Auto-Ignition Temperature: Data not available.
Decomposition Temperature: Data not available.
Viscosity: Data not available.
Explosive Properties: Data not available.
Oxidizing Properties: Data not available.

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Stable under normal conditions of use and storage.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Strong oxidizing agents, Lithium, Bromine Trifluoride.

10.4. Hazardous Decomposition Products

Will not occur.

Safety Data Sheet

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:

Not applicable.

Acute Toxicity - Dermal Exposure:

Not applicable.

Acute Toxicity - Inhalation Exposure:

Not applicable.

Acute Toxicity - Other Information:

LD50, Oral, Rat: (Sodium Chloride) 3000 mg/kg, details of toxic effects not reported other than lethal dose value. LD50, Dermal, Rabbit: (Sodium Chloride) >10 gm/kg.

Skin Corrosion and Irritation:

Not applicable.

Serious Eye Damage and Irritation:

Not applicable.

Respiratory Sensitization:

Not applicable.

Skin Sensitization:

Not applicable.

Germ Cell Mutagenicity:

Not applicable.

Carcinogenicity:

Not applicable.

Reproductive Toxicity:

Not applicable.

Specific Target Organ Toxicity from Single Exposure:

Not applicable.

Specific Target Organ Toxicity from Repeated Exposure:

Not applicable.

Aspiration Hazard:

Not applicable.

Additional Toxicology Information:

Data not available.

SECTION 12: Ecological Information

12.1. Ecotoxicity

Not applicable.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Data not available.

SECTION 14: Transportation Information

14.1. Transportation by Land-Department of Transportation (DOT, United States of America)

Not regulated according to DOT Regulations.

14.2. Transportation by Air - International Air Transport Association (IATA)

Not regulated according to IATA Dangerous Goods Regulations.

14.3 Transportation of Dangerous Goods (TDG, Canada)

Not regulated according to TDG Regulations.

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Not listed.

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Not listed.

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Not listed.

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Not listed.

15.5. Massachusetts Right-to-Know Substance List

Not listed.

15.6. Pennsylvania Right-to-Know Hazardous Substances

Water (CAS # 7732-18-5): Present

15.7. New Jersey Worker and Community Right-to-Know Components

Not listed.

15.8. California Proposition 65

Not listed.

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Sodium Chloride (CAS # 7647-14-5): Present (DSL)
Water (CAS # 7732-18-5): Present (DSL)

15.10. United States of America Toxic Substances Control Act (TSCA) List

Sodium Chloride (CAS # 7647-14-5): Present
Water (CAS # 7732-18-5): Present

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Sodium Chloride (CAS # 7647-14-5): 231-598-3
Water (CAS # 7732-18-5): 231-791-2
Water (CAS # 7732-18-5): 232-148-9

SECTION 16: Other Information

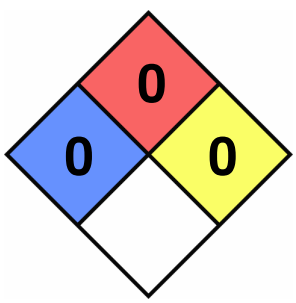
16.1. Full Text of Hazard Statements and Precautionary Statements

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.
Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.
Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.
Biohazardous Infectious Materials Hazard Class: Not Applicable.

16.3. National Fire Protection Association (NFPA) Rating

Health: 0
Flammability: 0
Reactivity: 0
Special Hazard:



Safety Data Sheet

16.4. Document Revision

Last Revision Date: 2020-11-02

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty, expressed or implied, is made and RICCA CHEMICAL COMPANY assumes no legal responsibility or liability whatsoever resulting from its use .

RICCA CHEMICAL COMPANY®

Safety Data Sheet

Classified According to OSHA Hazard Communication Standard (HCS)

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: Conductivity Standard, 10,000 µS/cm (10 mS/cm) at 25°C
5400 ppm TDS as NaCl

Product Number: 2246

Other Identifying Product Numbers: R2246000-20F1

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Ricca Chemical Company
Address: 448 West Fork Drive

Arlington, TX 76012 USA

Telephone: 888-467-4222

1.4. Emergency Telephone Number (24 hours)

CHEMTREC (USA)	800-424-9300
CHEMTREC (International)	1+ 703-527-3887

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

This product is not categorized as hazardous in any GHS hazard class.

2.2. GHS Label Elements

Pictograms: None Required.

Signal Word: None Required.

Safety Data Sheet

Hazard Statements: None Required.

Precautionary Statements: None Required.

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Water	H_2O	18.01 g/mol	7732-18-5	99.46
Sodium Chloride	NaCl	58.44 g/mol	7647-14-5	0.54

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: May cause irritation, redness, pain, and tearing.

Inhalation: Not expected to require first aid. If necessary, remove to fresh air.

Skin Contact: May cause irritation, redness, and pain.

Ingestion: Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

4.2. Most Important Symptoms and Effects, Acute and Delayed

Does not present any significant health hazards. May cause irritation. Wash areas of contact with water. EYE CONTACT: May cause irritation, rednes pain, and tearing. SKIN CONTACT: May cause irritation, redness, and pain.

4.3. Medical Attention or Special Treatment Needed

Not expected to require special treatment.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Use any means suitable for extinguishing surrounding fire.

5.2. Specific Hazards Arising from the Substance or Mixture

Not considered to be a fire or explosion hazard.

5.3. Special Protective Equipment for Firefighters

Use protective clothing and breathing equipment appropriate for the surrounding fire.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear appropriate PPE for the size and nature of the spill. As a general rule, wear safety glasses and gloves.

6.2. Cleanup and Containment Methods and Materials

Absorb with suitable material and dispose of in accordance with local regulations. Small amounts may be flushed to the sewer with excess water.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Data not available.				

8.2. Exposure Controls

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Chemical resistant gloves.

Eye Protection: Safety glasses or goggles.

8.3. Personal Protective Equipment

Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

Safety Data Sheet

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance: Colorless liquid
Physical State: Liquid
Odor: Odorless
Odor Threshold: Data not available.
pH: 6.7 - 7.3
Melting/Freezing Point: 0.0°C
Initial Boiling Point/Range: 100°C - 100°C
Flash Point: Data not available.
Evaporation Rate: Data not available.
Flammability: Data not available.
Flammability/Explosive Limits: Data not available.
Vapor Pressure: Not Applicable.
Vapor Density: Data not available.
Relative Density: 1.00
Solubility: Miscible
Partition Coefficient: Data not available.
Auto-Ignition Temperature: Data not available.
Decomposition Temperature: Data not available.
Viscosity: Data not available.
Explosive Properties: Data not available.
Oxidizing Properties: Data not available.

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Stable under normal conditions of use and storage.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Strong oxidizing agents, Lithium, Bromine Trifluoride.

10.4. Hazardous Decomposition Products

Will not occur.

Safety Data Sheet

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:
Not applicable.

Acute Toxicity - Dermal Exposure:
Not applicable.

Acute Toxicity - Inhalation Exposure:
Not applicable.

Acute Toxicity - Other Information:
LD50, Oral, Rat: (Sodium Chloride) 3000 mg/kg, details of toxic effects not reported other than lethal dose value. LD50, Dermal, Rabbit: (Sodium Chloride) >10 gm/kg.

Skin Corrosion and Irritation:
Not applicable.

Serious Eye Damage and Irritation:
Not applicable.

Respiratory Sensitization:
Not applicable.

Skin Sensitization:
Not applicable.

Germ Cell Mutagenicity:
Not applicable.

Carcinogenicity:
Not applicable.

Reproductive Toxicity:
Not applicable.

Specific Target Organ Toxicity from Single Exposure:
Not applicable.

Specific Target Organ Toxicity from Repeated Exposure:
Not applicable.

Aspiration Hazard:
Not applicable.

Additional Toxicology Information:
Data not available.

Safety Data Sheet

SECTION 12: Ecological Information

12.1. Ecotoxicity

Not applicable.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Data not available.

SECTION 14: Transportation Information

14.1. Transportation by Land-Department of Transportation (DOT, United States of America)

Not regulated according to DOT Regulations.

14.2. Transportation by Air - International Air Transport Association (IATA)

Not regulated according to IATA Dangerous Goods Regulations.

14.3 Transportation of Dangerous Goods (TDG, Canada)

Not regulated according to TDG Regulations.

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Not listed.

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Not listed.

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Not listed.

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Not listed.

15.5. Massachusetts Right-to-Know Substance List

Not listed.

Safety Data Sheet

15.6. Pennsylvania Right-to-Know Hazardous Substances

Water (CAS # 7732-18-5): Present

15.7. New Jersey Worker and Community Right-to-Know Components

Not listed.

15.8. California Proposition 65

Not listed.

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Sodium Chloride (CAS # 7647-14-5): Present (DSL)
Water (CAS # 7732-18-5): Present (DSL)

15.10. United States of America Toxic Substances Control Act (TSCA) List

Sodium Chloride (CAS # 7647-14-5): Present
Water (CAS # 7732-18-5): Present

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Sodium Chloride (CAS # 7647-14-5): 231-598-3
Water (CAS # 7732-18-5): 231-791-2
Water (CAS # 7732-18-5): 232-148-9

SECTION 16: Other Information

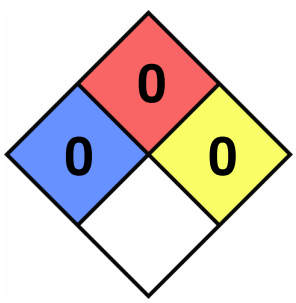
16.1. Full Text of Hazard Statements and Precautionary Statements

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.
Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.
Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.
Biohazardous Infectious Materials Hazard Class: Not Applicable.

16.3. National Fire Protection Association (NFPA) Rating

Health: 0
Flammability: 0
Reactivity: 0
Special Hazard:



Safety Data Sheet

16.4. Document Revision

Last Revision Date: 2020-10-27

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty, expressed or implied, is made and RICCA CHEMICAL COMPANY assumes no legal responsibility or liability whatsoever resulting from its use .

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

1 Identification

· **Product identifier**

· **Product name:** **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

· **Part number:** 5190-8348
· **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Agilent Technologies, Inc. Tel: 800-227-9770
5301 Stevens Creek Blvd
Santa Clara, CA 95051,
USA

· **Information department:** e-mail: pdl-msds_author@agilent.com
· **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

2 Hazard(s) identification

· **Classification of the substance or mixture**

GHS05 Corrosion

Met. Corr.1 H290 May be corrosive to metals.
Eye Dam. 1 H318 Causes serious eye damage.

GHS07

Skin Irrit. 2 H315 Causes skin irritation.

· **Label elements**
· **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**

GHS05

· **Signal word** Danger

· **Hazard-determining components of labeling:**
Nitric acid
· **Hazard statements**
H290 May be corrosive to metals.
H315 Causes skin irritation.
H318 Causes serious eye damage.
· **Precautionary statements**
P280 Wear protective gloves / eye protection / face protection.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a poison center/doctor.

(Contd. on page 2)

RCC-CW001057

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 1)

P321 *Specific treatment (see on this label).*
P332+P313 *If skin irritation occurs: Get medical advice/attention.*
P406 *Store in corrosive resistant container with a resistant inner liner.*

· ***Classification system:***
· ***NFPA ratings (scale 0 - 4)***

Health = 3
Fire = 0
Reactivity = 0

· ***HMIS-ratings (scale 0 - 4)***

Health = 3
Fire = 0
Reactivity = 0

· ***Other hazards***
· ***Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*

3 Composition/information on ingredients

· ***Chemical characterization: Mixtures***
· ***Description:*** *Aqueous solution.*

· ***Dangerous components:***

CAS: 7697-37-2 *RTECS: QU5775000*	*Nitric acid* *Ox. Liq. 2, H272; Met. Corr.1, H290; Skin Corr. 1A, H314*	*<5%*
CAS: 7440-50-8 *RTECS: GL 5325000*	*Copper* *Aquatic Acute 1, H400; Aquatic Chronic 1, H410*	*<0.25%*

· ***Additional information:***
The concentration of the acid stated in this SDS is calculated as an absolute mass concentration (%w/v). This is less than the acid concentration stated on the product label and COA, which reflects a percent value of the commercially available concentrated aqueous form of the acid.

4 First-aid measures

· ***Description of first aid measures***
· ***General information:*** *Immediately remove any clothing soiled by the product.*
· ***After inhalation:*** *Supply fresh air; consult doctor in case of complaints.*
· ***After skin contact:***
Immediately wash with water and soap and rinse thoroughly.
If skin irritation continues, consult a doctor.
· ***After eye contact:*** *Rinse opened eye for several minutes under running water. Then consult a doctor.*
· ***After swallowing:*** *Rinse mouth. Do not induce vomiting.*
· ***Information for doctor:***
· ***Most important symptoms and effects, both acute and delayed*** *No further relevant information available.*

(Contd. on page 3)

RCC-CW001058

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 2)

· ***Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

5 Fire-fighting measures

· ***Extinguishing media***
· ***Suitable extinguishing agents:*** *Use fire fighting measures that suit the environment.*
· ***Special hazards arising from the substance or mixture***
Formation of toxic gases is possible during heating or in case of fire.
· ***Advice for firefighters***
· ***Protective equipment:*** *Wear self-contained respiratory protective device.*

6 Accidental release measures

· ***Personal precautions, protective equipment and emergency procedures***
Wear protective equipment. Keep unprotected persons away.
· ***Environmental precautions:***
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
· ***Methods and material for containment and cleaning up:***
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Absorb liquid components with liquid-binding material.
DO NOT USE SAWDUST.
· ***Reference to other sections***
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· ***Protective Action Criteria for Chemicals***

· ***PAC-1:***		
CAS: 7697-37-2	*Nitric acid*	*0.16 ppm*
CAS: 7440-50-8	*Copper*	*3 mg/m³*

· ***PAC-2:***		
CAS: 7697-37-2	*Nitric acid*	*24 ppm*
CAS: 7440-50-8	*Copper*	*33 mg/m³*

· ***PAC-3:***		
CAS: 7697-37-2	*Nitric acid*	*92 ppm*
CAS: 7440-50-8	*Copper*	*200 mg/m³*

7 Handling and storage

· ***Handling:***
· ***Precautions for safe handling*** *Store in cool, dry place in tightly closed receptacles.*
· ***Information about protection against explosions and fires:*** *No special measures required.*

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 3)

· ***Conditions for safe storage, including any incompatibilities***
· ***Storage:***
· ***Requirements to be met by storerooms and receptacles:***
Please refer to the manufacturers certificate for specific storage and transport temperature conditions.
Store only in the original receptacle unless other advice is given on the CoA.
Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
· ***Information about storage in one common storage facility:*** *Store away from foodstuffs.*
· ***Further information about storage conditions:*** *Keep receptacle tightly sealed.*
· ***Specific end use(s)*** *No further relevant information available.*

8 Exposure controls/personal protection

· ***Additional information about design of technical systems:*** *No further data; see item 7.*

· ***Control parameters***

· ***Components with limit values that require monitoring at the workplace:***	
CAS: 7697-37-2 Nitric acid	
PEL	*Long-term value: 5 mg/m³, 2 ppm*
REL	*Short-term value: 10 mg/m³, 4 ppm* *Long-term value: 5 mg/m³, 2 ppm*
TLV	*Short-term value: 10 mg/m³, 4 ppm* *Long-term value: 5.2 mg/m³, 2 ppm*
CAS: 7440-50-8 Copper	
PEL	*Long-term value: 1 0.1 mg/m³* *as Cu dusts and mists fume*
REL	*Long-term value: 1 0.1 mg/m³* *as Cu dusts and mists fume*
TLV	*Long-term value: 1 0.2 mg/m³* *dusts and mists; fume; as Cu*

· ***Additional information:*** *The lists that were valid during the creation were used as basis.*

· ***Exposure controls***
· ***Personal protective equipment:***
· ***General protective and hygienic measures:***
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the skin.
Avoid contact with the eyes and skin.
· ***Breathing equipment:***
Not required.
Use suitable respiratory protective device in case of insufficient ventilation.
· ***Protection of hands:***
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

(Contd. on page 5)

RCC-CW001060

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 4)

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374

Protective gloves

· ***Material of gloves***
PVC gloves
Neoprene gloves
· ***Penetration time of glove material***
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· ***Eye protection:***

Tightly sealed goggles

9 Physical and chemical properties

· ***Information on basic physical and chemical properties***	
· ***General Information***	
· ***Appearance:***	
Form:	*Liquid*
Color:	*Colorless*
· ***Odor:***	*Odorless*
· ***Odor threshold:***	*Not determined.*
· ***pH-value at 20 °C (68 °F):***	*<2*
· ***Change in condition***	
Melting point/Melting range:	*Not determined.*
	Not determined.
Boiling point/Boiling range:	*100 °C (212 °F)*
· ***Flash point:***	*Not applicable.*
· ***Flammability (solid, gaseous):***	*Not determined.*
· ***Ignition temperature:***	*Not determined*
· ***Decomposition temperature:***	*Not determined.*
· ***Auto igniting:***	*Product is not selfigniting.*
· ***Danger of explosion:***	*Not determined.*
· ***Explosion limits:***	
Lower:	*Not determined.*
Upper:	*Not determined.*
· ***Vapor pressure at 20 °C (68 °F):***	*23 hPa (17.3 mm Hg)*
· ***Density at 20 °C (68 °F):***	*1.03059 g/cm³ (8.60027 lbs/gal)*

(Contd. on page 6)

RCC-CW001061

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 5)

· ***Relative density***	*Not determined.*
· ***Vapor density***	*Not determined.*
· ***Evaporation rate***	*Not determined.*
· ***Solubility in / Miscibility with***	
Water:	*Fully miscible.*
· ***Partition coefficient (n-octanol/water):***	*Not determined.*
· ***Viscosity:***	
Dynamic:	*Not determined.*
Kinematic:	*Not determined.*
· ***Other information***	*No further relevant information available.*

10 Stability and reactivity

· ***Reactivity***
Stable under normal conditions.
No further relevant information available.
· ***Chemical stability*** *Stable under normal conditions.*
· ***Thermal decomposition / conditions to be avoided:***
Formation of toxic gases is possible during heating or in case of fire.
· ***Possibility of hazardous reactions*** *No dangerous reactions known.*
· ***Conditions to avoid*** *Heat.*
· ***Incompatible materials:***
Strong oxidizing agents.
Metals.
· ***Hazardous decomposition products:*** *Formation of toxic gases is possible during heating or in case of fire.*

11 Toxicological information

· ***Information on toxicological effects***
· ***Acute toxicity:***

· ***LD/LC50 values that are relevant for classification:***		
CAS: 7697-37-2 Nitric acid		
Inhalative	*LC50/4 h*	*130 mg/l (rat)*

· ***Primary irritant effect:***
· ***on the skin:*** *Irritant to skin and mucous membranes.*
· ***on the eye:*** *Strong irritant with the danger of severe eye injury.*
· ***Sensitization:*** *Based on available data, the classification criteria are not met.*
· ***Additional toxicological information:***
The product shows the following dangers according to internally approved calculation methods for preparations:
Irritant

· ***Carcinogenic categories***

· ***IARC (International Agency for Research on Cancer)***
None of the ingredients is listed.

(Contd. on page 7)

RCC-CW001062

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 6)

· ***NTP (National Toxicology Program)***

None of the ingredients is listed.

· ***OSHA-Ca (Occupational Safety & Health Administration)***

None of the ingredients is listed.

12 Ecological information

· ***Toxicity***

· ***Aquatic toxicity:***

CAS: 7697-37-2 Nitric acid	
LC50/48	*180 mg/l (crustacean)*
CAS: 7440-50-8 Copper	
LC50/48	*0.044 mg/l (crustacean)*
EC50/48 h	*0.02 mg/l (crustacean)*
EC50/72h	*0.57 mg/l (Algae)*
LC50/96 h	*0.665 mg/l (fish)*

· ***Persistence and degradability*** *No further relevant information available.*
· ***Behavior in environmental systems:***
· ***Bioaccumulative potential*** *No further relevant information available.*
· ***Mobility in soil*** *No further relevant information available.*
· ***Additional ecological information:***
· ***General notes:***
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Must not reach bodies of water or drainage ditch undiluted or unneutralized.
Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
· ***Results of PBT and vPvB assessment***
· ***PBT:*** *Not applicable.*
· ***vPvB:*** *Not applicable.*
· ***Other adverse effects*** *No further relevant information available.*

13 Disposal considerations

· ***Waste treatment methods***
· ***Recommendation:***
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· ***Uncleaned packagings:***
· ***Recommendation:*** *Dispose in accordance with national regulations.*
· ***Recommended cleansing agent:*** *Water, if necessary with cleansing agents.*

(Contd. on page 8)

RCC-CW001063

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 7)

14 Transport information

· ***UN-Number***	
· ***DOT, ADR, IMDG, IATA***	*UN3264*
· ***DOT***	*Corrosive liquid, acidic, inorganic, n.o.s. (Nitric acid)*
· ***ADR***	*3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)*
· ***IMDG, IATA***	*CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID)*
· ***Transport hazard class(es)***	
· ***DOT***	

· ***Class***	*8 Corrosive substances*
· ***Label***	*8*
· ***ADR, IMDG, IATA***	

· ***Class***	*8 Corrosive substances*
· ***Label***	*8*
· ***Packing group***	
· ***DOT, ADR, IMDG, IATA***	*III*
· ***Environmental hazards:***	*Not applicable.*
· ***Special precautions for user***	*Warning: Corrosive substances*
· ***Danger code (Kemler):***	*80*
· ***EMS Number:***	*F-A,S-B*
· ***Segregation groups***	*Acids*
· ***Stowage Category***	*A*
· ***Stowage Code***	*SW2 Clear of living quarters.*
· ***Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code***	*Not applicable.*
· ***Transport/Additional information:***	
· ***ADR***	
· ***Excepted quantities (EQ)***	*Code: E1* *Maximum net quantity per inner packaging: 30 ml* *Maximum net quantity per outer packaging: 1000 ml*
· ***UN "Model Regulation":***	*UN 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (NITRIC ACID), 8, III*

(Contd. on page 9)

RCC-CW001064

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 8)

15 Regulatory information

· ***Safety, health and environmental regulations/legislation specific for the substance or mixture***
· ***Sara***

· ***Section 355 (extremely hazardous substances):***	
CAS: 7697-37-2	*Nitric acid*

· ***Section 313 (Specific toxic chemical listings):***	
CAS: 7697-37-2	*Nitric acid*
CAS: 7440-50-8	*Copper*

· ***TSCA (Toxic Substances Control Act):***
All components have the value ACTIVE.

· ***Hazardous Air Pollutants***
None of the ingredients is listed.

· ***Proposition 65***

· ***Chemicals known to cause cancer:***
None of the ingredients is listed.

· ***Chemicals known to cause reproductive toxicity for females:***
None of the ingredients is listed.

· ***Chemicals known to cause reproductive toxicity for males:***
None of the ingredients is listed.

· ***Chemicals known to cause developmental toxicity:***
None of the ingredients is listed.

· ***Carcinogenic categories***

· ***EPA (Environmental Protection Agency)***		
CAS: 7440-50-8	*Copper*	*D*

· ***TLV (Threshold Limit Value established by ACGIH)***
None of the ingredients is listed.

· ***NIOSH-Ca (National Institute for Occupational Safety and Health)***
None of the ingredients is listed.

· ***Hazard pictograms***

GHS05

· ***Signal word*** *Danger*

· ***Hazard-determining components of labeling:***
Nitric acid
· ***Hazard statements***
H290 May be corrosive to metals.
H315 Causes skin irritation.
H318 Causes serious eye damage.

(Contd. on page 10)

RCC-CW001065

Safety Data Sheet
acc. to OSHA HCS

Printing date 10/16/2020 *Reviewed on 10/16/2020*

Product name: **Copper Standard: 1000 µg/mL Cu in 5% HNO3 [100ml bottle]**

(Contd. of page 9)

· ***Precautionary statements***

P280	*Wear protective gloves / eye protection / face protection.*
P305+P351+P338	*If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
P310	*Immediately call a poison center/doctor.*
P321	*Specific treatment (see on this label).*
P332+P313	*If skin irritation occurs: Get medical advice/attention.*
P406	*Store in corrosive resistant container with a resistant inner liner.*

· ***Chemical safety assessment:*** *A Chemical Safety Assessment has not been carried out.*

16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

· ***Date of preparation / last revision*** *10/16/2020 / 1*

· ***Abbreviations and acronyms:***

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Ox. Liq. 2: Oxidizing liquids – Category 2
Met. Corr.1: Corrosive to metals – Category 1
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Skin Irrit. 2: Skin corrosion/irritation – Category 2
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
Aquatic Chronic 1: Hazardous to the aquatic environment - long-term aquatic hazard – Category 1

· ***Sources***

Tables 3.1 and 3.2 from Annex 6 of EC 1272/2008, EC 1907/2006, EH40/2005 as amended 2011, Registry of Toxic Effects of Chemical Substances (RTECS), The Dictionary of Substances and their Effects, 1st Edition, IUCLID.

· ***Data compared to the previous version altered.*** *All sections have been updated.*

RCC-CW001066

SAFETY DATA SHEET

Version 6.6
Revision Date 06/30/2021
Print Date 07/31/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Copper(II) sulfate

Product Number : 451657
Brand : Aldrich
Index-No. : 029-004-00-0
CAS-No. : 7758-98-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Cupric sulfate
Formula	:	CuO_4S
Molecular weight	:	159.61 g/mol
CAS-No.	:	7758-98-7
EC-No.	:	231-847-6
Index-No.	:	029-004-00-0

Component	Classification	Concentration
Copper(II) sulphate		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Aquatic Acute 1; Aquatic Chronic 1; H302, H315, H319, H400, H410 M-Factor - Aquatic Acute: 10 M-Factor - Aquatic Chronic: 1	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Sulfur oxides
Copper oxides
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Air sensitive. hygroscopic Store under inert gas.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Copper(II) sulphate	7758-98-7	TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		PEL	1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Color: light gray
b)	Odor	odorless
c)	Odor Threshold	Not applicable
d)	pH	3.5 - 4.5 at 50 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/range: 200 °C (392 °F) - dec.
f)	Initial boiling point and boiling range	Not applicable

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	9.7 hPa at 25 °C (77 °F)
l)	Vapor density	No data available
m)	Relative density	No data available
n)	Water solubility	203 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Exothermic reaction with:
hydroxylamine
Strong oxidizing agents
powdered magnesium

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 481 mg/kg
(OECD Test Guideline 401)
Inhalation: No data available
LD50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)
No data available

Skin corrosion/irritation
Causes skin irritation. (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes serious eye irritation.
(OECD Test Guideline 405)
The value is given in analogy to the following substances: Copper sulphate pentahydrate
Risk of corneal clouding. conjunctivitis

Respiratory or skin sensitization
Freund's complete adjuvant test - Guinea pig
Result: negative
(OECD Test Guideline 406)
The value is given in analogy to the following substances: Copper sulphate pentahydrate

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Rat
Cell type: Liver cells
Application Route: Oral
Method: OECD Test Guideline 486
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Red blood cells (erythrocytes)
Application Route: Oral
Method: Mutagenicity (micronucleus test)
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: GL8800000
Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has lead to hemolytic anemia and accelerates arteriosclerosis.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 0.193 mg/l - 96 h (US-EPA)

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Copper(II) sulphate)
Reportable Quantity (RQ): 10 lbs
1) Marine pollutant: yesPoison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Copper(II) sulphate)
Marine pollutant : yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Copper(II) sulphate)

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Copper(II) sulphate	7758-98-7	1993-02-16

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 16: Other information

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.6 Revision Date: 06/30/2021 Print Date: 07/31/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.07.2021 *version number 18* *Revision: 23.07.2021*

*
SECTION 1: Identification of the substance/mixture and of the company/undertaking

***1.1 Product identifier**
***Trade name:** **ELECTRODE FILLING SOLUTION 3M POTASSIUM CHLORIDE**

***Article number:** EFS3005
***Registration number**
A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
***1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
***Application of the substance / the mixture** Laboratory Chemicals

***1.3 Details of the supplier of the safety data sheet**
***Manufacturer/Supplier:**
Reagecon Diagnostics Ltd.
Shannon Free Zone,
Shannon,
Co. Clare,
Ireland.
Tel +353 61 472622
Fax +353 61 472642

***Further information obtainable by contacting:** sds@reagecon.ie
***1.4 Emergency telephone number:**
For Hazardous Materials [or Dangerous Goods] Incident
Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC
For Ireland call +(353)-19014670
For Outside Ireland call +1 703-741-5970 / 1-800-424-9300 CCN849800

*
SECTION 2: Hazards identification

***2.1 Classification of the substance or mixture**
***Classification according to Regulation (EC) No 1272/2008**
The product is not classified, according to the CLP regulation.

***2.2 Label elements**
***Labelling according to Regulation (EC) No 1272/2008** Void
***Hazard pictograms** Void
***Signal word** Void
***Hazard statements** Void
***2.3 Other hazards**
***Results of PBT and vPvB assessment**
***PBT:** Not applicable.
***vPvB:** Not applicable.

*
SECTION 3: Composition/information on ingredients

***3.2 Chemical characterisation: Mixtures**
***Description:** Mixture of substances listed below with nonhazardous additions.

***Dangerous components:** Void
***Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

***4.1 Description of first aid measures**
***General information:** No special measures required.

(Contd. on page 2)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.07.2021 *version number 18* *Revision: 23.07.2021*

Trade name: ELECTRODE FILLING SOLUTION 3M POTASSIUM CHLORIDE

(Contd. of page 1)

***After inhalation:**
Provide fresh air, warmth and rest. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Obtain medical attention if any discomfort continues.
***After skin contact:** Generally the product does not irritate the skin.
***After eye contact:**
Promptly wash eyes with plenty of water for up to 15 minutes. Open eyes wide apart and rinse well to remove any contact lenses. Do not remove contact lenses by hand. Continue to rinse. Get medical attention if symptoms persist.
***After swallowing:** If symptoms persist consult doctor.
***4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
***4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

***5.1 Extinguishing media**
***Suitable extinguishing agents:**
Indications shall be given whether any extinguishing media are inappropriate for a particular situation involving the substance or mixture
Use fire extinguishing methods suitable to surrounding conditions.
***5.2 Special hazards arising from the substance or mixture** No further relevant information available.
***5.3 Advice for firefighters**
***Protective equipment:**
Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers

SECTION 6: Accidental release measures

***6.1 Personal precautions, protective equipment and emergency procedures** Not required.
***6.2 Environmental precautions:**
Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.
***6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
***6.4 Reference to other sections**
No dangerous substances are released.
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

***7.1 Precautions for safe handling** No special measures required.
***Information about fire - and explosion protection:** No special measures required.

***7.2 Conditions for safe storage, including any incompatibilities**
***Storage:**
***Requirements to be met by storerooms and receptacles:** No special requirements.
***Information about storage in one common storage facility:** Not required.
***Further information about storage conditions:** None.
***7.3 Specific end use(s)** No further relevant information available.

(Contd. on page 3)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.07.2021 version number 18 Revision: 23.07.2021

Trade name: ELECTRODE FILLING SOLUTION 3M POTASSIUM CHLORIDE

(Contd. of page 2)

SECTION 8: Exposure controls/personal protection

*8.1 Control parameters
*Ingredients with limit values that require monitoring at the workplace:
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
*Additional information: The lists valid during the making were used as basis.

*8.2 Exposure controls
*Personal protective equipment:
*General protective and hygienic measures:
The usual precautionary measures are to be adhered to when handling chemicals.
*Respiratory protection: Not required.
*Protection of hands:
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Always ensure that gloves are inspected before use.
Selection of protective gloves must include consideration of the penetration times along with rates of diffusion and degradation. The selected glove should comply with the specifications of EU Directive 89/686/EEC and the standard EN374 derived from it.
*Material of gloves
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
*Penetration time of glove material
In the absence of data above, the exact break through time has to be sourced from the manufacturer of the protective gloves and has to be observed.
*Eye protection:

Goggles recommended during refilling: Use equipment for eye protection tested and approved under appropriate government standards
such as NIOSH (US) or EN 166(EU)

*Engineering Controls: No further data; see item 7.

SECTION 9: Physical and chemical properties

*9.1 Information on basic physical and chemical properties
*General Information
*Appearance:

*Form:	Liquid
*Colour:	According to product specification
*Odour:	Characteristic
*Odour threshold:	Not determined.
*pH-value:	Not determined.
*Change in condition	
*Melting point/freezing point:	Undetermined.
*Initial boiling point and boiling range:	100 °C
*Flash point:	Not applicable.
*Flammability (solid, gas):	Not applicable.
*Decomposition temperature:	Not determined.
*Auto-ignition temperature:	Product is not selfigniting.
*Explosive properties:	Product does not present an explosion hazard.
*Explosion limits:	
*Lower:	Not determined.
*Upper:	Not determined.
*Vapour pressure at 20 °C:	23 hPa
*Density:	Not determined.

(Contd. on page 4)

RCC-CW001079

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.07.2021 version number 18 Revision: 23.07.2021

Trade name: ELECTRODE FILLING SOLUTION 3M POTASSIUM CHLORIDE

(Contd. of page 3)

***Relative density**	Not determined.
***Vapour density**	Not determined.
***Evaporation rate**	Not determined.
***Solubility/ miscibility with**	
***water:**	Fully miscible.
***Partition coefficient: n-octanol/water:**	Not determined.
***Viscosity:**	
***Dynamic:**	Not determined.
***Kinematic:**	Not determined.
***9.2 Other information**	No further relevant information available.

SECTION 10: Stability and reactivity

***10.1 Reactivity** No further relevant information available.
***10.2 Chemical stability**
***Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
***10.3 Possibility of hazardous reactions** No dangerous reactions known.
***10.4 Conditions to avoid** No further relevant information available.
***10.5 Incompatible materials:** No further relevant information available.
***10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

***11.1 Information on toxicological effects**
***Acute toxicity** Based on available data, the classification criteria are not met.
***Primary irritant effect:**
***Skin corrosion/irritation** Based on available data, the classification criteria are not met.
***Serious eye damage/irritation** Based on available data, the classification criteria are not met.
***Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
***Additional toxicological information:**
***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
***Germ cell mutagenicity** Based on available data, the classification criteria are not met.
***Carcinogenicity** Based on available data, the classification criteria are not met.
***Reproductive toxicity** Based on available data, the classification criteria are not met.
***STOT-single exposure** Based on available data, the classification criteria are not met.
***STOT-repeated exposure** Based on available data, the classification criteria are not met.
***Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

***12.1 Toxicity**
***Aquatic toxicity:** No further relevant information available.
***12.2 Persistence and degradability** No further relevant information available.
***12.3 Bioaccumulative potential** No further relevant information available.
***12.4 Mobility in soil** No further relevant information available.
***Additional ecological information:**
***General notes:**
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
***12.5 Results of PBT and vPvB assessment**
***PBT:** Not applicable.
***vPvB:** Not applicable.

(Contd. on page 5)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.07.2021 *version number 18* *Revision: 23.07.2021*

Trade name: ELECTRODE FILLING SOLUTION 3M POTASSIUM CHLORIDE

(Contd. of page 4)

***12.6 Other adverse effects** No further relevant information available.*

SECTION 13: Disposal considerations

***13.1 Waste treatment methods**
***Recommendation** Smaller quantities can be disposed of with household waste.*

***Uncleaned packaging:**
***Recommendation:** Disposal must be made according to official regulations.*
***Recommended cleansing agents:** Water, if necessary together with cleansing agents.*

*

SECTION 14: Transport information

***14.1 UN-Number** ***ADR, ADN, IMDG, IATA**	Void
***14.2 UN proper shipping name** ***ADR, ADN, IMDG, IATA**	Void
***14.3 Transport hazard class(es)** ***ADR, ADN, IMDG, IATA** ***Class**	Void
***14.4 Packing group** ***ADR, IMDG, IATA**	Void
***14.5 Environmental hazards:** ***Marine pollutant:**	No
***14.6 Special precautions for user**	Not applicable.
***14.7 Transport in bulk according to Annex II of Marpol and the IBC Code**	Not applicable.
***Transport/Additional information:**	Not dangerous according to the above specifications.
***UN "Model Regulation":**	Void

*

SECTION 15: Regulatory information

***15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

***Directive 2012/18/EU**
***Named dangerous substances - ANNEX I** None of the ingredients is listed.*

LIST OF SUBSTANCES SUBJECT TO AUTHORISATION (ANNEX XIV)

CAS: 9002-93-1	triton x 100	Sunset date: 2021-01-04

DIRECTIVE 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment – Annex II

None of the ingredients is listed.

REGULATION (EU) 2019/1148

Annex I - RESTRICTED EXPLOSIVES PRECURSORS (Upper limit value for the purpose of licensing under Article 5(3))

None of the ingredients is listed.

Annex II - REPORTABLE EXPLOSIVES PRECURSORS

None of the ingredients is listed.

(Contd. on page 6)

RCC-CW001081

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.07.2021 *version number 18* *Revision: 23.07.2021*

Trade name: ELECTRODE FILLING SOLUTION 3M POTASSIUM CHLORIDE

(Contd. of page 5)

***National regulations:**

***Waterhazard class:** Water hazard class 1 (Self-assessment): slightly hazardous for water.
***15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

***Department issuing SDS:** Health and Safety
***Contact:** sds@reagecon.ie
***Abbreviations and acronyms:**
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
REACH (Registration, Evaluation, Authorisation and restriction of Chemicals)
ADR: Accord relatif au transport international des marchandises dangereuses par route (European Agreement Concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
***NO**

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.03.2021 *version number 4* *Revision: 23.03.2021*

SECTION 1: Identification of the substance/mixture and of the company/undertaking

***1.1 Product identifier**
***Trade name: ELECTRODE STORAGE SOLUTION**

***Article number:** ESS5
***Registration number**
A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
***1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
***Application of the substance / the mixture** Laboratory Chemicals

***1.3 Details of the supplier of the safety data sheet**
***Manufacturer/Supplier:**
Reagecon Diagnostics Ltd.
Shannon Free Zone,
Shannon,
Co. Clare,
Ireland.
Tel +353 61 472622
Fax +353 61 472642

***Further information obtainable by contacting:** sds@reagecon.ie
***1.4 Emergency telephone number:**
For Hazardous Materials [or Dangerous Goods] Incident
Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC
For Ireland call +(353)-19014670
For Outside Ireland call +1 703-741-5970 / 1-800-424-9300 CCN849800

SECTION 2: Hazards identification

***2.1 Classification of the substance or mixture**
***Classification according to Regulation (EC) No 1272/2008**
The product is not classified, according to the CLP regulation.

***2.2 Label elements**
***Labelling according to Regulation (EC) No 1272/2008** Void
***Hazard pictograms** Void
***Signal word** Void
***Hazard statements** Void
***2.3 Other hazards**
***Results of PBT and vPvB assessment**
***PBT:** Not applicable.
***vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

***3.2 Chemical characterisation: Mixtures**
***Description:** Mixture of substances listed below with nonhazardous additions.

***Dangerous components:** Void
***Additional information:** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

***4.1 Description of first aid measures**
***General information:** No special measures required.

(Contd. on page 2)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.03.2021 version number 4 Revision: 23.03.2021

Trade name: ELECTRODE STORAGE SOLUTION

(Contd. of page 1)

**After inhalation:*
Provide fresh air, warmth and rest. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Obtain medical attention if any discomfort continues.
**After skin contact:* Generally the product does not irritate the skin.
**After eye contact:*
Promptly wash eyes with plenty of water for up to 15 minutes. Open eyes wide apart and rinse well to remove any contact lenses. Do not remove contact lenses by hand. Continue to rinse. Get medical attention if symptoms persist.
**After swallowing:* If symptoms persist consult doctor.
**4.2 Most important symptoms and effects, both acute and delayed* No further relevant information available.
**4.3 Indication of any immediate medical attention and special treatment needed*
No further relevant information available.

SECTION 5: Firefighting measures

**5.1 Extinguishing media*
**Suitable extinguishing agents:*
Indications shall be given whether any extinguishing media are inappropriate for a particular situation involving the substance or mixture
Use fire extinguishing methods suitable to surrounding conditions.
**5.2 Special hazards arising from the substance or mixture* No further relevant information available.
**5.3 Advice for firefighters*
**Protective equipment:*
Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Do not breathe fumes. Keep containers cool by spraying with water if exposed to fire. Avoid run off to waterways and sewers

SECTION 6: Accidental release measures

**6.1 Personal precautions, protective equipment and emergency procedures* Not required.
**6.2 Environmental precautions:* Do not allow to enter sewers/ surface or ground water.
**6.3 Methods and material for containment and cleaning up:*
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
**6.4 Reference to other sections*
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

**7.1 Precautions for safe handling* No special measures required.
**Information about fire - and explosion protection:* No special measures required.

**7.2 Conditions for safe storage, including any incompatibilities*
**Storage:*
**Requirements to be met by storerooms and receptacles:* No special requirements.
**Information about storage in one common storage facility:* Not required.
**Further information about storage conditions:* None.
**7.3 Specific end use(s)* No further relevant information available.

SECTION 8: Exposure controls/personal protection

**8.1 Control parameters*
**Engineering Controls:* No further data; see item 7.

(Contd. on page 3)

RCC-CW001084

Safety data sheet
according to 1907/2006/EC, Article 31

Trade name: ELECTRODE STORAGE SOLUTION

(Contd. of page 2)

***Ingredients with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
***Additional information:** The lists valid during the making were used as basis.

***8.2 Exposure controls**
***Personal protective equipment:**
***General protective and hygienic measures:**
The usual precautionary measures are to be adhered to when handling chemicals.
***Respiratory protection:** Not required.
***Protection of hands:**
The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Always ensure that gloves are inspected before use.
Selection of protective gloves must include consideration of the penetration times along with rates of diffusion and degradation. The selected glove should comply with the specifications of EU Directive 89/686/EEC and the standard EN374 derived from it.
***Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
***Penetration time of glove material**
In the absence of data above, the exact break through time has to be sourced from the manufacturer of the protective gloves and has to be observed.
***Eye protection:**

Goggles recommended during refilling: Use equipment for eye protection tested and approved under appropriate government standards
such as NIOSH (US) or EN 166(EU)

SECTION 9: Physical and chemical properties

***9.1 Information on basic physical and chemical properties**	
***General Information**	
***Appearance:**	
Form:	Liquid
Colour:	According to product specification
***Odour:**	Characteristic
***Odour threshold:**	Not determined.
***pH-value:**	Not determined.
***Change in condition**	
Melting point/freezing point:	Undetermined.
Initial boiling point and boiling range:	100 °C
***Flash point:**	Not applicable.
***Flammability (solid, gas):**	Not applicable.
***Decomposition temperature:**	Not determined.
***Auto-ignition temperature:**	Product is not selfigniting.
***Explosive properties:**	Product does not present an explosion hazard.
***Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
***Vapour pressure at 20 °C:**	23 hPa
***Density at 20 °C:**	1.22042 g/cm³

(Contd. on page 4)

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.03.2021 version number 4 Revision: 23.03.2021

Trade name: ELECTRODE STORAGE SOLUTION

(Contd. of page 3)

***Relative density**	Not determined.
***Vapour density**	Not determined.
***Evaporation rate**	Not determined.
***Solubility/ miscibility with water:**	Not miscible or difficult to mix.
***Partition coefficient: n-octanol/water:**	Not determined.
***Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
***9.2 Other information**	No further relevant information available.

SECTION 10: Stability and reactivity

***10.1 Reactivity** No further relevant information available.
***10.2 Chemical stability**
***Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
***10.3 Possibility of hazardous reactions** No dangerous reactions known.
***10.4 Conditions to avoid** No further relevant information available.
***10.5 Incompatible materials:** No further relevant information available.
***10.6 Hazardous decomposition products:** No dangerous decomposition products known.

SECTION 11: Toxicological information

***11.1 Information on toxicological effects**
***Acute toxicity** Based on available data, the classification criteria are not met.
***Primary irritant effect:**
***Skin corrosion/irritation** Based on available data, the classification criteria are not met.
***Serious eye damage/irritation** Based on available data, the classification criteria are not met.
***Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
***Additional toxicological information:**
***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)**
***Germ cell mutagenicity** Based on available data, the classification criteria are not met.
***Carcinogenicity** Based on available data, the classification criteria are not met.
***Reproductive toxicity** Based on available data, the classification criteria are not met.
***STOT-single exposure** Based on available data, the classification criteria are not met.
***STOT-repeated exposure** Based on available data, the classification criteria are not met.
***Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

***12.1 Toxicity**
***Aquatic toxicity:** No further relevant information available.
***12.2 Persistence and degradability** No further relevant information available.
***12.3 Bioaccumulative potential** No further relevant information available.
***12.4 Mobility in soil** No further relevant information available.
***Additional ecological information:**
***General notes:**
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
***12.5 Results of PBT and vPvB assessment**
***PBT:** Not applicable.

(Contd. on page 5)

RCC-CW001086

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.03.2021 version number 4 Revision: 23.03.2021

Trade name: ELECTRODE STORAGE SOLUTION

(Contd. of page 4)

**vPvB:* Not applicable.
**12.6 Other adverse effects* No further relevant information available.

SECTION 13: Disposal considerations

**13.1 Waste treatment methods*
**Recommendation* Smaller quantities can be disposed of with household waste.

**Uncleaned packaging:*
**Recommendation:* Disposal must be made according to official regulations.

SECTION 14: Transport information

**14.1 UN-Number* **ADR, IMDG, IATA*	Void
**14.2 UN proper shipping name* **ADR, IMDG, IATA*	Void
**14.3 Transport hazard class(es)* **ADR, IMDG, IATA* **Class*	Void
**14.4 Packing group* **ADR, IMDG, IATA*	Void
**14.5 Environmental hazards:* **Marine pollutant:*	No
**14.6 Special precautions for user*	Not applicable.
**14.7 Transport in bulk according to Annex II of Marpol and the IBC Code*	Not applicable.
**Transport/Additional information:*	Not dangerous according to the above specifications.
**UN "Model Regulation":*	Void

SECTION 15: Regulatory information

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture*

**Directive 2012/18/EU*
**Named dangerous substances - ANNEX I* None of the ingredients is listed.

**DIRECTIVE 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment – Annex II*

None of the ingredients is listed.

**National regulations:*

**Waterhazard class:* Water hazard class 1 (Self-assessment): slightly hazardous for water.
**15.2 Chemical safety assessment:* A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

**Department issuing SDS:* Health and Safety

(Contd. on page 6)

RCC-CW001087

Safety data sheet
according to 1907/2006/EC, Article 31

Printing 23.03.2021 *version number 4* *Revision: 23.03.2021*

Trade name: ELECTRODE STORAGE SOLUTION

(Contd. of page 5)

***Contact:** sds@reagecon.ie*

Abbreviations and acronyms:

REACH (Registration, Evaluation, Authorisation and restriction of Chemicals)
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative

Safety Data Sheet
FERRIC CHLORIDE SOLUTION

Version 1.2 Revision Date: 10/22/2020

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : FERRIC CHLORIDE SOLUTION

Recommended use of the chemical and restrictions on use

Recommended use : Reserved for industrial and professional use.

Manufacturer or supplier's details

Company : Univar Solutions USA, Inc.
Address 3075 Highland Pkwy Suite 200
Downers Grove, IL 60515
United States of America (USA)

Emergency telephone number:
Transport North America: CHEMTREC (1-800-424-9300)
CHEMTREC INTERNATIONAL Tel # 703-527-3887

Additional Information: : Responsible Party: Product Compliance Department
E-mail: SDSNA@univarsolutions.com
SDS Requests: 1-855-429-2661
Website: www.univarsolutions.com

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Corrosive to metals : Category 1

Acute toxicity (Oral) : Category 4

Skin corrosion : Category 1

Serious eye damage : Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.

Precautionary statements : **Prevention:**
P234 Keep only in original container.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P363 Wash contaminated clothing before reuse.
P390 Absorb spillage to prevent material damage.
Storage:
P405 Store locked up.
P406 Store in corrosive resistant container with a resistant inner liner.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components

CAS-No.	Chemical name	Weight percent
7705-08-0	Iron chloride (FeCl3)	50 - 70
7647-01-0	Hydrochloric acid	1 - 5

Actual concentration is withheld as a trade secret
Any Concentration shown as a range is due to batch variation.

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Consult a physician.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

In case of skin contact : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
If on skin, rinse well with water.
If on clothes, remove clothes.

In case of eye contact	:	Small amounts splashed into eyes can cause irreversible tissue damage and blindness. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Continue rinsing eyes during transport to hospital. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.
If swallowed	:	Clean mouth with water and drink afterwards plenty of water. Keep respiratory tract clear. Do not induce vomiting without medical advice. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take victim immediately to hospital.

SECTION 5. FIREFIGHTING MEASURES

Unsuitable extinguishing media	:	High volume water jet
Specific hazards during firefighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	sulfur oxides toxic fumes
Further information	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment.
Environmental precautions	:	Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Neutralize with chalk, alkali solution or ammonia. Soak up with inert absorbent material (e.g. sand, silica gel,

acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Advice on safe handling : Do not breathe vapours/dust.
Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
To avoid spills during handling keep bottle on a metal tray.
Dispose of rinse water in accordance with local and national regulations.

Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Observe label precautions.
Electrical installations / working materials must comply with the technological safety standards.

Materials to avoid : Do not store near acids.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

CAS-No.	Components	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
7705-08-0	Iron chloride (FeCl3)	TWA	1 mg/m3 (Iron)	ACGIH
		TWA	1 mg/m3 (Iron)	OSHA P0
		TWA	1 mg/m3 (Iron)	NIOSH REL
7647-01-0	Hydrochloric acid	C	2 ppm	ACGIH
		C	5 ppm 7 mg/m3	NIOSH REL
		C	5 ppm 7 mg/m3	OSHA Z-1
		C	5 ppm 7 mg/m3	OSHA P0

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are un-

known, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Remarks	:	The suitability for a specific workplace should be discussed with the producers of the protective gloves.
Eye protection	:	Eye wash bottle with pure water Tightly fitting safety goggles Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	Impervious clothing Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures	:	When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	dark brown
Odour	:	Sour
Odour Threshold	:	No data available
pH	:	< 2
Freezing Point ()	:	10 °F (10 °F)
Boiling Point ()	:	100 - 110 °C (212 - 230 °F)
Flash point	:	Not applicable
Evaporation rate	:	< 1
Flammability (solid, gas)	:	No data available
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available

Vapour pressure	:	No data available
Relative vapour density	:	No data available
Relative density	:	1.237 - 1.488
Density	:	10.300 - 12.395 lb/gal
Solubility(ies) Water solubility	:	completely soluble @ 20 °C (68 °F)
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Thermal decomposition	:	No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Stable under recommended storage conditions.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No decomposition if stored and applied as directed.
Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Acids Alkali metals Amines Ammonia Bases brass bronze Carbon steel chlorinated hydrocarbons Chlorine Copper Copper alloys hydrogen chloride Lead Metals metallic oxides nitrates sodium hypochlorite steel Strong oxidizing agents Sulphides

Tin
water
Zinc
Aluminium
Peroxides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity : Acute toxicity estimate: 880 mg/kg

Components:

7705-08-0:

Acute oral toxicity : LD50 (Mouse, female): 440 mg/kg
Assessment: The component/mixture is moderately toxic after single ingestion.

Skin corrosion/irritation

Components:

7705-08-0:
Species: Rabbit
Exposure time: 20 h
Result: Irritating to skin.

7647-01-0:
Species: Rabbit
Result: Causes burns.

Serious eye damage/eye irritation

Components:

7705-08-0:
Species: Rabbit
Result: Risk of serious damage to eyes.

Carcinogenicity

IARC No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen

by NTP.

STOT - single exposure

Components:

7647-01-0:
Target Organs: Respiratory system, Lungs
Assessment: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

Further information

Product:

Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

No data available

Persistence and degradability

No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Ozone-Depletion Potential	:	Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with all applicable local, state and federal regulations. For assistance with your waste management needs - including disposal, recycling and waste stream reduction, contact Univar Solutions ChemCare: 1-800-909-4897

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

DOT (Department of Transportation):
UN2582, FERRIC CHLORIDE SOLUTION, 8, III

IATA (International Air Transport Association):
UN2582, FERRIC CHLORIDE SOLUTION, 8, III

IMDG (International Maritime Dangerous Goods):
UN2582, FERRIC CHLORIDE SOLUTION, 8, III

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Iron chloride (FeCl3)	7705-08-0	1000	2000
Hydrochloric acid	7647-01-0	5000	*

*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Hydrochloric acid	7647-01-0	5000	*

*: Calculated RQ exceeds reasonably attainable upper limit.

SARA 311/312 Hazards : Corrosive to metals
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 302 :

7647-01-0 Hydrochloric acid

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

7647-01-0 Hydrochloric acid

Clean Air Act

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):

7647-01-0 Hydrochloric acid

The following chemical(s) are listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F):

7647-01-0 Hydrochloric acid

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489).

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

7705-08-0 Iron chloride (FeCl3)
7647-01-0 Hydrochloric acid

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

7705-08-0 Iron chloride (FeCl3)
7647-01-0 Hydrochloric acid

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

Massachusetts Right To Know

7705-08-0 Iron chloride (FeCl3)
7647-01-0 Hydrochloric acid

Pennsylvania Right To Know

7732-18-5 Water
7705-08-0 Iron chloride (FeCl3)
7647-01-0 Hydrochloric acid

California Prop 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:

TSCA : On the inventory, or in compliance with the inventory

DSL : All components of this product are on the Canadian DSL

AICS : Not in compliance with the inventory

NZIoC : Not in compliance with the inventory

ENCS : Not in compliance with the inventory

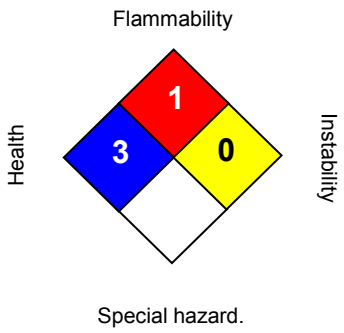
KECI : Not in compliance with the inventory

PICCS : Not in compliance with the inventory

IECSC : Not in compliance with the inventory

SECTION16. OTHER INFORMATION

NFPA:



HMIS III:

HEALTH	3
FLAMMABILITY	1
PHYSICAL HAZARD	4

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 =Extreme, * = Chronic

The information accumulated is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made become available subsequently to the date hereof, we do not assume any responsibility for the results of its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Univar Solutions Product Compliance Department (1-855-429-2661) SDSNA@univarsolutions.com.

Revision Date : 10/22/2020

Material number:
16163979, 16145299, 16147454, 16163672, 16143945, 16137157, 16147487, 16141551

Key or legend to abbreviations and acronyms used in the safety data sheet			
ACGIH	American Conference of Government Industrial Hygienists	LD50	Lethal Dose 50%
AICS	Australia, Inventory of Chemical Substances	LOAEL	Lowest Observed Adverse Effect Level
DSL	Canada, Domestic Substances List	NFPA	National Fire Protection Agency
NDSL	Canada, Non-Domestic Substances List	NIOSH	National Institute for Occupational Safety & Health
CNS	Central Nervous System	NTP	National Toxicology Program
CAS	Chemical Abstract Service	NZIoC	New Zealand Inventory of Chemicals
EC50	Effective Concentration	NOAEL	No Observable Adverse Effect Level
EC50	Effective Concentration 50%	NOEC	No Observed Effect Concentration
EGEST	EOSCA Generic Exposure Scenario Tool	OSHA	Occupational Safety & Health Administration
EOSCA	European Oilfield Specialty Chemicals Association	PEL	Permissible Exposure Limit

EINECS	European Inventory of Existing Chemical Substances	PICCS	Philippines Inventory of Commercial Chemical Substances
MAK	Germany Maximum Concentration Values	PRNT	Presumed Not Toxic
GHS	Globally Harmonized System	RCRA	Resource Conservation Recovery Act
>=	Greater Than or Equal To	STEL	Short-term Exposure Limit
IC50	Inhibition Concentration 50%	SARA	Superfund Amendments and Reauthorization Act.
IARC	International Agency for Research on Cancer	TLV	Threshold Limit Value
IECSC	Inventory of Existing Chemical Substances in China	TWA	Time Weighted Average
ENCS	Japan, Inventory of Existing and New Chemical Substances	TSCA	Toxic Substance Control Act
KECI	Korea, Existing Chemical Inventory	UVCB	Unknown or Variable Composition, Complex Reaction Products, and Biological Materials
<=	Less Than or Equal To	WHMIS	Workplace Hazardous Materials Information System
LC50	Lethal Concentration 50%		

SAFETY DATA SHEET

Colonial Chemical Solutions, Inc.

SECTION 1 · COMPANY AND PRODUCT IDENTIFICATION

PRODUCT

Product Name: **FERRIC SULFATE**
Control Number: 0437
Product Description: IRON III Solution

COMPANY IDENTIFICATION

Supplier: **COLONIAL CHEMICAL SOLUTIONS, INC.**
916 West Lathrop Avenue
Savannah, Georgia 31415

24 Hour Emergency Telephone: (800)-424-9300 CHEMTREC
General Information: (912) 236-1331

SECTION 2· HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Corrosive to metals Category 1
Acute toxicity, Oral Category 3
Acute toxicity, Dermal Category 2
Serious eye irritation Category 2A

GHS Label elements, including precautionary statements

Pictograms

Signal Word: Danger

Hazard statements:
H290 May be corrosive to metals.
H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:
P202 Do not handle until all safety precautions have been read and understood.
P262 Do not get in eyes, on skin, or on clothing.
P264 Wash thoroughly after handling
P280 Wear protective gloves/protective clothing/eye protection/face protection
P234 Keep only in original container
P270 Do not eat, drink or smoke when using this product
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P321 Specific treatment, see supplemental first aid information.
P391 Collect spillage, absorb spillage to prevent material damage
P301 + 312 - IF SWALLOWED: Call a poison center or doctor/physician if you feel unwell. Rinse mouth.
P313 Get medical attention
P302 + P352 IF ON SKIN: Wash with plenty of soap and water
P362 Take off contaminated clothing and wash before reuse
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P378 In case of fire, use extinguishing media appropriate for the surrounding fire. This material will not burn easily.
P331 DO NOT induce vomiting.
P501 Dispose of contents/ container to an approved waste disposal plant.

SECTION 3 · COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS Number	%Weight
Ferric Sulfate	10028-22-5	13 Fe^{3+}

Contains no impurities or stabilizing additives which themselves are classified and which contribute to the classification of this product.

SECTION 4 · FIRST AID MEASURES

FIRST AID PROCEDURES:
Eye Contact: Flush eyes with plenty of water for at least 15 minutes. Seek medical advice.
Skin Contact: Wash with soap and water. Seek medical attention if irritation develops.
Inhalation: Remove to fresh air. If not breathing, give artificial respiration. Seek medical attention if symptoms appear.
Ingestion: Never give anything by mouth to an unconscious person. Rinse mouth with water. Seek medical attention.

See Section 11 for **Signs and Symptoms of Exposure**

SECTION 5 · FIRE FIGHTING MEASURES

Suitable Extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Hazardous combustion products: Oxides of sulfur and iron.
Fire Fighting Procedures: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Unusual Fire and Explosion Hazards: Material a crystalline powder and will not burn.

SECTION 6 · ACCIDENTAL RELEASE

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Stop leak if possible. Avoid personal risk.
Small Spills – Absorb spill with clay or dry material or neutralize with lime, limestone or soda ash and collect in appropriate container for disposal.
Large Spills – Prevent entry into sewers and confined areas. Dike, if possible. Keep unnecessary people away, isolate non-reactive dry materials and collect in appropriate container for disposal. Neutralize spill residuals carefully with lime, limestone, or soda ash and collect in suitable container for disposal. Flush area with water.

SECTION 7 · STORAGE AND HANDLING

Handling: Avoid formation of vapors and aerosols. Do not breathe. Keep container closed and tightly sealed when not in use. Use good hygiene practices.
Storage: Prevent material from coming in contact with common metals. Ensure that all storage vessels are labeled. Avoid skin and eye contact. Wear appropriate protective clothing. Keep storage temperatures between 10° and 30°C. Store away from incompatible materials such as alkalis. Keep smaller containers (drums and totes) tightly closed when not in use or when empty.

SECTION 8 · EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Provide adequate ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below the applicable workplace exposure limits indicated below. The level of protection and types of controls will vary depending upon potential exposure conditions.

Exposure Limits: Ferric Sulfate 1 mg/m3 ACGIH 1 mg/m3 OSHA

Personal Protective Equipment (PPE):
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.
Skin: If prolonged or repeated skin contact is likely, wear appropriate protective gloves.
Clothing: Selection of protective clothing depends on work conditions, potential exposure conditions and may include gloves, boots, suits and other protective items.
Respirators: Where adequate ventilation is not available an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of OSHA Respiratory Protection Standard, 29 CFR 1920.134. In confined areas, use a self-contained breathing apparatus.

SECTION 9· PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
Odor/Appearance: Reddish Brown / acidic odor
Odor threshold: No available data
pH: < 2
Melting point/freezing point: 0 ^{O}F
Initial boiling point and boiling range: 220-230 ^{O}F
Flash point: No available data
Evaporation rate: No available data
Flammability (solid, gas): No available data
Flammability Limits: No available data
Vapor pressure: No available data
Vapor density: No available data
Relative density: 1.55-1.63
Solubility: Soluble
Partition coefficient: n-octanol/water: No available data
Auto-ignition temperature: No available data
Decomposition temperature: No available data
Viscosity: No available data

SECTION 10 · STABILITY AND REACTIVITY

Chemical Stability: Stable under normal use and temperature conditions.
Conditions to Avoid: Avoid contact with mineral acids, excessive heat and bases/alkalis.
Incompatible Materials: Carbon steel, brasses, and nylon.
Possibility of hazardous reactions: Will not occur under normal use and temperature conditions.

SECTION 11 · TOXILOGICAL INFORMATION

Signs and Symptoms of Overexposure:
Eye: Contact with eyes may cause severe irritation.
Skin: Contact with skin causes irritation and possible rash, especially if the skin is wet or moist.
Ingestion: May cause gastrointestinal tract irritation.
Inhalation: May cause irritation of the respiratory tract.
lung edema.

Acute oral toxicity:
LD50 rat: 520 mg/kg
Acute inhalation toxicity:
LC50 rat: 2,140 mg/kg 1h
Acute dermal toxicity:
LD50 rabbit: No available data

Germ Cell mutagenicity: Not classified
Carcinogenicity: Not classified
Reproductive Toxicity: Not classified
STOT single exposure: Not classified
STOT repeated exposure: Not classified

SECTION 12 · ECOLOGICAL INFORMATION

Aquatic Toxicity: Acute toxicity Fish LC50 Mosquitofish (Gambusia affinis) 37,200 ug/l
Bio-accumulative potential: No Available data.
Mobility: No Available data.

SECTION 13 · DISPOSAL CONSIDERATIONS

Chemical waste generators must determine at the time of disposal, whether a discarded chemical is classified as a hazardous waste. Chemical additions, processing or otherwise altering this material may make waste management information presented in this SDS incomplete, inaccurate or otherwise inappropriate. The transportation, storage, treatment and disposal of this waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268 and 270. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

SECTION 14 · TRANSPORTATION

U.S. DEPARTMENT OF TRANSPORTATION (Road or Rail):

Proper Shipping Name:	Corrosive liquid, acidic, inorganic, n.o.s.
Hazard Class:	8
UN Number:	3264
Packaging Group:	3

SECTION 15 · REGULATORY INFORMATION

US FEDERAL REGULATIONS

Comprehensive Environmental Response and Liability Act (CERCLA) This material is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302. The reportable quantity (RQ) for this material is 1000 pounds. If appropriate, immediately report to the National Response Center (800/424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies.

Toxic Substance Control Act (TSCA): All components of this product are on the Chemical Substance Inventory and designated as active in U.S. Commerce.

SARA Section 313 (40 CFR 372) Hazard Categories:
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Clean Water Act: This product contains Ferric Sulfate a chemical listed as Hazardous Substances under the CWA

Clean Air Act: None of the chemicals in this product are listed as Hazardous Substances under the CCA.

California Prop 65: This product contains no chemicals known by the State of California to cause cancer, birth defects or other reproductive harm.

SECTION 16 · OTHER INFORMATION

SDS Revision Date: December 2020

National Fire Protection Association (NFPA) Ratings: This information is intended solely for the use of individuals trained in the NFPA system.

Health: 2
Flammability: 0
Reactivity: 0

The information above is believed to be accurate and represents the best information currently available to us. However, Colonial Chemical Solutions makes no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Colonial be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Colonial has been advised of the possibility of such damages. The vendor assumes no responsibility for injury or damages resulting from the inappropriate alteration or manipulation of this SDS and its contents from that originally submitted by Colonial.

SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier
Product Name Ferrous Ammonium Sulfate

Other means of identification
Product Code(s) 1125614

Safety data sheet number M00455

Recommended use of the chemical and restrictions on use
Recommended Use Laboratory Use. Water Analysis.
Uses advised against None.
Restrictions on use None.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number
+1(303) 623-5716 - 24 Hour Service

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Combustible dust	Yes

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Signal word
Warning

Hazard statements

Other Hazards Known
May be harmful if swallowed

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Chemical Name	Ferrous Ammonium Sulfate
Chemical Family	Inorganic salt.
Formula	$Fe(NH_4)_2(SO_4)_2 \cdot 6H_2O$
CAS No	7783-85-9
Alternate CAS Number	10045-89-3 (Anhydrous)

Chemical name	CAS No	Percent Range	HMRIC #
Sulfuric acid, ammonium iron(2+) salt (2:2:1), hexahydrate	7783-85-9	100%	-

4. FIRST AID MEASURES

Description of first aid measures

General advice No hazards which require special first aid measures. Use first aid treatment according to the nature of the injury.

Inhalation Remove to fresh air.

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash skin with soap and water.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects, both acute and delayed

Symptoms See Section 11 for additional Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Caution: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical No information available.

Hazardous combustion products Nitrogen oxides (NOx). Sulfur oxides.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Ensure adequate ventilation.

Environmental precautions

Environmental precautions See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH
Sulfuric acid, ammonium iron(2+) salt (2:2:1), hexahydrate CAS#: 7783-85-9	TWA: 1 mg/m^3 Fe	(vacated) TWA: 1 mg/m^3	TWA: 1 mg/m^3 Fe

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required. Wear breathing apparatus if exposed to vapors/dusts/aerosols.

Hand Protection Wear suitable gloves.

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin and body protection No special protective equipment required.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Solid
Appearance crystalline
Color Blue-green
Odor Odorless
Odor threshold Not applicable

Property	Values	Remarks • Method
Molecular weight	392.14 g/mole	
pH	3.7	5% Solution
Melting point/freezing point	100 °C / 212 °F	
Boiling point / boiling range	No data available	
Evaporation rate	Not applicable	
Vapor pressure	Not applicable	
Relative vapor density	No data available	
Specific gravity (water = 1 / air = 1)	1.86	
Partition Coefficient (n-octanol/water)	log K_{ow} ~ 0	
Soil Organic Carbon-Water Partition Coefficient	log K_{oc} ~ 0	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Completely soluble	269000 mg/L	20 °C / 68 °F

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
Dilute Acid	Soluble	> 1000 mg/L	25 °C / 77 °F

Other information

Metal Corrosivity

Steel Corrosion Rate No data available
Aluminum Corrosion Rate No data available

Volatile Organic Compounds (VOC) Content
This Product is by Weight 100% an Individual Pure Chemical Substance

Chemical name	CAS No	Volatile organic compounds (VOC) content	CAA (Clean Air Act)
Sulfuric acid, ammonium iron(2+) salt (2:2:1), hexahydrate	7783-85-9	No data available	-

Explosive properties

Upper explosion limit No data available
Lower explosion limit No data available

Flammable properties

Flash point Not applicable

Flammability Limit in Air
Upper flammability limit: No data available
Lower flammability limit: No data available

Oxidizing properties No data available.

Bulk density 900 kg/m^3

10. STABILITY AND REACTIVITY

Reactivity
Not applicable.

Chemical stability
Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

Possibility of hazardous reactions
None under normal processing.

Hazardous polymerization
None under normal processing.

Conditions to avoid
None known based on information supplied.

Incompatible materials
Strong oxidizing agents, strong acids, and strong bases.

Hazardous decomposition products
Sulfur oxides. Ammonia. Nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation	No known effect based on information supplied.
Eye contact	No known effect based on information supplied.
Skin contact	No known effect based on information supplied.
Ingestion	No known effect based on information supplied.
Symptoms	No information available.

Acute toxicity
Based on available data, the classification criteria are not met

Product Acute Toxicity Data
If available, see ingredient data below.

Ingredient Acute Toxicity Data
No data available.

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sulfuric acid, ammonium iron(2+) salt (2:2:1), hexahydrate (100%) CAS#: 7783-85-9	Rat LD_{50}	3250 mg/kg	None reported	None reported	Vendor SDS

Unknown Acute Toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)
Not applicable
The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	No information available
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	No information available
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Skin corrosion/irritation
Based on available data, the classification criteria are not met.

Product Skin Corrosion/Irritation Data
If available, see ingredient data below.

Ingredient Skin Corrosion/Irritation Data
No data available.

Serious eye damage/irritation
Based on available data, the classification criteria are not met.

Product Serious Eye Damage/Eye Irritation Data

If available, see ingredient data below.

Ingredient Eye Damage/Eye Irritation Data
No data available.

Respiratory or skin sensitization
Based on available data, the classification criteria are not met.

Product Sensitization Data
If available, see ingredient data below.

Ingredient Sensitization Data
No data available.

STOT - single exposure
Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Single Exposure Data
If available, see ingredient data below.

Ingredient Specific Target Organ Toxicity Single Exposure Data
No data available.

STOT - repeated exposure
Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Repeat Dose Data
If available, see ingredient data below.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data
No data available.

Carcinogenicity
Based on available data, the classification criteria are not met.

Product Carcinogenicity Data
If available, see ingredient data below.

Ingredient Carcinogenicity Data
No data available.

Chemical name	CAS No	ACGIH	IARC	NTP	OSHA
Sulfuric acid, ammonium iron(2+) salt (2:2:1), hexahydrate	7783-85-9	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Germ cell mutagenicity
Based on available data, the classification criteria are not met.

Product Germ Cell Mutagenicity *invitro* Data
If available, see ingredient data below.

Ingredient Germ Cell Mutagenicity *invitro* Data

No data available.

Product Germ Cell Mutagenicity *invivo* Data
If available, see ingredient data below.

Ingredient Germ Cell Mutagenicity *invivo* Data
No data available.

Reproductive toxicity
Based on available data, the classification criteria are not met.

Product Reproductive Toxicity Data
No data available.

Ingredient Reproductive Toxicity Data
No data available.

Aspiration hazard
Based on available data, the classification criteria are not met.

12. ECOLOGICAL INFORMATION

Ecotoxicity Based on available data, the classification criteria are not met.

Unknown aquatic toxicity 0 % of the mixture consists of component(s) of unknown hazards to the aquatic environment.

Product Ecological Data

Aquatic Acute Toxicity
If available, see ingredient data below.

Aquatic Chronic Toxicity
If available, see ingredient data below.

Ingredient Ecological Data

Aquatic Acute Toxicity
No data available.

Aquatic Chronic Toxicity
No data available.

Persistence and degradability

Product Biodegradability Data
No data available.

Product Bioaccumulation Data
No data available.

Partition Coefficient (n-octanol/water) $\log K_{ow} \sim 0$

Mobility

Soil Organic Carbon-Water Partition Coefficient $\log K_{oc} \sim 0$

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

Special instructions for disposal Dilute to 3 to 5 times the volume with cold water. Flush system with plenty of water.

14. TRANSPORT INFORMATION

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG Not regulated

Note: No special precautions necessary.

Additional information
There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods.
If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA	Complies
DSL/NDSL	Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL - Existing substances	Complies
PICCS	Complies
TCSI	Complies
AICS	Complies
NZIoC	Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated by state right-to-know regulations.

Chemical name	New Jersey	Massachusetts	Pennsylvania
Sulfuric acid, ammonium iron(2+) salt (2:2:1), hexahydrate 7783-85-9	-	-	X

U.S. EPA Label Information

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments
None

Additional information

Global Automotive Declarable Substance List (GADSL)
Not applicable
NFPA and HMIS Classifications

NFPA	**Health hazards** - 0	**Flammability** - 0	**Instability** - 0	**Physical and chemical properties** -
HMIS	**Health hazards** - 1	**Flammability** - 0	**Physical hazards** - 0	**Personal protection** - X - I

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH	*Immediately Dangerous to Life or Health*
ACGIH	ACGIH (American Conference of Governmental Industrial Hygienists)
NDF	*no data*

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By	Hach Product Compliance Department
Issue Date	25-May-2021
Revision Date	02-Jun-2021
Revision Note	None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY©2021

End of Safety Data Sheet

SAFETY DATA SHEET

According to US Regulation 29 CFR 1910.1200 (HazCom 2012)

1. Identification

Product identifier: Ferrous Sulfate, Heptahydrate

Other means of identification

Product No.: 2063, 2070, 2074, 5056, 5572

Recommended restrictions

Recommended use: For Laboratory, Research or Manufacturing Use.
Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Company Name:	Avantor Performance Materials, LLC
Address:	100 Matsonford Rd, Suite 200 Radnor, PA 19087
Telephone:	Customer Service: 855-282-6867
Contact Person:	Product Information Compliance
E-mail:	info@avantormaterials.com

Emergency telephone number:

CHEMTREC: 1-800-424-9300 within US and Canada (24 hrs/day, 7 days/week)

2. Hazard(s) identification

Hazard Classification

Health Hazards

Acute toxicity (Oral)	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2A
Specific Target Organ Toxicity - Single Exposure (Oral)	Category 2[1.]
Specific Target Organ Toxicity - Single Exposure	Category 3[2.]

Target Organs

1. Liver
2. Respiratory tract irritation.

Unknown toxicity - Health

Acute toxicity, inhalation, dust or mist	100 %

Environmental Hazards

Acute hazards to the aquatic environment	Category 1
Chronic hazards to the aquatic environment	Category 1

Unknown toxicity - Environment

Acute hazards to the aquatic environment	0 %
Chronic hazards to the aquatic environment	100 %

Label Elements

Hazard Symbol:

Signal Word: Warning

Hazard Statement:
Harmful if swallowed.
Causes skin irritation.
Causes serious eye irritation.
May cause respiratory irritation.
May cause damage to organs if swallowed.
Very toxic to aquatic life with long lasting effects.

Precautionary Statements

Prevention: Wear protective gloves/protective clothing/eye protection/face protection. Do not eat, drink or smoke when using this product. Do not breathe dust. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Avoid release to the environment.

Response: IF exposed or if you feel unwell: Call a POISON CENTER or doctor. IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing. IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Collect spillage.

Storage: Store locked up. Store in a well-ventilated place. Keep container tightly closed.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC): None.

3. Composition/information on ingredients

Substances

Chemical Identity	CAS number	Content in percent (%)*
Ferrous sulfate, heptahydrate	7782-63-0	99.0 - 100.0%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Rinse mouth. Call a POISON CENTER/doctor if you feel unwell.

Inhalation: Move to fresh air. Get medical attention if symptoms persist.

Skin Contact: Wash skin thoroughly with soap and water. Get medical attention if irritation persists after washing. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if symptoms persist.

Most important symptoms/effects, acute and delayed

Symptoms: Irritating to eyes, respiratory system and skin. Harmful if swallowed.

Hazards: None known.

Indication of immediate medical attention and special treatment needed

Treatment: Symptoms may be delayed. Treat symptomatically.

5. Fire-fighting measures

General Fire Hazards: No unusual fire or explosion hazards noted.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Keep unauthorized personnel away. Keep upwind. Ventilate closed spaces before entering them. Avoid inhalation of dust. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment.

Methods and material for containment and cleaning up: Sweep up and place in a clearly labeled container for chemical waste. Clean surface thoroughly to remove residual contamination.

Notification Procedures: Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so. Avoid release to the environment.

7. Handling and storage

Precautions for safe handling: Minimize dust generation and accumulation. Wear appropriate personal protective equipment. Avoid inhalation of dust. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Do not eat, drink or smoke when using the product. Use only with adequate ventilation. Wash hands thoroughly after handling. See Section 8 of the SDS for Personal Protective Equipment.

Conditions for safe storage, including any incompatibilities: Keep container tightly closed. Store in a well-ventilated place. Store in a dry place. Store locked up.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	Type	Exposure Limit Values	Source
Ferrous sulfate, heptahydrate - as Fe	TWA	1 mg/m3	US. ACGIH Threshold Limit Values (2011)
	REL	1 mg/m3	US. NIOSH: Pocket Guide to Chemical Hazards (2010)
	TWA	1 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
	TWA	1 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
	TWA PEL	1 mg/m3	US. California Code of Regulations, Title 8, Section 5155. Airborne Contaminants (08 2010)

Appropriate Engineering Controls No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Wear safety glasses with side shields (or goggles).

Skin Protection

Hand Protection:	Chemical resistant gloves
Other:	Wear suitable protective clothing.
Respiratory Protection:	In case of inadequate ventilation use suitable respirator. Air-purifying respirator with a high efficiency particulate filter.
Hygiene measures:	Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance	
Physical state:	Solid
Form:	Crystals
Color:	Blue-green
Odor:	Odorless
Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	64 °C
Initial boiling point and boiling range:	> 300 °C
Flash Point:	Not applicable
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Density:	1.9 g/ml (20 °C)
Relative density:	1.9 (20 °C)
Solubility(ies)	
Solubility in water:	Soluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.
Other information	
Molecular weight:	278.01 g/mol ($FeSO_4 \cdot 7H_2O$)

10. Stability and reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical Stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization does not occur.

Conditions to avoid: Excessive heat. Avoid conditions which create dust.

Incompatible Materials: Strong oxidizing agents. Alkalies.

Hazardous Decomposition Products: Oxides of sulfur.

11. Toxicological information

Information on likely routes of exposure

Inhalation: May cause irritation to the respiratory system.

Skin Contact: Causes skin irritation.

Eye contact: Causes serious eye irritation.

Ingestion: Harmful if swallowed.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: LD 50 (Rat): 584 - 5,850 mg/kg

Dermal
Product: LD 50 (Rat) > 3,600 mg/kg

Inhalation
Product: No data available.

Repeated dose toxicity
Product: No data available.

Skin Corrosion/Irritation
Product: Causes skin irritation.

Serious Eye Damage/Eye Irritation
Product: Causes serious eye irritation.

Respiratory or Skin Sensitization
Product: Not a skin nor a respiratory sensitizer.

Carcinogenicity
Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive toxicity
Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure
Product: Respiratory tract irritation. Liver.

Specific Target Organ Toxicity - Repeated Exposure
Product: None known.

Target Organs
Specific Target Organ Toxicity - Single Exposure: Liver
Specific Target Organ Toxicity - Single Exposure: Respiratory tract irritation.

Aspiration Hazard
Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: LC 50 (Brook trout (Salvelinus fontinalis), 96 h): 0.41 mg/l

Aquatic Invertebrates
Product: EC 50 (Water flea (Daphnia magna), 48 h): 6.15 mg/l

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: Not inherently biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative potential

Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in soil: The product is water soluble and may spread in water systems.

Other adverse effects: Very toxic to aquatic life with long lasting effects.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws. Do not allow to enter drains, sewers or watercourses.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

15. Regulatory information

US Federal Regulations
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
None present or none present in regulated quantities.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Identity	Reportable quantity
Ferrous sulfate, heptahydrate	1000 lbs.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Acute toxicity (any route of exposure)
Skin Corrosion or Irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

SARA 302 Extremely Hazardous Substance
None present or none present in regulated quantities.

SARA 304 Emergency Release Notification

None present or none present in regulated quantities.

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
Ferrous sulfate, heptahydrate	10000 lbs.

SARA 313 (TRI Reporting)

None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):

None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3):

Chemical Identity	Reportable quantity
Ferrous sulfate, heptahydrate	Reportable quantity: 1000 lbs.

US State Regulations

US. California Proposition 65

No ingredient requiring a warning under CA Prop 65.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity
Ferrous sulfate, heptahydrate

US. Massachusetts RTK - Substance List

Chemical Identity
Ferrous sulfate, heptahydrate

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity
Ferrous sulfate, heptahydrate

US. Rhode Island RTK

Chemical Identity
Ferrous sulfate, heptahydrate

International regulations

Montreal protocol

Not applicable

Stockholm convention

Not applicable

Rotterdam convention

Not applicable

Kyoto protocol

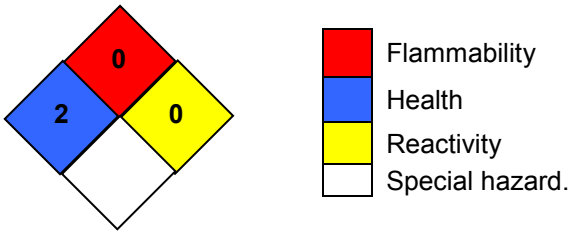
Not applicable

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
Japan ISHL Listing:	Not in compliance with the inventory.
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Mexico INSQ:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Philippines PICCS:	On or in compliance with the inventory
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory

16.Other information, including date of preparation or last revision

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	03-31-2021
Revision Information:	Not relevant.
Version #:	1.1
Source of information:	Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, information from the Toxicology Data Network (TOXNET), European Chemical Agency (ECHA) substance dossiers, IARC Monographs, US National Toxicology Program data, the Agency for Toxic Substances and Disease Registry, other manufacturer's SDSs and other sources, as appropriate.
Further Information:	No data available.

Disclaimer:

The information provided in this Safety Data Sheet (SDS) was prepared based on data believed to be accurate as of the date of this SDS. TO THE GREATEST EXTENT PERMITTED BY LAW, AVANTOR PERFORMANCE MATERIALS (“AVANTOR”) EXPRESSLY DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES REGARDING THE INFORMATION CONTAINED HEREIN INCLUDING, WITHOUT LIMITATION, AS TO ACCURACY, COMPLETENESS, FITNESS FOR PURPOSE OR USE, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY AND STABILITY. This SDS is intended as a guide to the appropriate use, handling, storage and disposal of the product to which it relates by properly trained personnel, and is not intended to be comprehensive. Users of Avantor’s products are advised to perform their own tests and to exercise their own judgment to determine the safety, suitability and appropriate use, handling, storage and disposal of each product and product combination for their own purposes and uses. TO THE GREATEST EXTENT PERMITTED BY LAW, AVANTOR DISCLAIMS LIABILITY FOR, AND BY USING AVANTOR’S PRODUCTS PURCHASER AGREES THAT UNDER NO CIRCUMSTANCES SHALL AVANTOR BE LIABLE FOR, SPECIAL, INDIRECT, INCIDENTAL , PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY TYPE OR KIND, INCLUDING WITHOUT LIMITATION, FOR LOSS OF PROFITS, REPUTATIONAL DAMAGE, PRODUCT RECALL OR BUSINESS INTERRUPTION.

SAFETY DATA SHEET

According to US Regulation 29 CFR 1910.1200 (HazCom 2012)

1. Identification

Product identifier: Glycerol

Other means of identification

Synonyms: Glycerin, 1,2,3-Propanetriol
Product No.: 2136, 2140, 2142, 2143, 2144, 4043, 5092, 5093, 5270, 5271, 5273, M778, P137, 18301, 72138, RMB2135

Recommended restrictions

Recommended use: For Laboratory, Research or Manufacturing Use.
Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Company Name:	Avantor Performance Materials, LLC
Address:	100 Matsonford Rd, Suite 200 Radnor, PA 19087
Telephone:	Customer Service: 855-282-6867
Contact Person:	Product Information Compliance
E-mail:	info@avantormaterials.com

Emergency telephone number:

CHEMTREC: 1-800-424-9300 within US and Canada (24 hrs/day, 7 days/week)

2. Hazard(s) identification

Hazard Classification

Not classified

Environmental Hazards

Acute hazards to the aquatic environment	Category 3

Unknown toxicity - Environment

Acute hazards to the aquatic environment	0 %
Chronic hazards to the aquatic environment	100 %

Label Elements

Hazard Symbol:	No symbol
Signal Word:	No signal word.
Hazard Statement:	Not applicable

Precautionary Statements	Not applicable
Hazard(s) not otherwise classified (HNOC):	None.

3. Composition/information on ingredients

Substances

Chemical Identity	CAS number	Content in percent (%)*
Glycerin	56-81-5	98.0 - 100.0%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.

Inhalation: Move to fresh air. Get medical attention if symptoms persist.

Skin Contact: Wash skin thoroughly with soap and water. Get medical attention if symptoms occur. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention if symptoms persist.

Most important symptoms/effects, acute and delayed

Symptoms: May cause irritation to skin, eyes and respiratory tract.

Hazards: None known.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: No data available.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, fog, CO2, dry chemical, or alcohol resistant foam.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: This product is not flammable. May burn, but does not ignite readily.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: See Section 8 of the SDS for Personal Protective Equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep unauthorized personnel away. Ventilate closed spaces before entering them. Use personal protective equipment.

Methods and material for containment and cleaning up: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling: Use personal protective equipment as required. Avoid breathing mist. Avoid contact with eyes. Use only in well-ventilated areas. Wash thoroughly after handling. See Section 8 of the SDS for Personal Protective Equipment.

Conditions for safe storage, including any incompatibilities: Keep container tightly closed. Store in a dry place. Store in a well-ventilated place.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	Type	Exposure Limit Values	Source
Glycerin - Total dust.	PEL	15 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
Glycerin - Respirable fraction.	PEL	5 mg/m3	US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000) (02 2006)
	TWA	5 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
Glycerin - Total dust.	TWA	10 mg/m3	US. OSHA Table Z-1-A (29 CFR 1910.1000) (1989)
Glycerin - Respirable fraction and dust or fume.	TWA	5 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
Glycerin - Total dust and mist.	TWA	10 mg/m3	US. Tennessee. OELs. Occupational Exposure Limits, Table Z1A (06 2008)
Glycerin	ST ESL	1,000 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (03 2014)
	ST ESL	50 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (03 2014)
	AN ESL	100 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (03 2014)
	AN ESL	5 µg/m3	US. Texas. Effects Screening Levels (Texas Commission on Environmental Quality) (03 2014)

Appropriate Engineering Controls	Provide sufficient ventilation during operations which cause vapor formation.

Individual protection measures, such as personal protective equipment

General information:	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.
Eye/face protection:	Wear safety glasses with side shields (or goggles).
Skin Protection	
Hand Protection:	No data available.
Other:	Wear suitable protective clothing and gloves.
Respiratory Protection:	In case of inadequate ventilation use suitable respirator.
Hygiene measures:	Provide eyewash station and safety shower. Observe good industrial hygiene practices. Wash hands before breaks and immediately after handling the product. Wash contaminated clothing before reuse. Avoid contact with skin.

9. Physical and chemical properties

Appearance

Physical state:	Liquid
Form:	Viscous liquid
Color:	Clear colorless
Odor:	Mild odor
Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	18.17 °C
Initial boiling point and boiling range:	290 °C
Flash Point:	195.6 - 199 °C (Closed Cup)
Evaporation rate:	No data available.
Flammability (solid, gas):	Class IIIB Combustible Liquid
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	19 %(V)
Flammability limit - lower (%):	2.7 %(V)
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	0.02 Pa (25 °C)
Vapor density:	3.17 (Air=1)
Density:	1.26 g/ml (20 °C)
Relative density:	1.26 (20 °C)
Solubility(ies)	
Solubility in water:	Miscible
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	-1.76
Auto-ignition temperature:	393 °C

Decomposition temperature: No data available.
Viscosity: No data available.

Other information
Liquid conductivity: 0.64 µS/cm (25 °C)
Molecular weight: 92.09 g/mol ($HOCH_2CHOHCH_2OH$)

10. Stability and reactivity

Reactivity: No dangerous reaction known under conditions of normal use.

Chemical Stability: Material is stable under normal conditions.

Possibility of hazardous reactions: Hazardous polymerization does not occur.

Conditions to avoid: Excessive heat.

Incompatible Materials: Strong oxidizing agents. Strong acids. Strong bases.

Hazardous Decomposition Products: Thermal decomposition may release oxides of carbon.

11. Toxicological information

Information on likely routes of exposure
Inhalation: May cause irritation to the respiratory system.

Skin Contact: May cause irritation.

Eye contact: May irritate eyes.

Ingestion: Expected to be a low ingestion hazard.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: LD 50 (Rat): 18,300 - 27,200 mg/kg

Dermal
Product: LD 50 (Rabbit) 5,000 mg/kg

Inhalation
Product: No data available.

Repeated dose toxicity
Product: No data available.

Skin Corrosion/Irritation
Product: No data available.

Serious Eye Damage/Eye Irritation
Product: No data available.

Respiratory or Skin Sensitization

Product: Not a skin sensitizer.

Carcinogenicity
Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive toxicity
Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure
Product: None known.

Specific Target Organ Toxicity - Repeated Exposure
Product: None known.

Aspiration Hazard
Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: LC 50 (Rainbow Trout, 96 h): 51,000 mg/l

Aquatic Invertebrates
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: Log Kow: -1.76

Mobility in soil: The product is partly soluble in water. May spread in the aquatic environment.

Other adverse effects: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

15. Regulatory information

US Federal Regulations
TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
None present or none present in regulated quantities.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)
None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):
None present or none present in regulated quantities.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Not classified

SARA 302 Extremely Hazardous Substance
None present or none present in regulated quantities.

SARA 304 Emergency Release Notification
None present or none present in regulated quantities.

SARA 311/312 Hazardous Chemical

Chemical Identity	Threshold Planning Quantity
Glycerin	10000 lbs.

SARA 313 (TRI Reporting)
None present or none present in regulated quantities.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
None present or none present in regulated quantities.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3):
None present or none present in regulated quantities.

US State Regulations

US. California Proposition 65
No ingredient requiring a warning under CA Prop 65.

US. New Jersey Worker and Community Right-to-Know Act

Chemical Identity
Glycerin

US. Massachusetts RTK - Substance List

Chemical Identity
Glycerin

US. Pennsylvania RTK - Hazardous Substances

Chemical Identity
Glycerin

US. Rhode Island RTK

Chemical Identity
Glycerin

International regulations

Montreal protocol
Not applicable

Stockholm convention
Not applicable

Rotterdam convention
Not applicable

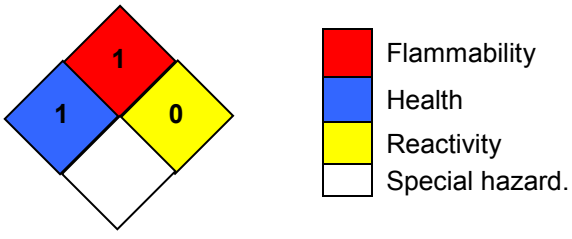
Kyoto protocol
Not applicable

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
Japan ISHL Listing:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Mexico INSQ:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Philippines PICCS:	On or in compliance with the inventory
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory

16.Other information, including date of preparation or last revision

NFPA Hazard ID



Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe; RNP - Rating not possible

Issue Date:	06-16-2021
Revision Information:	Not relevant.
Version #:	1.4
Source of information:	Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, information from the Toxicology Data Network (TOXNET), European Chemical Agency (ECHA) substance dossiers, IARC Monographs, US National Toxicology Program data, the Agency for Toxic Substances and Disease Registry, other manufacturer's SDSs and other sources, as appropriate.
Further Information:	No data available.

Disclaimer:

The information provided in this Safety Data Sheet (SDS) was prepared based on data believed to be accurate as of the date of this SDS. TO THE GREATEST EXTENT PERMITTED BY LAW, AVANTOR PERFORMANCE MATERIALS ("AVANTOR") EXPRESSLY DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES REGARDING THE INFORMATION CONTAINED HEREIN INCLUDING, WITHOUT LIMITATION, AS TO ACCURACY, COMPLETENESS, FITNESS FOR PURPOSE OR USE, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY AND STABILITY. This SDS is intended as a guide to the appropriate use, handling, storage and disposal of the product to which it relates by properly trained personnel, and is not intended to be comprehensive. Users of Avantor's products are advised to perform their own tests and to exercise their own judgment to determine the safety, suitability and appropriate use, handling, storage and disposal of each product and product combination for their own purposes and uses. TO THE GREATEST EXTENT PERMITTED BY LAW, AVANTOR DISCLAIMS LIABILITY FOR, AND BY USING AVANTOR'S PRODUCTS PURCHASER AGREES THAT UNDER NO CIRCUMSTANCES SHALL AVANTOR BE LIABLE FOR, SPECIAL, INDIRECT, INCIDENTAL , PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY TYPE OR KIND, INCLUDING WITHOUT LIMITATION, FOR LOSS OF PROFITS, REPUTATIONAL DAMAGE, PRODUCT RECALL OR BUSINESS INTERRUPTION.

SAFETY DATA SHEET

Creation Date 11-Oct-2010 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Gold(III) chloride**

Cat No. : **43360**

CAS-No 13453-07-1
Synonyms Gold Trichloride.; Auric Trichloride; Auric chloride

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Warning

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Gold trichloride	13453-07-1	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.

Inhalation Remove to fresh air. Get medical attention. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
None known.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	1	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes or clothing.
Environmental Precautions	Avoid release to the environment. See Section 12 for additional Ecological Information.
Methods for Containment and Clean Up	Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from direct sunlight.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.
Engineering Measures	Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Dark red
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	254 °C / 489.2 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	Au Cl3
Molecular Weight	303.32

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Hygroscopic. Light sensitive.

Conditions to Avoid Avoid dust formation. Incompatible products. Excess heat. Exposure to moisture. Exposure to light.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Gold trichloride	13453-07-1	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Gold trichloride	13453-07-1	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Gold trichloride	13453-07-1	X	-	236-623-1	-	X	X	X	KE-18095

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Creation Date 11-Oct-2010
Revision Date 14-Feb-2020
Print Date 14-Feb-2020
Revision Summary SDS authoring systems update, replaces ChemGes SDS No. 13453-07-1.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 26-Oct-2009 **Revision Date** 17-Jun-2021 **Revision Number** 11

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description: Hexane
Cat No. : **H/0406/15, H/0406/15X, H/0406/17, H/0406/17CN, H/0406/21, H/0406/25SS, H/0406/27SS, H/0406/DH25, H/0406/PB17, H/0406/PB17X, H/0406/21RSS, H/0406/10RSS, H/0406/25RSS, H/0406/30RSS, H/0406/27RSS**
Synonyms Hex
CAS-No 110-54-3
EC-No. 203-777-6
Molecular Formula C6 H14
Reach Registration Number -

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

Tel: 01509 231166
Chemtrec US: (800) 424-9300
Chemtrec EU: 001 (202) 483-7616

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Flammable liquids	Category 2 (H225)

Health hazards

Aspiration Toxicity	Category 1 (H304)
Skin Corrosion/Irritation	Category 2 (H315)
Reproductive Toxicity	Category 2 (H361f)
Specific target organ toxicity - (single exposure)	Category 3 (H336)
Specific target organ toxicity - (repeated exposure)	Category 2 (H373)

Environmental hazards

Chronic aquatic toxicity	Category 2 (H411)

Full text of Hazard Statements: see section 16

2.2. Label elements

Signal Word **Danger**

Hazard Statements

H225 - Highly flammable liquid and vapor
H304 - May be fatal if swallowed and enters airways
H315 - Causes skin irritation
H336 - May cause drowsiness or dizziness
H361f - Suspected of damaging fertility
H373 - May cause damage to organs through prolonged or repeated exposure
H411 - Toxic to aquatic life with long lasting effects

Precautionary Statements

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P331 - Do NOT induce vomiting
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P273 - Avoid release to the environment

2.3. Other hazards

Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No

				1272/2008
Hexane	110-54-3	EEC No. 203-777-6	>95	Flam. Liq. 2 (H225) Asp. Tox. 1 (H304) Skin Irrit. 2 (H315) STOT SE 3 (H336) Repr. 2 (H361f) STOT RE 2 (H373) Aquatic Chronic 2 (H411)

Component	Specific concentration limits (SCL's)	M-Factor	Component notes
Hexane	STOT RE 2 (H373) :: C>=5%	-	-

Reach Registration Number	-

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs naturally, have victim lean forward.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention. Aspiration into lungs can produce severe lung damage.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

4.2. Most important symptoms and effects, both acute and delayed

Difficulty in breathing. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically. Symptoms may be delayed.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
CO_2, dry chemical, dry sand, alcohol-resistant foam. Water mist may be used to cool closed containers.

Extinguishing media which must not be used for safety reasons
Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products
Carbon monoxide (CO), Carbon dioxide (CO_2).

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.

6.2. Environmental precautions

Do not flush into surface water or sanitary sewer system. Avoid release to the environment. Collect spillage.

6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Do not breathe mist/vapors/spray. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2. Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Flammables area.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 3

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **EU** - Commission Directive (EU) 2019/1831 of 24 October 2019 establishing a fifth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC and amending Commission Directive 2000/39/EC **UK** - EH40/2005 Work Exposure Limits, Third edition. Published 2018. **IRE -** 2018 Code of Practice for the Chemical Agents Regulations, Schedule 1. Published by the Health and Safety Authority

Component	The United Kingdom	European Union	Ireland
Hexane	TWA: 72 mg/m^3 TWA: 20 ppm STEL: 60 ppm STEL: 216 mg/m^3	TWA: 20 ppm (8hr) TWA: 72 mg/m^3 (8hr)	TWA: 20 ppm 8 hr. TWA: 72 mg/m^3 8 hr. STEL: 60 ppm 15 min STEL: 216 mg/m^3 15 min Skin

Biological limit values
List source(s):

Derived No Effect Level (DNEL) / Derived Minimum Effect Level (DMEL)
See table for values

Component	Acute effects local (Dermal)	Acute effects systemic (Dermal)	Chronic effects local (Dermal)	Chronic effects systemic (Dermal)
Hexane 110-54-3 (>95)				DNEL = 11mg/kg bw/day

Component	Acute effects local (Inhalation)	Acute effects systemic (Inhalation)	Chronic effects local (Inhalation)	Chronic effects systemic (Inhalation)
Hexane 110-54-3 (>95)				DNEL = 75mg/m^3

Predicted No Effect Concentration (PNEC)
No information available.

8.2. Exposure controls

Engineering Measures
Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Wear safety glasses with side shields (or goggles) (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Nitrile rubber	> 480 minutes	0.38 - 0.56 mm	Level 6	As tested under EN374-3 Determination of
Viton (R)	> 480 minutes	0.7 mm	EN 374	Resistance to Permeation by Chemicals
Neoprene gloves	< 180 minutes	0.45 mm		

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly
Large scale/emergency use	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced **Recommended Filter type:** Organic gases and vapours filter Type A Brown conforming to EN14387
Small scale/Laboratory use	Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. **Recommended half mask:-** Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141 When RPE is used a face piece Fit Test should be conducted
Environmental exposure controls	Prevent product from entering drains. Do not allow material to contaminate ground water system.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Liquid	
Appearance	Colorless	
Odor	Petroleum distillates	
Odor Threshold	No data available	
Melting Point/Range	-95 °C / -139 °F	
Softening Point	No data available	
Boiling Point/Range	69 °C / 156.2 °F	@ 760 mmHg
Flammability (liquid)	Highly flammable	On basis of test data
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	**Lower** 1.1 vol% **Upper** 7.5 vol%	
Flash Point	-22 °C / -7.6 °F	**Method -** No information available
Autoignition Temperature	223 °C / 433.4 °F	
Decomposition Temperature	No data available	
pH	Not applicable	
Viscosity	0.31 mPa s at 20 °C	
Water Solubility	Immiscible	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Component	**log Pow**	
Hexane	4.11	
Vapor Pressure	160 mbar @ 20 °C	
Density / Specific Gravity	0.659	
Bulk Density	Not applicable	Liquid
Vapor Density	2.97	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	

9.2. Other information

Molecular Formula	C6 H14
Molecular Weight	86.18
Explosive Properties	Not explosive Vapors may form explosive mixtures with air

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization	No information available.
Hazardous Reactions	No information available.

10.4. Conditions to avoid

Incompatible products. Heat, flames and sparks. Exposure to light. Keep away from open flames, hot surfaces and sources of ignition.

10.5. Incompatible materials

Strong oxidizing agents. Halogens.

10.6. Hazardous decomposition products

Carbon monoxide (CO). Carbon dioxide (CO_2).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

(a) acute toxicity;

Oral	Based on available data, the classification criteria are not met
Dermal	Based on available data, the classification criteria are not met
Inhalation	Based on available data, the classification criteria are not met

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hexane	LD50 = 25 g/kg (Rat)	LD50 = 3000 mg/kg (Rabbit)	LC50 = 48000 ppm (Rat) 4 h

(b) skin corrosion/irritation; Category 2

(c) serious eye damage/irritation; Based on available data, the classification criteria are not met

(d) respiratory or skin sensitization;

Respiratory	Based on available data, the classification criteria are not met
Skin	Based on available data, the classification criteria are not met

(e) germ cell mutagenicity; On basis of test data

Mutagenic effects have occurred in experimental animals

(f) carcinogenicity; Based on available data, the classification criteria are not met

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; Category 2
Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.
Developmental Effects Developmental effects have occurred in experimental animals.
Teratogenicity Teratogenic effects have occurred in experimental animals.

(h) STOT-single exposure; Category 3

Results / Target organs Central nervous system (CNS).

(i) STOT-repeated exposure; Category 2

Target Organs Skin, Respiratory system, Eyes, Central nervous system (CNS), Heart, Blood, Liver, Reproductive System, Peripheral Nervous System (PNS).

(j) aspiration hazard; Category 1

Other Adverse Effects Tumorigenic effects have been reported in experimental animals. See actual entry in RTECS for complete information

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

11.2. Information on other hazards

Endocrine Disrupting Properties Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecotoxicity effects Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Fish	Water Flea	Freshwater Algae
Hexane	LC50: 2.1 - 2.98 mg/L, 96h flow-through (Pimephales promelas)	EC50: 3.87 mg/L/48h	

12.2. Persistence and degradability

Persistence Persistence is unlikely, based on information available.
Degradation in sewage treatment plant Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.

12.3. Bioaccumulative potential

Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Hexane	4.11	No data available

12.4. Mobility in soil

The product contains volatile organic compounds (VOC) which will evaporate easily from all surfaces Will likely be mobile in the environment due to its volatility. Disperses rapidly in air

12.5. Results of PBT and vPvB assessment

Substance is not considered persistent, bioaccumulative and toxic (PBT) / very persistent and very bioaccumulative (vPvB).

12.6. Endocrine disrupting properties

Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects

Persistent Organic Pollutant This product does not contain any known or suspected substance

Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

European Waste Catalogue (EWC) According to the European Waste Catalog, Waste Codes are not product specific, but application specific.

Other Information Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Can be landfilled or incinerated, when in compliance with local regulations. Do not let this chemical enter the environment. Do not empty into drains.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

14.1. UN number	UN1208
14.2. UN proper shipping name	Hexanes
14.3. Transport hazard class(es)	3
14.4. Packing group	II

ADR

14.1. UN number	UN1208
14.2. UN proper shipping name	Hexanes
14.3. Transport hazard class(es)	3
14.4. Packing group	II

IATA

14.1. UN number	UN1208
14.2. UN proper shipping name	Hexanes
14.3. Transport hazard class(es)	3

14.4. Packing group II

14.5. Environmental hazards Dangerous for the environment
Product is a marine pollutant according to the criteria set by IMDG/IMO

14.6. Special precautions for user No special precautions required

14.7. Maritime transport in bulk according to IMO instruments Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories
X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Japan (ISHL), Australia (AICS), Korea (KECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	IECSC	ENCS	ISHL	AICS	KECL
Hexane	203-777-6	438-390-3		X	X	-	X	X	X	X	X	KE-18626

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Hexane		Use restricted. See item 75. (see link for restriction details)	

https://echa.europa.eu/substances-restricted-under-reach

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals
Not applicable

National Regulations

WGK Classification See table for values

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Hexane	WGK2	

Component	France - INRS (Tables of occupational diseases)
Hexane	Tableaux des maladies professionnelles (TMP) - RG 59,RG 84

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment
Take note of Directive 94/33/EC on the protection of young people at work
Take note of Dir 92/85/EC on the protection of pregnant and breastfeeding women at work

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has been conducted by the manufacturer/importer

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3
H225 - Highly flammable liquid and vapor
H304 - May be fatal if swallowed and enters airways

H315 - Causes skin irritation
H336 - May cause drowsiness or dizziness
H373 - May cause damage to organs through prolonged or repeated exposure
H411 - Toxic to aquatic life with long lasting effects
H361f - Suspected of damaging fertility

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC - (Volatile Organic Compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
First aid for chemical exposure, including the use of eye wash and safety showers.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
Fire prevention and fighting, identifying hazards and risks, static electricity, explosive atmospheres posed by vapours and dusts.

Creation Date	26-Oct-2009
Revision Date	17-Jun-2021
Revision Summary	Not applicable.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006 COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

SAFETY DATA SHEET

Methyl Isobutyl Ketone

Safety Data Sheet according to Reg. (EU) No 2015/830

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier
Product name: Methyl Isobutyl Ketone

Chemical name of the substance: 4-methylpentan-2-one
CASRN: 108-10-1
EC-No.: 203-550-1
REACH Registration Number: 01-2119473980-30-0003

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Manufacture of substance, industrial. Distribution of substance. Formulation & (re)packing of substances and mixtures, industrial. Uses in Coatings, industrial. Uses in Coatings, professional. Uses in Coatings, consumer. Uses in Coatings, consumer. Use in Cleaning Agents, professional. Use in Cleaning Agents, consumer. Use in Oil and Gas field drilling and production operations, industrial. Lubricants, industrial. Lubricants, consumer. Lubricants, consumer. Metal working fluids / rolling oils, professional. Use in Agrochemicals, professional. Functional Fluids, industrial. Functional Fluids, professional. Use in laboratories, industrial. Use in laboratories, professional. Rubber production and processing, industrial. Polymer processing, industrial. Polymer processing, professional. Water treatment chemicals, industrial. Use in Agrochemicals, consumer. For details on use descriptors and exposure scenarios, please refer to the extended part of the Safety Data Sheet.

1.3 Details of the supplier of the safety data sheet
COMPANY IDENTIFICATION
ALTIVIA Ketones & Additives, LLC
1100 Louisiana Street, Suite 4800
Houston, TX 77002
UNITED STATES

Responsible Party – EU
Intertek Deutschland GmbH
Stangenstraβe 1
70771 Leinfedlen-Echterdingen
Deutschland
T: 0800 5855888
T: +49 711 27311 152
F: +49 711 27311 559

Emergency Response: **For Chemical Emergency Spill, Leak, Fire, Exposure, or Accident Call CHEMTREC Day or Night**
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1 703-527-3887 (collect calls accepted)
In the United Kingdom 44-870-8200418 and 44-2038073798

Web Address: www.ALTIVIA.com

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008:
Flammable liquids - Category 2 - H225
Acute toxicity - Category 4 - Inhalation - H332
Eye irritation - Category 2 - H319
Specific target organ toxicity - single exposure - Category 3 - H335
For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008:

Hazard pictograms

Signal word: DANGER

Hazard statements

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

Precautionary statements

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P370 + P378	In case of fire: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide to extinguish.

Supplemental information

EUH066	Repeated exposure may cause skin dryness or cracking.

2.3 Other hazards
No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

This product is a substance.

CASRN / EC-No. / Index-No.	REACH Registration Number	Concentration	Component	Classification: REGULATION (EC) No 1272/2008
CASRN 108-10-1 **EC-No.** 203-550-1 **Index-No.** 606-004-00-4	01-2119473980-30	> 99.0 %	4-methylpentan-2-one	Flam. Liq. - 2 - H225 Acute Tox. - 4 - H332 Eye Irrit. - 2 - H319 STOT SE - 3 - H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures
General advice:
First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Skin contact: Wash off with plenty of water.

Eye contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist. Suitable emergency eye wash facility should be available in work area.

Ingestion: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

4.2 Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention

and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

4.3 Indication of any immediate medical attention and special treatment needed
Notes to physician: Maintain adequate ventilation and oxygenation of the patient. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. Because rapid absorption may occur through the lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Repeated excessive exposure may aggravate preexisting lung disease. Skin contact may aggravate preexisting dermatitis.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Unsuitable extinguishing media: Do not use direct water stream. Straight or direct water streams may not be effective to extinguish fire.

5.2 Special hazards arising from the substance or mixture
Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Electrically ground and bond all equipment. Flammable mixtures of this product are readily ignited even by static discharge. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Flammable mixtures may exist within the vapor space of containers at room temperature. Flammable concentrations of vapor can accumulate at temperatures above flash point; see Section 9.

5.3 Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Avoid accumulation of water. Product may be carried across water surface spreading fire or contacting an ignition source.

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Refer to section 7, Handling, for additional precautionary measures. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard. Keep out of sewers. For large spills, warn public of downwind explosion hazard. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

6.2 Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

6.3 Methods and materials for containment and cleaning up: Small spills: Absorb with materials such as: Sand. Vermiculite. Large spills: Contain spilled material if possible. Ground and bond all containers and handling equipment. Pump with explosion-proof equipment. If available, use foam to smother or suppress. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

6.4 Reference to other sections: References to other sections, if applicable, have been provided in the previous sub-sections.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling: Keep away from heat, sparks and flame. Avoid contact with eyes. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use only with adequate ventilation. No smoking, open flames or sources of ignition in handling and storage area. Ignition sources can include and are not limited to pilot lights, flames, smoking, sparks, heaters, electrical equipment, and static discharges. Electrically bond and ground all containers and equipment before transfer or use of material. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Never use air pressure for transferring product. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

7.2 Conditions for safe storage, including any incompatibilities: Minimize sources of ignition, such as static build-up, heat, spark or flame. Keep container closed. Flammable mixtures may exist within the vapor space of containers at room temperature. Avoid prolonged storage with exposure to air due to peroxide formation. Test every 12 months for the presence of peroxide.

7.3 Specific end use(s): See the technical data sheet on this product for further information.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value/Notation
4-methylpentan-2-one	ACGIH	TWA	20 ppm
	ACGIH	STEL	75 ppm
	2000/39/EC	TWA	83 mg/m3 20 ppm
	2000/39/EC	STEL	208 mg/m3 50 ppm
	GB EH40	TWA	SKIN
	GB EH40	STEL	SKIN
	GB EH40	TWA	208 mg/m3 50 ppm
	GB EH40	STEL	416 mg/m3 100 ppm

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
4-methylpentan-2-one	108-10-1	4-methylpentan-2-one	Urine	After shift	20 micromol per litre	GB EH40 BAT
		methyl isobutyl ketone	Urine	End of shift (As soon as possible after exposure ceases)	1 mg/l	ACGIH BEI

Derived No Effect Level

4-methylpentan-2-one

Workers

Acute systemic effects		*Acute local effects*		*Long-term systemic effects*		*Long-term local effects*	
Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
n.a.	208 mg/m3	n.a.	208 mg/m3	11.8 mg/kg bw/day	83 mg/m3	n.a.	83 mg/m3

Consumers

Acute systemic effects			*Acute local effects*		*Long-term systemic effects*			*Long-term local effects*	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
n.a.	155.2 mg/m3	n.a.	n.a.	155.2 mg/m3	4.2 mg/kg bw/day	14.7 mg/m3	4.2 mg/kg bw/day	n.a.	14.7 mg/m3

Predicted No Effect Concentration
4-methylpentan-2-one

Compartment	PNEC
Fresh water	0.6 mg/l
Marine water	0.06 mg/l
Intermittent use/release	1.5 mg/l
Fresh water sediment	8.27 mg/kg dry weight (d.w.)
Marine sediment	0.83 mg/kg dry weight (d.w.)
Soil	1.3 mg/kg dry weight (d.w.)
Sewage treatment plant	27.5 mg/l

8.2 Exposure controls
Engineering controls: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Eye/face protection: Use chemical goggles. Chemical goggles should be consistent with EN 166 or equivalent. If exposure causes eye discomfort, use a full-face respirator.

Skin protection

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Butyl rubber. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). When prolonged or frequently repeated contact may occur, a glove with a protection class of 4 or higher (breakthrough time greater than 120 minutes according to EN 374) is recommended. When only brief contact is expected, a glove with a protection class of 1 or higher (breakthrough time greater than 10 minutes according to EN 374) is recommended. Glove thickness alone is not a good indicator of the level of protection a glove provides against a chemical substance as this level of protection is also highly dependent on the specific composition of the material that the glove is fabricated from. The thickness of the glove must, depending on model and type of material, generally be more than 0.35 mm to offer sufficient protection for prolonged and frequent contact with the substance. As an exception to this general rule it is known that multilayer laminate gloves may offer prolonged protection at thicknesses less than 0.35 mm. Other glove materials with a thickness of less than 0.35 mm may offer sufficient protection when only brief contact is expected. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: Wear clean, body-covering clothing.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-

pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply.
Use the following CE approved air-purifying respirator: Organic vapor cartridge, type A (boiling point >65 ºC)

Environmental exposure controls
See SECTION 7: Handling and storage and SECTION 13: Disposal considerations for measures to prevent excessive environmental exposure during use and waste disposal.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	
Physical state	Liquid.
Color	Colorless
Odor	Characteristic
Odor Threshold	No test data available
pH	No test data available
Melting point/range	-84 °C *Literature*
Freezing point	-84 °C *Literature*
Boiling point (760 mmHg)	116.1 °C *Literature*
Flash point	**closed cup** >15 °C *ASTM D 56*
Evaporation Rate (Butyl Acetate = 1)	No data available
Flammability (solid, gas)	Not applicable to liquids
Lower explosion limit	1.2 % vol *Literature*
Upper explosion limit	8.0 % vol *Literature*
Vapor Pressure	2.64 kPa at 25 °C *Literature*
Relative Vapor Density (air = 1)	3.5 *Literature*
Relative Density (water = 1)	0.801 at 20 °C / 20 °C *Literature*
Water solubility	14.1 g/L at 20 °C at 1 atm *Literature*
Partition coefficient: n-octanol/water	log Pow: 1.9 *Calculated.*
Auto-ignition temperature	448 - 460 °C *Literature*
Decomposition temperature	No test data available
Dynamic Viscosity	0.585 cP at 20 °C *Literature*
Kinematic Viscosity	0.73 mm2/s at 20 °C *Literature*
Explosive properties	No
Oxidizing properties	No

9.2 Other information

Molecular weight	100.16 g/mol *Calculated.*
Molecular formula	CH3COCH2CH(CH3)2

NOTE: The physical data presented above are typical values and should not be construed as a specification.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity: No data available

10.2 Chemical stability: Stable under recommended storage conditions. See Storage, Section 7.

10.3 Possibility of hazardous reactions: Polymerization will not occur.

10.4 Conditions to avoid: Avoid prolonged exposure to air to reduce formation of explosive peroxides. Exposure to elevated temperatures can cause product to decompose. Avoid static discharge.

10.5 Incompatible materials: Avoid contact with: Acids. Aldehydes. Bases. Halogens. Oxidizers.

10.6 Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

11.1 Information on toxicological effects

Acute toxicity

Acute oral toxicity

Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

LD50, Rat, 2,080 mg/kg OECD 401 or equivalent

Acute dermal toxicity

Prolonged skin contact is unlikely to result in absorption of harmful amounts.

LD50, Rat, male and female, > 2,000 mg/kg OECD Test Guideline 402 No deaths occurred at this concentration.

Acute inhalation toxicity

Vapor concentrations are attainable which could be hazardous on single exposure. Excessive exposure may cause irritation to upper respiratory tract (nose and throat) and lungs. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed.

LC50, Rat, male, 4 Hour, vapour, 8.2 - 16.4 mg/l OECD Test Guideline 403

Skin corrosion/irritation
Prolonged contact may cause slight skin irritation with local redness.
May cause drying and flaking of the skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.
May cause slight corneal injury.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Sensitization
Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory system

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Excessive exposure to methyl isobutyl ketone may cause respiratory irritation, gastrointestinal distress, anesthesia, kidney and liver effects.

Carcinogenicity
Has caused cancer in some laboratory animals. However, the relevance of this to humans is unknown. Kidney effects and/or tumors have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans.

Teratogenicity
Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Reproductive toxicity
In animal studies, did not interfere with reproduction.

Mutagenicity
In vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

Aspiration Hazard
May be harmful if swallowed and enters airways.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

12.1 Toxicity

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).

LC50, Danio rerio (zebra fish), static test, 96 Hour, > 179 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia magna (Water flea), 48 Hour, > 200 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
EC50, Pseudokirchneriella subcapitata (green algae), static test, 96 Hour, Growth rate inhibition, 400 mg/l, OECD Test Guideline 201 or Equivalent

EC50, Lemna minor (duckweed), semi-static test, 7 d, Growth rate inhibition, > 146 mg/l, OECD 221.

Chronic aquatic toxicity
Chronic toxicity to fish
NOEC, Pimephales promelas (fathead minnow), 31 d, weight, 57 mg/l

LOEC, Pimephales promelas (fathead minnow), 31 d, weight, 105 mg/l

MATC (Maximum Acceptable Toxicant Level), Pimephales promelas (fathead minnow), 31 d, weight, 77.4 mg/l

NOEC, Pimephales promelas (fathead minnow), 31 d, weight, 57 mg/l

Chronic toxicity to aquatic invertebrates
NOEC, Daphnia magna (Water flea), 21 d, 30 mg/l

12.2 Persistence and degradability

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
10-day Window: Pass
Biodegradation: 83 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent

12.3 Bioaccumulative potential

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient: n-octanol/water(log Pow): 1.9 Calculated.

12.4 Mobility in soil

Potential for mobility in soil is high (Koc between 50 and 150).
Partition coefficient (Koc): 101 Estimated.

12.5 Results of PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

12.6 Other adverse effects

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

This product, when being disposed of in its unused and uncontaminated state should be treated as a hazardous waste according to EC Directive 2008/98/EC. Any disposal practices must be in compliance with all national and provincial laws and any municipal or local by-laws governing hazardous waste. For used, contaminated and residual materials additional evaluations may be required. Do not dump into any sewers, on the ground, or into any body of water.

The definitive assignment of this material to the appropriate EWC group and thus its proper EWC code will depend on the use that is made of this material. Contact the authorized waste disposal services.

SECTION 14: TRANSPORT INFORMATION

Classification for ROAD and Rail transport (ADR/RID):

14.1	**UN number**	UN 1245
14.2	**UN proper shipping name**	METHYL ISOBUTYL KETONE
14.3	**Transport hazard class(es)**	3
14.4	**Packing group**	II
14.5	**Environmental hazards**	Not considered environmentally hazardous based on available data.
14.6	**Special precautions for user**	Hazard Identification Number: 33

Classification for SEA transport (IMO-IMDG):

14.1	**UN number**	UN 1245
14.2	**UN proper shipping name**	METHYL ISOBUTYL KETONE
14.3	**Transport hazard class(es)**	3
14.4	**Packing group**	II
14.5	**Environmental hazards**	Not considered as marine pollutant based on available data.
14.6	**Special precautions for user**	EmS: F-E, S-D
14.7	**Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code**	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

14.1	**UN number**	UN 1245
14.2	**UN proper shipping name**	Methyl isobutyl ketone
14.3	**Transport hazard class(es)**	3
14.4	**Packing group**	II
14.5	**Environmental hazards**	Not applicable
14.6	**Special precautions for user**	No data available.

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACh Regulation (EC) No 1907/2006
This substance has been registered according to Regulation (EC) No. 1907/2006 (REACH)., The aforementioned indications of the REACH registration status are provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. It is the buyer´s/user´s responsibility to ensure that his/her understanding of the regulatory status of this product is correct.

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.
Listed in Regulation: FLAMMABLE LIQUIDS
Number in Regulation: P5c
5,000 t
50,000 t

15.2 Chemical safety assessment
A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

Legend

2000/39/EC	Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
ACGIH	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	ACGIH - Biological Exposure Indices (BEI)
GB EH40	UK. EH40 WEL - Workplace Exposure Limits
GB EH40 BAT	UK. Biological monitoring guidance values
SKIN	Absorbed via skin
STEL	Short-term exposure limit
TWA	8-hour, time-weighted average
Acute Tox.	Acute toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
STOT SE	Specific target organ toxicity - single exposure

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH-Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN- United Nations; vPvB - Very Persistent and Very Bioaccumulative

ALTIVIA urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer- specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

GB

Annex

Exposure Scenario

Number	Title
ES1	Manufacture of substance, industrial
ES2	Distribution of substance
ES3	Formulation & (re)packing of substances and mixtures, industrial
ES4	Uses in Coatings, industrial
ES5	Uses in Coatings, professional
ES6	Uses in Coatings, consumer
ES7	Uses in Coatings, consumer
ES8	Use in Cleaning Agents, professional
ES9	Use in Cleaning Agents, consumer
ES10	Use in Oil and Gas field drilling and production operations, industrial
ES11	Lubricants, industrial
ES12	Lubricants, consumer
ES13	Lubricants, consumer
ES14	Metal working fluids / rolling oils, professional
ES15	Use in Agrochemicals, professional
ES16	Functional Fluids, industrial
ES17	Functional Fluids, professional
ES18	Use in laboratories, industrial
ES19	Use in laboratories, professional
ES20	Rubber production and processing, industrial
ES21	Polymer processing, industrial
ES22	Polymer processing, professional
ES23	Water treatment chemicals, industrial
ES24	Use in Agrochemicals, consumer

ES1: Manufacture of substance, industrial

1.1. Title section

Structured Short Title	:	Manufacture; Manufacture of bulk, large scale substances (including petroleum products); manufacture of fine chemicals (SU 8,9).
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC1, ERC4, ERC6a
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**General exposures (closed systems), no sampling**	PROC1
CS4	**General exposures (closed systems), Sampling, Outdoor**	PROC2
CS5	**General exposures (closed systems), Sampling, Outdoor**	PROC2
CS6	**Storage**	PROC2
CS7	**General exposures (closed systems), Indoor**	PROC3
CS8	**General exposures (closed systems), Outdoor**	PROC3
CS9	**General exposures (open systems), Batch process, Indoor**	PROC4
CS10	**General exposures (open systems), Batch process, Outdoor**	PROC4
CS11	**Equipment cleaning and maintenance**	PROC8a
CS12	**Process sampling**	PROC8b
CS13	**Bulk transfers, without local exhaust ventilation**	PROC8b
CS14	**Bulk transfers, with local exhaust ventilation**	PROC8b
CS15	**Laboratory activities**	PROC15

1.2. Conditions of use affecting exposure

1.2.1. Control of environmental exposure: Manufacture of the substance (ERC1) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of intermediate (ERC6a)

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

1.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

1.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

No specific risk management measures required.
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

1.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

1.2.5. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		

Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

1.2.6. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system. Avoid dip sampling.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

1.2.7. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		

Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

1.2.8. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

1.2.9. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure samples are obtained under containment or extract ventilation.		

Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

1.2.10. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

1.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Drain down system prior to equipment break-in or maintenance Clear spills immediately.		

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

1.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure samples are obtained under containment or extract ventilation.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

1.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Transfer via enclosed lines.		

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

1.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation. Clear transfer lines prior to de-coupling.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

1.2.15. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		

Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

1.3. Exposure estimation and reference to its source

1.3.1. Environmental release and exposure: Manufacture of the substance (ERC1) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of intermediate (ERC6a)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

1.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA)	0.03
inhalative	systemic	long-term		0.00
combined routes				0.03

1.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA)	0.12
inhalative	systemic	long-term	16.69 mg/m³	0.20
combined routes				0.32
inhalative	systemic	short-term	66.77 mg/m³	

1.3.5. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR

Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA)	0.12
inhalative	systemic	long-term		0.34
combined routes				0.46

1.3.6. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA)	0.12
inhalative	systemic	long-term		0.49
combined routes				0.61

1.3.7. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA)	0.03
inhalative	systemic	long-term		0.12
combined routes				0.15

1.3.8. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA)	0.03
inhalative	systemic	long-term		0.86
combined routes				0.89

1.3.9. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day	0.58

			(ECETOC TRA)	
inhalative	systemic	long-term		0.10
combined routes				0.68

1.3.10. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.69
inhalative	systemic	long-term		0.12
combined routes				0.81

1.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA)	0.23
inhalative	systemic	long-term		0.49
combined routes				0.72

1.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.58
inhalative	systemic	long-term		0.25
combined routes				0.83

1.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.12
inhalative	systemic	long-term		0.74

combined routes				0.86

1.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.58
inhalative	systemic	long-term		0.25
combined routes				0.83

1.3.15. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA)	0.03
inhalative	systemic	long-term		0.49
combined routes				0.52

1.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Where other Risk Management Measures/OperationalConditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W

ES2: Distribution of substance

2.1. Title section

Structured Short Title	:	Formulation or re-packing; Various sectors (SU9, SU8).
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC1, ERC2
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**General exposures (closed systems)**	PROC1
CS4	**Storage**	PROC2
CS5	**General exposures (closed systems), With occasional controlled exposure.**	PROC2
CS6	**Process sampling**	PROC3
CS7	**General exposures (closed systems), Batch process**	PROC2
CS8	**General exposures (open systems), Batch process**	PROC4
CS9	**Equipment cleaning and maintenance**	PROC8a
CS10	**bulk closed loading and unloading**	PROC8b
CS11	**bulk open loading, with local exhaust ventilation**	PROC8b
CS12	**bulk open loading, without local exhaust ventilation**	PROC8b
CS13	**Drum and small package filling**	PROC9
CS14	**Laboratory activities**	PROC15

2.2. Conditions of use affecting exposure

2.2.1. Control of environmental exposure: Manufacture of the substance (ERC1) / Formulation into mixture (ERC2)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

2.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Handle substance within a closed system.
Conditions and measures related to personal protection, hygiene and health evaluation
Not applicable
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

2.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid dip sampling. Store substance within a closed system.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Not applicable		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.5. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation. Avoid dip sampling.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.7. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.8. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Apply vessel entry procedures including use of forced supplied air. Drain down and flush system prior to equipment opening or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

2.2.10. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear transfer lines prior to de-coupling. Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation. Clear transfer lines prior to de-coupling.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear transfer lines prior to de-coupling. Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.13. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Fill containers/cans at dedicated filling points supplied with local extract ventilation. Clear spills immediately.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.2.14. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

2.3. Exposure estimation and reference to its source

2.3.1. Environmental release and exposure: Manufacture of the substance (ERC1) / Formulation into mixture (ERC2)

Additional information on exposure estimation

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

2.3.2. Worker exposure: General measures applicable to all activities (CS135)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	short-term	mg/kg bw/day (ECETOC TRA v3.0 Worker)	
inhalative	systemic	long-term		
combined routes				

2.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.01
combined routes				0.03

2.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.14 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.01
inhalative	systemic	long-term		0.49
combined routes				0.51

2.3.5. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12

inhalative	systemic	long-term		0.49
combined routes				0.61

2.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.74
combined routes				0.77

2.3.7. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.12
combined routes				0.15

2.3.8. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.10
combined routes				0.68

2.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC	0.12

			TRA v3.0 Worker)	
inhalative	systemic	long-term		0.25
combined routes				0.36

2.3.10. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.74
combined routes				0.86

2.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.49
combined routes				0.61

2.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.74
combined routes				0.86

2.3.13. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR

Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.25
combined routes				0.83

2.3.14. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.49
combined routes				0.52

2.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES3: Formulation & (re)packing of substances and mixtures, industrial

3.1. Title section

Structured Short Title	:	Formulation or re-packing; Formulation [mixing] of preparations and/or re-packaging (SU10).
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC2
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**General exposures (closed systems), no sampling**	PROC1
CS4	**General exposures (closed systems), Sampling**	PROC1
CS5	**Storage**	PROC2
CS6	**General exposures (closed systems)**	PROC3
CS7	**Process sampling**	PROC3
CS8	**Batch processes at elevated temperatures**	PROC3
CS9	**General exposures (open systems), Batch process**	PROC4
CS10	**Mixing operations (open systems)**	PROC5
CS11	**Transfer from/pouring from containers, Manual**	PROC8a
CS12	**Equipment cleaning and maintenance**	PROC8a
CS13	**Bulk transfers**	PROC8b
CS14	**Drum and small package filling**	PROC9
CS15	**Tabletting, compression, extrusion, pelettisation, granulation**	PROC14
CS16	**Laboratory activities**	PROC15

3.2. Conditions of use affecting exposure

3.2.1. Control of environmental exposure: Formulation into mixture (ERC2)

Amount used, frequency and duration of use (or from service life)

Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

3.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		

3.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		

Conditions and measures related to personal protection, hygiene and health evaluation
Not applicable
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

3.2.4. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Not applicable		

3.2.5. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system.		

3.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		

3.2.7. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		

3.2.8. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Formulate in enclosed or ventilated mixing vessels. Ensure material transfers are under containment or extract ventilation.		

3.2.9. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		

3.2.10. Control of worker exposure: Mixing or blending in batch processes (PROC5)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

3.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

3.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Apply vessel entry procedures including use of forced supplied air. Drain down and flush system prior to equipment opening or maintenance.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

3.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		

3.2.14. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Fill containers/cans at dedicated filling points supplied with local extract ventilation.		

3.2.15. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Handle substance within a predominantly closed system provided with extract ventilation.

3.2.16. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		

3.3. Exposure estimation and reference to its source

3.3.1. Environmental release and exposure: Formulation into mixture (ERC2)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed. In accordance to the Article 14 (5b) of the REACh Regulation (EC) No 1907/2006, exposure estimation and risk characterisation for human health does not need to be performed for end uses in cosmetic products within the scope of Directive 76/768/EEC.

3.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.00
combined routes				0.03

3.3.4. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.49
combined routes				0.61

3.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.12
combined routes				0.15

3.3.7. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.12
combined routes				0.15

3.3.8. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03

inhalative	systemic	long-term		0.49
combined routes				0.52

3.3.9. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.10
combined routes				0.68

3.3.10. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

3.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

3.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23

inhalative	systemic	long-term		0.25
combined routes				0.48

3.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.25
combined routes				0.83

3.3.14. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.25
combined routes				0.83

3.3.15. Worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	3.43 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.29
inhalative	systemic	long-term		0.25
combined routes				0.54

3.3.16. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03

inhalative	systemic	long-term		0.49
combined routes				0.52

3.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES4: Uses in Coatings, industrial

4.1. Title section

Structured Short Title	:	Use at industrial sites
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC4
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**General exposures (closed systems)**	PROC1
CS4	**General exposures (closed systems), With sample collection, Use in contained systems**	PROC2
CS5	**Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing**	PROC2
CS6	**Mixing operations (closed systems), General exposures (closed systems)**	PROC3
CS7	**Film formation - air drying**	PROC4
CS8	**Preparation of material for application, Mixing operations (open systems)**	PROC4
CS9	**Spraying (automatic/robotic)**	PROC7
CS10	**Manual, Spraying**	PROC7
CS11	**Material transfers**	PROC8a
CS12	**Material transfers**	PROC8b
CS13	**Material transfers, Drum/batch transfers, Transfer from/pouring from containers**	PROC9
CS14	**Roller, spreader, flow application**	PROC10
CS15	**Dipping, immersion and pouring**	PROC13
CS16	**Production or preparation or articles by tabletting, compression, extrusion or pelletisation**	PROC14

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

4.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. Use suitable eye protection and gloves.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics

Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.5. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.8. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient

temperature.
Assumes a good basic standard of occupational hygiene is implemented

4.2.9. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Carry out in a vented booth provided with laminar airflow.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.10. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		

Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear transfer lines prior to de-coupling. Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear transfer lines prior to de-coupling. Provide extract ventilation to points where emissions occur.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.13. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to material transfer points and other openings.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.14. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.15. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur. Avoid manual contact with wet work pieces.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.2.16. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

4.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.00
combined routes				0.03

4.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.49
combined routes				0.61

4.3.5. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.25
combined routes				0.36

4.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.12
combined routes				0.15

4.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.10
combined routes				0.68

4.3.8. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

4.3.9. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	4.29 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.36
inhalative	systemic	long-term		0.62
combined routes				0.98

4.3.10. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.07
inhalative	systemic	long-term		0.37
combined routes				0.44

4.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

4.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.07
combined routes				0.66

4.3.13. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.25
combined routes				0.83

4.3.14. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.25
combined routes				0.71

4.3.15. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

4.3.16. Worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	3.43 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.29
inhalative	systemic	long-term		0.25
combined routes				0.54

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES5: Uses in Coatings, professional

5.1. Title section

Structured Short Title	:	Widespread use by professional workers
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC8c, ERC8d, ERC8f
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**General exposures (closed systems)**	PROC1
CS4	**General exposures (closed systems)**	PROC2
CS5	**General exposures (closed systems), Use in contained systems**	PROC2
CS6	**Preparation of material for application**	PROC3
CS7	**Film formation - air drying, Outdoor**	PROC4
CS8	**Film formation - air drying, Indoor**	PROC4
CS9	**Preparation of material for application, Indoor**	PROC5
CS10	**Preparation of material for application, Outdoor**	PROC5
CS11	**Material transfers, Drum/batch transfers**	PROC8a
CS12	**Material transfers, Drum/batch transfers**	PROC8b
CS13	**Roller, spreader, flow application, Indoor**	PROC10
CS14	**Roller, spreader, flow application, Outdoor**	PROC10
CS15	**Roller, spreader, flow application, Indoor**	PROC10
CS16	**Manual, Spraying, Indoor**	PROC11
CS17	**Manual, Spraying, Indoor**	PROC11
CS18	**Manual, Spraying, Outdoor**	PROC11
CS19	**Dipping, immersion and pouring, Outdoor**	PROC13
CS20	**Dipping, immersion and pouring, Indoor**	PROC13
CS21	**Laboratory activities**	PROC15

CS22	**Hand application - fingerpaints, pastels, adhesives, Indoor**	PROC19
CS23	**Hand application - fingerpaints, pastels, adhesives, Outdoor**	PROC19

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use leading to inclusion into/onto article (indoor) (ERC8c) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use leading to inclusion into/onto article (outdoor) (ERC8f)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

5.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

Assumes a good basic standard of occupational hygiene is implemented

5.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		

Not applicable		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.5. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures		
Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Ensure that enough fresh air is supplied to dilute and remove dusts, fumes or vapours. Between 5 and 15 air changes per hour are recommended, with a through draught.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.8. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics

Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.9. Control of worker exposure: Mixing or blending in batch processes (PROC5)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

Assumes a good basic standard of occupational hygiene is implemented

5.2.10. Control of worker exposure: Mixing or blending in batch processes (PROC5)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		

Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Technical and organisational conditions and measures		
Provide extract ventilation to material transfer points and other openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

5.2.13. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		

Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.14. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.15. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 25 %		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

5.2.16. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Carry out in a vented booth or extracted enclosure.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.17. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Technical and organisational conditions and measures		
Carry out in a vented booth or extracted enclosure.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.18. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 5 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.19. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid manual contact with wet work pieces. Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.20. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur. Avoid manual contact with wet work pieces.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.21. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.22. Control of worker exposure: Manual activities involving hand contact (PROC19)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Ensure doors and windows are opened.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.2.23. Control of worker exposure: Manual activities involving hand contact (PROC19)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		

Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use leading to inclusion into/onto article (indoor) (ERC8c) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use leading to inclusion into/onto article (outdoor) (ERC8f)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

5.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.00
inhalative	systemic	long-term	0.042 mg/m³	0.00
inhalative	systemic	short-term	0.167 mg/m³	
combined routes				0.00

5.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	16.69 mg/m³	0.20
inhalative	systemic	short-term	66.77 mg/m³	
combined routes				0.32

5.3.5. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	16.69 mg/m³	0.20
inhalative	systemic	short-term	66.77 mg/m³	
combined routes				0.32

5.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.06
inhalative	systemic	long-term	73.03 mg/m³	0.88
inhalative	systemic	short-term	292.13 mg/m³	
combined routes				0.94

5.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.14 mg/kg bw/day (ECETOC TRA	0.01

			v3.0 Worker)	
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	584.27 mg/m³	
combined routes				0.36

5.3.8. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	41.73 mg/m³	0.50
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.62

5.3.9. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	12.52 mg/m³	0.15
inhalative	systemic	short-term	50.08 mg/m³	
combined routes				0.38

5.3.10. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	116.85 mg/m³	
combined routes				0.58

5.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.27 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.02
inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	500.80 mg/m³	
combined routes				0.32

5.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/m³ (ECETOC TRA)	0.23
inhalative	systemic	long-term	20.87 mg/kg bw/day	0.25
inhalative	systemic	short-term	83.47 mg/m³	
combined routes				0.48

5.3.13. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.99 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.08
inhalative	systemic	long-term	45.07 mg/m³	0.54
inhalative	systemic	short-term	300.48 mg/m³	
combined routes				0.63

5.3.14. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23

inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	116.85 mg/m³	
combined routes				0.58

5.3.15. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.65 mg/kg bw/day (ECETOC TRA)	0.14
inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	100.16 mg/m³	
combined routes				0.44

5.3.16. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.57 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.22
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	> 999 mg/m³	
combined routes				0.82

5.3.17. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.57 mg/kg bw/day (ECETOC TRA)	0.60
inhalative	systemic	long-term	50.08 mg/m³	0.22
inhalative	systemic	short-term	> 999 mg/m³	
combined routes				0.82

5.3.18. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.14 mg/kg bw/day (ECETOC TRA	0.18

			v3.0 Worker)	
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	116.85 mg/m³	
combined routes				0.53

5.3.19. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.65 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.14
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	333.87 mg/m³	
combined routes				0.74

5.3.20. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA worker v2.0)	0.12
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	116.85 mg/m³	
combined routes				0.47

5.3.21. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term	12.52 mg/m³	0.15
inhalative	systemic	short-term	50.08 mg/m³	
combined routes				0.18

5.3.22. Worker exposure: Manual activities involving hand contact (PROC19)

Exposure route	Health effect	Exposure	Exposure level	RCR

		indicator		
Dermal	systemic	long-term	2.83 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.24
inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	500.80 mg/m³	
combined routes				0.54

5.3.23. Worker exposure: Manual activities involving hand contact (PROC19)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.83 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.24
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	> 999 mg/m³	
combined routes				0.94

5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES6: Uses in Coatings, consumer

6.1. Title section

Structured Short Title	:	Consumer use; Various products (PC34, PC31, PC24, PC23, PC18, PC15, PC9c, PC9b, PC9a, PC8, PC4, PC1).
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC8c, ERC8d, ERC8f
Consumer		
CS2		PC8
CS3		PC8
CS4		PC8
CS5	**Aerosol spray can**	PC9a
CS6	**Rolling, Brushing**	PC9a

6.2. Conditions of use affecting exposure

6.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use leading to inclusion into/onto article (indoor) (ERC8c) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use leading to inclusion into/onto article (outdoor) (ERC8f)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk		

characterization was performed.

6.2.2. Control of consumer exposure: Biocidal products (PC8)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers exposure up to 60 min

6.2.3. Control of consumer exposure: Biocidal products (PC8)

Product (article) characteristics		
Covers concentrations up to 3 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
Use frequency	:	Covers frequency up to: 1.25 uses per day
Other conditions affecting consumers exposure		
Room size	:	Covers use in a one car garage (>34 m3) under typical ventilation.

6.2.4. Control of consumer exposure: Biocidal products (PC8)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
Use frequency	:	Covers frequency up to: 1 uses per day
Use frequency	:	Covers frequency up to: 365 times per year
Other conditions affecting consumers exposure		
Temperature	:	Covers use at ambient temperatures.

6.2.5. Control of consumer exposure: Coatings and paints, thinners, paint removers (PC9a)

Product (article) characteristics		
Covers concentrations up to 10 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers exposure up to 18 min
Other conditions affecting consumers exposure		
Room size	:	Covers use in a one car garage (>34 m3) under typical ventilation.

6.2.6. Control of consumer exposure: Coatings and paints, thinners, paint removers (PC9a)

Product (article) characteristics		
Covers concentrations up to 10 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
For each use event, covers use amounts up to	:	0.109 kg
Duration	:	Covers exposure up to 30 min
Other conditions affecting consumers exposure		
Room size	:	Covers use in room size of 20 m3
Ventilation rate	:	Covers use under typical household ventilation.

6.3. Exposure estimation and reference to its source

6.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use leading to inclusion into/onto article (indoor) (ERC8c) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use leading to inclusion into/onto article (outdoor) (ERC8f)

Additional information on exposure estimation

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

6.3.2. Consumer exposure: Biocidal products (PC8)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	short-term	2.353 mg/kg bw/day (ECETOC TRA)	
inhalative	systemic	long-term		0.13
inhalative	systemic	short-term		0.01
Dermal	systemic	long-term		0.56
combined routes				0.69

6.3.3. Consumer exposure: Biocidal products (PC8)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	short-term	0.952 mg/kg bw/day (ECETOC TRA)	0.11
inhalative	systemic	long-term	0.005 mg/kg bw/day	0.06
Dermal	systemic	short-term	3.3 mg/kg bw/day	
Dermal	systemic	long-term	0.018 mg/kg bw/day	0.79
combined routes				0.85

6.3.4. Consumer exposure: Biocidal products (PC8)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	short-term	6.26 mg/kg bw/day (ECETOC TRA)	0.76
inhalative	systemic	long-term	0.017 mg/kg bw/day	0.37
Dermal	systemic	short-term	0.9 mg/kg bw/day	
Dermal	systemic	long-term	0.002 mg/kg bw/day	0.21
combined routes				0.58

6.3.5. Consumer exposure: Coatings and paints, thinners, paint removers (PC9a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	short-term	2.28 mg/kg bw/day (ECETOC TRA)	0.92
inhalative	systemic	long-term	0.012 mg/kg bw/day	0.13
Dermal	systemic	short-term	2.5 mg/kg bw/day	
Dermal	systemic	long-term	0.013 mg/kg bw/day	0.60
combined routes				0.73

6.3.6. Consumer exposure: Coatings and paints, thinners, paint removers (PC9a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	short-term	3.64 mg/kg bw/day (ECETOC TRA)	0.88
inhalative	systemic	long-term	0.009 mg/kg bw/day	0.21
Dermal	systemic	short-term	1.5 mg/kg bw/day	
Dermal	systemic	long-term	0.004 mg/kg bw/day	0.36
combined routes				0.57

6.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Predicted exposures are not expected toexceed the DNMEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users shouldensure that risks are managed to at least equivalent levels.
Environment - not applicable

ES7: Uses in Coatings, consumer

7.1. Title section

Structured Short Title	:	Use at industrial sites
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC4
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Automated process with (semi) closed systems., Use in contained systems**	PROC2
CS4	**Application of cleaning products in closed systems**	PROC2
CS5	**Automated process with (semi) closed systems., Drum/batch transfers, Use in contained systems**	PROC3
CS6	**Automated process with (semi) closed systems., Drum/batch transfers, Use in contained systems**	PROC3
CS7	**Use in contained batch processes**	PROC3
CS8	**Use in contained batch processes**	PROC4
CS9	**Cleaning with high pressure washers**	PROC7
CS10	**Bulk transfers**	PROC8b
CS11	**Filling/ preparation of equipment from drums or containers.**	PROC8b
CS12	**Cleaning with low-pressure washers**	PROC10
CS13	**Cleaning with low-pressure washers**	PROC7
CS14	**Manual, Surfaces, Cleaning, no spraying**	PROC10
CS15	**Degreasing small objects in cleaning station**	PROC13

7.2. Conditions of use affecting exposure

7.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

7.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Technical and organisational conditions and measures
Avoid direct eye contact with product, also via contamination on hands.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.

7.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.5. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator conforming to EN140 with Type A filter or better.

7.2.7. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.8. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.9. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.10. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.12. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.13. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general or controlled ventilation (5 to 15 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.14. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (10 to 15 air changes per hour)		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

7.2.15. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Provide extract ventilation to points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

7.3. Exposure estimation and reference to its source

7.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

7.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.49
combined routes				0.61

7.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.49
combined routes				0.61

7.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.25
combined routes				0.28

7.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA)	0.03
inhalative	systemic	long-term		0.25
inhalative	systemic	short-term		
combined routes				0.28

7.3.7. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.30
combined routes				0.88

7.3.8. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.58

inhalative	systemic	long-term		0.30
combined routes				0.88
inhalative	systemic	short-term		

7.3.9. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.07
inhalative	systemic	long-term		0.37
combined routes				0.44

7.3.10. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.07
combined routes				0.66

7.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.07
combined routes				0.66

7.3.12. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA	0.23

			v3.0 Worker)	
inhalative	systemic	long-term		0.15
combined routes				0.38

7.3.13. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA)	0.23
inhalative	systemic	long-term		0.74
combined routes				0.97
inhalative	systemic	short-term		

7.3.14. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.15
combined routes				0.38

7.3.15. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

7.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES8: Use in Cleaning Agents, professional

8.1. Title section

Structured Short Title	:	Widespread use by professional workers
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC8d
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Automated process with (semi) closed systems., Use in contained systems**	PROC2
CS4	**Automated process with (semi) closed systems., Use in contained systems**	PROC2
CS5	**Automated process with (semi) closed systems., Drum/batch transfers, Use in contained systems**	PROC3
CS6	**Automated process with (semi) closed systems., Drum/batch transfers, Use in contained systems**	PROC3
CS7	**Semi automated process. (e.g.: semi automatic application of floor care and maintenance products)**	PROC4
CS8	**Application of cleaning products in closed systems, Outdoor**	PROC4
CS9	**Cleaning of medical devices**	PROC4
CS10	**Application of cleaning products in closed systems, Outdoor**	PROC4
CS11	**Cleaning of medical devices**	PROC4
CS12	**Filling/ preparation of equipment from drums or containers.**	PROC9
CS13	**Filling/ preparation of equipment from drums or containers.**	PROC8b
CS14	**Filling/ preparation of equipment from drums or containers.**	PROC9
CS15	**Cleaning with low-pressure washers, Rolling, Brushing, no spraying**	PROC10
CS16	**Manual, Surfaces, Cleaning, Rolling, Brushing**	PROC10
CS17	**Manual, Surfaces, Cleaning, Rolling, Brushing**	PROC10
CS18	**Ad hoc manual application via trigger sprays, dipping, etc., Rolling, Brushing**	PROC10

CS19	**Ad hoc manual application via trigger sprays, dipping, etc., Rolling, Brushing**	PROC10
CS20	**Cleaning with high pressure washers, Spraying, Indoor**	PROC11
CS21	**Cleaning with high pressure washers, Spraying, Outdoor**	PROC11
CS22	**Cleaning with high pressure washers, Spraying, Outdoor**	PROC11
CS23	**Manual, Surfaces, Cleaning, Dipping, immersion and pouring**	PROC13
CS24	**Manual, Surfaces, Cleaning, Dipping, immersion and pouring**	PROC13

8.2. Conditions of use affecting exposure

8.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

8.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to		

EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.5. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better.		
Other conditions affecting workers exposure		

Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.8. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		

Ensure operation is undertaken outdoors.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

8.2.9. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.10. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		

Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.11. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Ensure that enough fresh air is supplied to dilute and remove dusts, fumes or vapours. Between 5 and 15 air changes per hour are recommended, with a through draught.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.14. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Limit the substance content in the product to 25 %. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.15. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 5 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		

Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.16. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Ensure doors and windows are opened.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.17. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics

Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure doors and windows are opened.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.18. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.19. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.20. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 1 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.		
Other conditions affecting workers exposure		

Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.21. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.22. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 1 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		

Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.23. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.2.24. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

8.3. Exposure estimation and reference to its source

8.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d)

Additional information on exposure estimation
No exposure assessment presented for the environment.

8.3.2. Worker exposure: General measures applicable to all activities (CS135)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	mg/kg bw/day (ECETOC TRA v3.0 Worker)	
inhalative	systemic	long-term	mg/m³	
inhalative	systemic	long-term	mg/m³	
combined routes				

8.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure	Exposure level	RCR

		indicator		
Dermal	systemic	long-term	0.82 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.07
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	333.87 mg/m³	
combined routes				0.67

8.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.82 mg/kg bw/day (ECETOC TRA)	0.07
inhalative	systemic	long-term	50.08 mg/m³	0.60
combined routes				0.67
inhalative	systemic	short-term	333.87 mg/m³	

8.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.41 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term	62.60 mg/m³	0.75
inhalative	systemic	short-term	417.33 mg/m³	
combined routes				0.79

8.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.41 mg/kg bw/day (ECETOC TRA)	0.03
inhalative	systemic	long-term	62.60 mg/m³	0.75

combined routes				0.79
inhalative	systemic	short-term	417.33 mg/m³	

8.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.06
inhalative	systemic	long-term	62.60 mg/m³	0.75
inhalative	systemic	short-term	250.40 mg/m³	
combined routes				0.81

8.3.8. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.27 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.02
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	584.27 mg/m³	
combined routes				0.38

8.3.9. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.27 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.02
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	584.27 mg/m³	
combined routes				0.38

8.3.10. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	4.11 mg/kg bw/day	0.35

			(ECETOC TRA)	
inhalative	systemic	long-term	25.04 mg/m³	0.30
combined routes				0.65
inhalative	systemic	short-term	166.93 mg/m³	

8.3.11. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	4.11 mg/kg bw/day (ECETOC TRA)	0.35
inhalative	systemic	long-term	25.04 mg/m³	0.30
combined routes				0.65
inhalative	systemic	short-term	166.93 mg/m³	

8.3.12. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	116.85 mg/m³	
combined routes				0.47

8.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA)	0.14
inhalative	systemic	long-term	20.87 mg/m³	0.45
inhalative	systemic	short-term	83.47 mg/m³	
combined routes				0.59

8.3.15. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.10 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.09
inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	100.16 mg/m³	
combined routes				0.39

8.3.16. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.99 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.08
inhalative	systemic	long-term	45.07 mg/m³	0.54
inhalative	systemic	short-term	300.48	
combined routes			mg/m³	0.63

8.3.17. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.99 mg/kg bw/day (ECETOC TRA)	0.08
inhalative	systemic	long-term	45.07 mg/m³	0.54
combined routes				0.63
inhalative	systemic	short-term	300.48 mg/m³	

8.3.18. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	3.29 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.28
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	200.32 mg/m³	

combined routes				0.88

8.3.19. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.65 mg/kg bw/day (ECETOC TRA)	0.14
inhalative	systemic	long-term	25.04 mg/m³	0.30
combined routes				0.44
inhalative	systemic	short-term	100.16 mg/m³	

8.3.20. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.07 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.09
inhalative	systemic	long-term	62.60 mg/m³	0.75
inhalative	systemic	short-term	250.40 mg/m³	
combined routes				0.85

8.3.21. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.21 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.02
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	584.27 mg/m³	0.37
combined routes				

8.3.22. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.21 mg/kg bw/day (ECETOC TRA)	0.02
inhalative	systemic	long-term	29.21 mg/m³	0.35

combined routes				0.37
inhalative	systemic	short-term	584.27 mg/m³	

8.3.23. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.27 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.02
inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	500.08 mg/m³	
combined routes				0.32

8.3.24. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	mg/m³ (ECETOC TRA)	0.02
inhalative	systemic	long-term	mg/m³	0.30
combined routes				0.32
inhalative	systemic	short-term	mg/m³	

8.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES9: Use in Cleaning Agents, consumer

9.1. Title section

Structured Short Title	:	Consumer use; Various products (PC38, PC35, PC24, PC9c, PC9b, PC9a, PC8, PC4, PC3).
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC8d
Consumer		
CS2	**Material transfers, Liquids**	PC13
CS3	**Material transfers, Liquids**	PC13
CS4	**Cleaning, Spraying**	PC35

9.2. Conditions of use affecting exposure

9.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

9.2.2. Control of consumer exposure: Fuels (PC13)

Product (article) characteristics		
Covers concentrations up to 5,000 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers exposure up to 15 min
Other conditions affecting consumers exposure		
Ventilation rate	:	Covers use under typical household ventilation.

9.2.3. Control of consumer exposure: Fuels (PC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
For each use event, covers use amounts up to	:	5 kg
Duration	:	Covers exposure up to 15 min
Other conditions affecting consumers exposure		
Ventilation rate	:	Covers use under typical household ventilation.

9.2.4. Control of consumer exposure: Washing and cleaning products (PC35)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers exposure up to 240 min
Other conditions affecting consumers exposure		
Room size	:	Covers use in room size of 58 m3
Ventilation rate	:	Covers use under typical household ventilation.

9.3. Exposure estimation and reference to its source

9.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

9.3.2. Consumer exposure: Fuels (PC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	short-term	0.255 mg/kg bw/day (ECETOC TRA)	0.86
inhalative	systemic	long-term	< 0.001 mg/kg bw/day	0.03
Dermal	systemic	short-term	0.025 mg/kg bw/day	
Dermal	systemic	long-term	2.26 mg/kg bw/day	0.01
combined routes				0.04

9.3.3. Consumer exposure: Fuels (PC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
inhalative	systemic	short-term	0.255 mg/kg bw/day (ECETOC TRA)	0.86
inhalative	systemic	long-term	< 0.001 mg/kg bw/day	0.03
Dermal	systemic	short-term	0.025 mg/kg bw/day	
Dermal	systemic	long-term	2.26 mg/kg bw/day	0.01
combined routes				0.04

9.3.4. Consumer exposure: Washing and cleaning products (PC35)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR

inhalative	systemic	short-term	0.002 mg/kg bw/day (ECETOC TRA)	0.00
inhalative	systemic	long-term	0.002 mg/kg bw/day	0.00
Dermal	systemic	short-term	0.161 mg/kg bw/day	
Dermal	systemic	long-term	0.161 mg/kg bw/day	0.04
combined routes				0.04

9.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Predicted exposures are not expected toexceed the DNMEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users shouldensure that risks are managed to at least equivalent levels.
Environment - not applicable

ES10: Use in Oil and Gas field drilling and production operations, industrial

10.1. Title section

Structured Short Title	:	Use at industrial sites
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC4
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**In-line injection**	PROC1
CS4	**Storage**	PROC2
CS5	**Drilling mud (re-)formulation**	PROC3
CS6	**Treatment and disposal of filtered solids**	PROC3
CS7	**Process sampling**	PROC2
CS8	**Drill floor operations**	PROC4
CS9	**Operation of solids filtering equipment - aerosol exposures**	PROC4
CS10	**Operation of solids filtering equipment - vapour exposures**	PROC4
CS11	**Scale squeeze and removal operations**	PROC4
CS12	**Cleaning of solids filtering equipment**	PROC8a
CS13	**Pouring from small containers**	PROC8a
CS14	**Equipment cleaning and maintenance**	PROC8a
CS15	**Bulk transfers from tote tanks and supply vessels**	PROC8b
CS16	**Filling/ preparation of equipment from drums or containers.**	PROC8b

10.2. Conditions of use affecting exposure

10.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Amount used, frequency and duration of use (or from service life)

Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

10.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		

10.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		

10.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system.		

10.2.5. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		

10.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle in a fume cupboard or under extract ventilation.		

10.2.7. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear spills immediately. Clear transfer lines prior to de-coupling. Ensure material transfers are under containment or extract ventilation.		

10.2.8. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

10.2.9. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Formulate in enclosed or ventilated mixing vessels. Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

10.2.10. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

10.2.11. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		

10.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation. Avoid dip sampling.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

10.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

10.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container. Avoid spillage when withdrawing pump.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

10.2.15. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

10.2.16. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better.		

10.3. Exposure estimation and reference to its source

10.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Additional information on exposure estimation
No exposure assessment presented for the environment.

10.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.00
combined routes				0.03

10.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.14 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.01
inhalative	systemic	long-term		0.49
combined routes				0.51

10.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.12
combined routes				0.15

10.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA	0.03

			v3.0 Worker)	
inhalative	systemic	long-term		0.12
combined routes				0.15

10.3.7. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.12
combined routes				0.15

10.3.8. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.20
combined routes				0.78

10.3.9. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.68 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.12
combined routes				0.24

10.3.10. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12

inhalative	systemic	long-term		0.50
combined routes				0.62

10.3.11. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.10
combined routes				0.66

10.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

10.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.50
combined routes				0.73

10.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA)	0.23

inhalative	systemic	long-term		0.49
combined routes				0.73

10.3.15. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term		0.49
combined routes				0.61

10.3.16. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.58
inhalative	systemic	long-term		0.25
combined routes				0.83

10.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES11: Lubricants, industrial

11.1. Title section

Structured Short Title	:	Use at industrial sites
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC4, ERC7
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**General exposures (closed systems)**	PROC2
CS4	**Storage**	PROC1
CS5	**General exposures (closed systems), With sample collection**	PROC3
CS6	**General exposures (open systems)**	PROC4
CS7	**General exposures (open systems), With potential for aerosol generation**	PROC4
CS8	**Spraying**	PROC7
CS9	**Spraying, With potential for aerosol generation**	PROC7
CS10	**Filling/ preparation of equipment from drums or containers., Non-dedicated facility**	PROC9
CS11	**Maintenance of small items**	PROC8a
CS12	**Bulk transfers**	PROC8b
CS13	**Maintenance (of larger plant items) and machine set up**	PROC8b
CS14	**Maintenance (of larger plant items) and machine set up**	PROC8b
CS15	**Filling/ preparation of equipment from drums or containers., Dedicated facility**	PROC8b
CS16	**Initial factory fill of equipment**	PROC9
CS17	**Remanufacture of reject articles**	PROC8a
CS18	**Rolling, Brushing, Manual**	PROC10
CS19	**Treatment by dipping and pouring**	PROC13
CS20	**Operation and lubrication of high energy open equipment**	PROC17
CS21	**Operation and lubrication of high energy open equipment, With potential**	PROC17

	for aerosol generation	
CS22	**Operation and lubrication of high energy open equipment**	PROC18
CS23	**Operation and lubrication of high energy open equipment, With potential for aerosol generation**	PROC18

11.2. Conditions of use affecting exposure

11.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of functional fluid at industrial site (ERC7)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

11.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

11.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

11.2.4. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system. Transfer via enclosed lines.		

11.2.5. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).		

11.2.6. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

11.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		

Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

11.2.8. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves (tested to EN374), coverall and eye protection.		

11.2.9. Control of worker exposure: Industrial spraying (PROC7)

Technical and organisational conditions and measures
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves (tested to EN374), coverall and eye protection.

11.2.10. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

11.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means. Avoid manual contact with wet work pieces.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

11.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

11.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means. Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

11.2.14. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Technical and organisational conditions and measures
Provide enhanced general ventilation by mechanical means. Ensure material transfers are under containment or extract ventilation.

Provide extract ventilation to emission points when contact with warm (>50oC) product is likely.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

11.2.15. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

11.2.16. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		

11.2.17. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

11.2.18. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374. Wear a respirator conforming to EN140 with Type A/P2 filter or better.		

11.2.19. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Restrict area of openings to equipment. Allow time for product to drain from workpiece. Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

11.2.20. Control of worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur. Restrict area of openings to equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

11.2.21. Control of worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur. Restrict area of openings to equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

11.2.22. Control of worker exposure: General greasing/lubrication at high kinetic energy conditions (PROC18)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur. Restrict area of openings to equipment.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

11.2.23. Control of worker exposure: General greasing/lubrication at high kinetic energy conditions (PROC18)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur. Restrict area of openings to equipment.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

11.3. Exposure estimation and reference to its source

11.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of functional fluid at industrial site (ERC7)

Additional information on exposure estimation
No exposure assessment presented for the environment.

11.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49
combined routes				0.61

11.3.4. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.14 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.01

inhalative	systemic	long-term		0.49
combined routes				0.51

11.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.86
combined routes				0.89

11.3.6. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.20
combined routes				0.31

11.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA)	0.11
inhalative	systemic	long-term		0.50
combined routes				0.61

11.3.8. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.14 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.00

inhalative	systemic	long-term		0.62
combined routes				0.62

11.3.9. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.14 mg/kg bw/day (ECETOC TRA)	0.18
inhalative	systemic	long-term		0.10
combined routes				0.28

11.3.10. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

11.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.74
combined routes				0.97

11.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11

inhalative	systemic	long-term		0.74
combined routes				0.85

11.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.74
combined routes				0.85

11.3.14. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA)	0.06
inhalative	systemic	long-term		0.22
combined routes				0.28

11.3.15. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

11.3.16. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11

inhalative	systemic	long-term		0.25
combined routes				0.36

11.3.17. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.372 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.74
combined routes				0.85

11.3.18. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.07
combined routes				0.53

11.3.19. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.371 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.74
combined routes				0.85

11.3.20. Worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.486 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.55

inhalative	systemic	long-term		0.12
combined routes				0.67

11.3.21. Worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.486 mg/kg bw/day (ECETOC TRA)	0.46
inhalative	systemic	long-term		0.10
combined routes				0.56

11.3.22. Worker exposure: General greasing/lubrication at high kinetic energy conditions (PROC18)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA)	0.27
inhalative	systemic	long-term		0.12
combined routes				0.40

11.3.23. Worker exposure: General greasing/lubrication at high kinetic energy conditions (PROC18)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA)	0.06
inhalative	systemic	long-term		0.10
combined routes				0.16

11.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES12: Lubricants, consumer

12.1. Title section

Structured Short Title	:	Widespread use by professional workers
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC8d, ERC9a, ERC9b
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**General exposures (closed systems)**	PROC1
CS4	**Storage**	PROC2
CS5	**General exposures (closed systems)**	PROC3
CS6	**General exposures (open systems)**	PROC4
CS7	**Filling/ preparation of equipment from drums or containers., Non-dedicated facility**	PROC9
CS8	**Maintenance of small items**	PROC8a
CS9	**Bulk transfers**	PROC8b
CS10	**Filling/ preparation of equipment from drums or containers., Dedicated facility**	PROC9
CS11	**Maintenance (of larger plant items) and machine set up, without local exhaust ventilation**	PROC8b
CS12	**Maintenance (of larger plant items) and machine set up, with local exhaust ventilation**	PROC8b
CS13	**Engine lubricant service**	PROC9
CS14	**Manual, Roller application or brushing, with local exhaust ventilation**	PROC10
CS15	**Manual, Roller application or brushing, without local exhaust ventilation**	PROC10
CS16	**Manual, Roller application or brushing, without local exhaust ventilation**	PROC10
CS17	**Spraying, without local exhaust ventilation**	PROC11
CS18	**Spraying, without local exhaust ventilation**	PROC11

CS19	**Treatment by dipping and pouring, without local exhaust ventilation**	PROC13
CS20	**Treatment by dipping and pouring, without local exhaust ventilation**	PROC13
CS21	**Operation and lubrication of high energy open equipment, Indoor**	PROC17
CS22	**Operation and lubrication of high energy open equipment, Outdoor**	PROC17
CS23	**Operation and lubrication of high energy open equipment, Indoor**	PROC18
CS24	**Operation of equipment containing engine oils and similar**	PROC20

12.2. Conditions of use affecting exposure

12.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Wide dispersive indoor use of substances in closed systems (ERC9a) / Wide dispersive outdoor use of substances in closed systems (ERC9b)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

12.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection.		

If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

12.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		

Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Ensure that enough fresh air is supplied to dilute and remove dusts, fumes or vapours. Between 5 and 15 air changes per hour are recommended, with a through draught.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.5. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.6. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.7. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient

	temperature.
Assumes a good basic standard of occupational hygiene is implemented	

12.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear a respirator conforming to EN140 with Type A/P2 filter or better.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		

Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

12.2.10. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means. Clear transfer lines prior to de-coupling.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide extract ventilation to emission points when contact with warm (>50oC) product is likely. Clear transfer lines prior to de-coupling.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.13. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A/P2 filter or better.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.14. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.15. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.16. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Conditions and measures related to personal protection, hygiene and health evaluation		

Wear suitable gloves tested to EN374. Wear a respirator conforming to EN140 with Type A filter or better.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

12.2.17. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics
Covers concentrations up to 100 %
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)
Duration : Covers use up to 60 min
Technical and organisational conditions and measures
Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

12.2.18. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics
Covers concentrations up to 100 %
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)

Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Minimise exposure by extracted full enclosure for the operation or equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.19. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Minimise exposure by extracted full enclosure for the operation or equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.20. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.21. Control of worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Restrict area of openings to equipment. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

Assumes a good basic standard of occupational hygiene is implemented

12.2.22. Control of worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Product (article) characteristics		
Covers concentrations up to 5 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

12.2.23. Control of worker exposure: General greasing/lubrication at high kinetic energy conditions (PROC18)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Restrict area of openings to equipment. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at		

openings.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

12.2.24. Control of worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Product (article) characteristics
Covers concentrations up to 100 %
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Handle substance within a predominantly closed system provided with extract ventilation. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

12.3. Exposure estimation and reference to its source

12.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Wide dispersive indoor use of substances in closed systems (ERC9a) / Wide dispersive outdoor use of substances in closed systems (ERC9b)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

12.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.17 mg/m³	
combined routes				0.82

12.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA)	0.11
inhalative	systemic	long-term	58.43 mg/m³	0.70
combined routes				0.82
inhalative	systemic	short-term	233.71 mg/m³	

12.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.06
inhalative	systemic	long-term	73.03 mg/m³	0.88
inhalative	systemic	short-term	292.13 mg/m³	
combined routes				0.94

12.3.6. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	41.73 mg/m³	0.50
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.62

12.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.55 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	25.04 mg/m³	0.25
inhalative	systemic	short-term	500.80 mg/m³	
combined routes				0.48

12.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.99 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.08
inhalative	systemic	long-term	22.54 mg/m³	0.27
inhalative	systemic	short-term	150.24 mg/m³	
combined routes				0.36

12.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.65 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.14

inhalative	systemic	long-term	37.56 mg/m³	0.45
inhalative	systemic	short-term	250.40 mg/m³	
combined routes				0.59

12.3.10. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	20.87 mg/m³	0.25
inhalative	systemic	short-term	83.47 mg/m³	
combined routes				0.48

12.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.65 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term	37.56 mg/m³	0.74
inhalative	systemic	short-term	250.40 mg/m³	
combined routes				0.85

12.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.65 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.06
inhalative	systemic	long-term	62.60 mg/m³	0.22
inhalative	systemic	short-term	417.33 mg/m³	
combined routes				0.28

12.3.13. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	4.11 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.35
inhalative	systemic	long-term	7.51 mg/m³	0.09
inhalative	systemic	short-term	50.08 mg/m³	
combined routes				0.44

12.3.14. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.65 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.14
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	333.87 mg/m³	
combined routes				0.74

12.3.15. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.05
inhalative	systemic	long-term	41.73 mg/m³	0.30
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.35

12.3.16. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA)	0.46
inhalative	systemic	long-term	41.73 mg/m³	0.50
combined routes				0.97

inhalative	systemic	short-term	166.93 mg/m³	

12.3.17. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.43 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.54
inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.85

12.3.18. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.14 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.18
inhalative	systemic	long-term	12.52 mg/m³	0.15
inhalative	systemic	short-term	250.40 mg/m³	0.33
combined routes				

12.3.19. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.65 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.14
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	333.87 mg/m³	
combined routes				0.74

12.3.20. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23

inhalative	systemic	long-term	41.73 mg/m³	0.50
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.74

12.3.21. Worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.55 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.05
inhalative	systemic	long-term	33.39 mg/m³	0.40
inhalative	systemic	short-term	667.73 mg/m³	
combined routes				0.45

12.3.22. Worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.22 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.02
inhalative	systemic	long-term	23.37 mg/m³	0.28
inhalative	systemic	short-term	467.41 mg/m³	
combined routes				0.30

12.3.23. Worker exposure: General greasing/lubrication at high kinetic energy conditions (PROC18)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.55 mg/kg bw/day (ECETOC TRA)	0.05
inhalative	systemic	long-term	33.39 mg/m³	0.40
combined routes				0.45
inhalative	systemic	short-term	667.73 mg/m³	

12.3.24. Worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.71 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.15
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.85

12.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES13: Lubricants, consumer

13.1. Title section

Structured Short Title	:	Use at industrial sites
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC4
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**General exposures (closed systems)**	PROC1
CS4	**Automated metal rolling/forming**	PROC2
CS5	**Storage**	PROC1
CS6	**General exposures (closed systems)**	PROC3
CS7	**General exposures (open systems)**	PROC4
CS8	**Semi-automated metal rolling/forming**	PROC4
CS9	**Filling/ preparation of equipment from drums or containers.**	PROC5
CS10	**Spraying**	PROC7
CS11	**Spraying, With potential for aerosol generation**	PROC7
CS12	**Equipment cleaning and maintenance, Non-dedicated facility**	PROC8a
CS13	**Bulk transfers**	PROC8b
CS14	**Filling/ preparation of equipment from drums or containers.**	PROC9
CS15	**Process sampling**	PROC2
CS16	**Equipment cleaning and maintenance, Dedicated facility**	PROC8a
CS17	**Filling/ preparation of equipment from drums or containers.**	PROC9
CS18	**Manual, Roller application or brushing**	PROC10
CS19	**Manual, Roller application or brushing**	PROC10
CS20	**Treatment of articles by dipping and pouring**	PROC13
CS21	**Metal machining operations**	PROC17
CS22	**Semi-automated metal rolling/forming**	PROC17
CS23	**Semi-automated metal rolling/forming**	PROC17

13.2. Conditions of use affecting exposure

13.2.1. Control of environmental exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

13.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

13.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.		

13.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Carry out in a vented booth provided with laminar airflow.		

13.2.5. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Store substance within a closed system. Transfer via enclosed lines.

13.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Technical and organisational conditions and measures
Handle substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

13.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

13.2.8. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

13.2.9. Control of worker exposure: Mixing or blending in batch processes (PROC5)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

13.2.10. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		

Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

13.2.11. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

13.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Provide enhanced general ventilation by mechanical means.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

13.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means. Clear transfer lines prior to de-coupling.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

13.2.14. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container.		

13.2.15. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Use dedicated equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

13.2.16. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

13.2.17. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

13.2.18. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

13.2.19. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374. Wear a respirator conforming to EN140 with Type A/P2 filter or better.		

13.2.20. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

13.2.21. Control of worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Provide extract ventilation to points where emissions occur. Restrict area of openings to equipment.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

13.2.22. Control of worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

13.2.23. Control of worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

13.3. Exposure estimation and reference to its source

13.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Additional information on exposure estimation
No exposure assessment presented for the environment.

13.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.69
combined routes				0.81

13.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.12
combined routes				0.24

13.3.5. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.83
combined routes				0.95

13.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	(ECETOC TRA)	0.03
inhalative	systemic	long-term		0.86
combined routes				0.89
inhalative	systemic	short-term		

13.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.69
combined routes				0.81

13.3.8. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	(ECETOC TRA)	0.06
inhalative	systemic	long-term		0.49
combined routes				0.55
inhalative	systemic	short-term		

13.3.9. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	(ECETOC TRA)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48
inhalative	systemic	short-term		

13.3.10. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	42.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.36
inhalative	systemic	long-term		0.62
combined routes				0.97

13.3.11. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	8.57 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.71
inhalative	systemic	long-term		0.10
combined routes				0.81

13.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.74
combined routes				0.97

13.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.74
combined routes				0.85

13.3.14. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

13.3.15. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49
combined routes				0.61

13.3.16. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.74
combined routes				0.85

13.3.17. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	(ECETOC TRA)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82
inhalative	systemic	short-term		

13.3.18. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.486 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.49
combined routes				0.95

13.3.19. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.486 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.52
combined routes				0.98

13.3.20. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.74
combined routes				0.97

13.3.21. Worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	(ECETOC TRA)	0.46
inhalative	systemic	long-term		0.12
combined routes				0.58
inhalative	systemic	short-term		

13.3.22. Worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.10
combined routes				0.56

13.3.23. Worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.25
combined routes				0.70

13.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES14: Metal working fluids / rolling oils, professional

14.1. Title section

Structured Short Title	:	Widespread use by professional workers
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC9a
Worker		
CS2	**General risk management measures applicable to all activities**	PROC11
CS3	**General exposures (closed systems)**	PROC1
CS4	**Storage**	PROC1
CS5	**General exposures (closed systems)**	PROC11
CS6	**Filling/ preparation of equipment from drums or containers., Non-dedicated facility**	PROC8a
CS7	**Equipment cleaning and maintenance, Non-dedicated facility**	PROC8a
CS8	**Bulk transfers**	PROC8b
CS9	**Filling/ preparation of equipment from drums or containers., Dedicated facility**	PROC9
CS10	**Process sampling**	PROC2
CS11	**Equipment cleaning and maintenance, Dedicated facility**	PROC8a
CS12	**Filling/ preparation of equipment from drums or containers., Non-dedicated facility**	PROC9
CS13	**Manual, Roller application or brushing, with local exhaust ventilation**	PROC10
CS14	**Manual, Roller application or brushing, without local exhaust ventilation**	PROC10
CS15	**Spraying, with local exhaust ventilation**	PROC11
CS16	**Spraying, without local exhaust ventilation**	PROC11
CS17	**Treatment by dipping and pouring, with local exhaust ventilation**	PROC13
CS18	**Treatment by dipping and pouring, without local exhaust ventilation**	PROC13
CS19	**Metal machining operations**	PROC17

14.2. Conditions of use affecting exposure

14.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Wide dispersive indoor use of substances in closed systems (ERC9a)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

14.2.2. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		

14.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

14.2.4. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Ensure that enough fresh air is supplied to dilute and remove dusts, fumes or vapours. Between 5 and 15 air changes per hour are recommended, with a through draught.		

14.2.5. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Handle substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.

14.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

14.2.7. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Drain or remove substance from equipment prior to break-in or maintenance.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

14.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

14.2.9. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Use drum pumps or carefully pour from container.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

14.2.10. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Use dedicated equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

14.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means. Drain or remove substance from equipment prior to break-in or maintenance.		
Conditions and measures related to personal protection, hygiene and health evaluation		

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

14.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Use drum pumps or carefully pour from container.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

14.2.13. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

14.2.14. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Wear suitable gloves tested to EN374.		

14.2.15. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

14.2.16. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		

Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

14.2.17. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Allow time for product to drain from workpiece. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

14.2.18. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Allow time for product to drain from workpiece.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Wear suitable gloves tested to EN374.

14.2.19. Control of worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear a respirator conforming to EN140 with Type A filter or better.		

14.3. Exposure estimation and reference to its source

14.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Wide dispersive indoor use of substances in closed systems (ERC9a)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

14.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.034 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	0.029 mg/m³	0.70
inhalative	systemic	short-term	0.117 mg/m³	
combined routes				0.82

14.3.4. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.82

14.3.5. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.06
inhalative	systemic	long-term	73.03 mg/m³	0.88
inhalative	systemic	short-term	292.13 mg/m³	
combined routes				0.94

14.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.27 mg/kg bw/day (ECETOC TRA)	0.05

inhalative	systemic	long-term	25.04 mg/m³	0.70
combined routes				0.75
inhalative	systemic	short-term	500.80 mg/m³	

14.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	41.73 mg/m³	0.50
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.74

14.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	62.60 mg/m³	0.75
inhalative	systemic	short-term	250.40 mg/m³	
combined routes				0.99

14.3.9. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	20.87 mg/m³	0.25
inhalative	systemic	short-term	83.47 mg/m³	
combined routes				0.48

14.3.10. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.55 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.05
inhalative	systemic	long-term	41.73 mg/m³	0.50
inhalative	systemic	short-term	834.67 mg/m³	
combined routes				0.55

14.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	62.60 mg/m³	0.75
inhalative	systemic	short-term	250.40 mg/m³	
combined routes				0.87

14.3.12. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.82 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.07
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	333.87 mg/m³	
combined routes				0.67

14.3.13. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	3.29 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.28

inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	333.87 mg/m³	
combined routes				0.88

14.3.14. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	3.29 mg/kg bw/day (ECETOC TRA worker v2.0)	0.28
inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.58

14.3.15. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.43 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.54
inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.85

14.3.16. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.14 mg/kg bw/day (ECETOC TRA worker v2.0)	0.18
inhalative	systemic	long-term	12.52 mg/m³	0.15
inhalative	systemic	short-term	250.40 mg/m³	
combined routes				0.33

14.3.17. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR

Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.94

14.3.18. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	41.73 mg/m³	0.50
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.74

14.3.19. Worker exposure: Lubrication at high energy conditions and in partly open process (PROC17)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	16.69 mg/m³	0.20
inhalative	systemic	short-term	66.77 mg/m³	
combined routes				0.43

14.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES15: Use in Agrochemicals, professional

15.1. Title section

Structured Short Title	:	Widespread use by professional workers
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC8d
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Storage**	PROC1
CS4	**Mixing operations (open systems)**	PROC3
CS5	**Operation of equipment containing engine oils and similar**	PROC20
CS6	**Disposal of wastes**	PROC8a
CS7	**Transfer from/pouring from containers**	PROC8b
CS8	**Spraying/ fogging by manual application**	PROC11
CS9	**Spraying/ fogging by machine application**	PROC11
CS10	**Ad hoc manual application via trigger sprays, dipping, etc.**	PROC10

15.2. Conditions of use affecting exposure

15.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d)

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

15.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

15.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system. Ensure operation is undertaken outdoors.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

15.2.4. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Ensure operation is undertaken outdoors.		

15.2.5. Control of worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.		

15.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min

Technical and organisational conditions and measures
Ensure operation is undertaken outdoors.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

15.2.7. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

15.2.8. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

15.2.9. Control of worker exposure: Non-industrial spraying (PROC11)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A filter or better. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

15.2.10. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 25 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

15.3. Exposure estimation and reference to its source

15.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d)

Additional information on exposure estimation

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

15.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.82

15.3.4. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	29.21 mg/m³	0.35
inhalative	systemic	short-term	584.27 mg/m³	
combined routes				0.47

15.3.5. Worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.16 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.01
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	> 999 mg/m³	
combined routes				0.62

15.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.16 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.01
inhalative	systemic	long-term	35.06 mg/m³	0.42
inhalative	systemic	short-term	701.12 mg/m³	
combined routes				0.44

15.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.55 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.05
inhalative	systemic	long-term	41.73 mg/m³	0.50
inhalative	systemic	short-term	834.67 mg/m³	
combined routes				0.55

15.3.8. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.14 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.18
inhalative	systemic	long-term	12.52 mg/m³	0.15
inhalative	systemic	short-term	250.40 mg/m³	
combined routes				0.33

15.3.9. Worker exposure: Non-industrial spraying (PROC11)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.43 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.54

inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.85

15.3.10. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.16 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.01
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	> 999 mg/m³	
combined routes				0.62

15.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES16: Functional Fluids, industrial

16.1. Title section

Structured Short Title	:	Use at industrial sites
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC7
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Bulk transfers, (closed systems)**	PROC1
CS4	**General exposures (closed systems)**	PROC2
CS5	**Storage**	PROC2
CS6	**General exposures (open systems)**	PROC4
CS7	**General exposures (open systems), Elevated temperature**	PROC4
CS8	**General exposures (open systems), With potential for aerosol generation**	PROC4
CS9	**Manual, Filling/ preparation of equipment from drums or containers.**	PROC8a
CS10	**Equipment maintenance**	PROC8a
CS11	**Drum/batch transfers**	PROC8a
CS12	**Filling of articles/equipment, (closed systems)**	PROC9
CS13	**Remanufacture of reject articles**	PROC8a

16.2. Conditions of use affecting exposure

16.2.1. Control of environmental exposure: Use of functional fluid at industrial site (ERC7)

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

16.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		

16.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

16.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Not applicable		

16.2.5. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system. Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan.		

16.2.6. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide enhanced general ventilation by mechanical means.		

16.2.7. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (10 to 15 air changes per hour)		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

16.2.8. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

16.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to material transfer points and other openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

16.2.10. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Drain down system prior to equipment break-in or maintenance		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

16.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		

16.2.12. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		

16.2.13. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Provide extract ventilation to points where emissions occur.

16.3. Exposure estimation and reference to its source

16.3.1. Environmental release and exposure: Use of functional fluid at industrial site (ERC7)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

16.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49
combined routes				0.61

16.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49
combined routes				0.61

16.3.5. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49

combined routes				0.61

16.3.6. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.30
combined routes				0.87

16.3.7. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.57
inhalative	systemic	long-term		0.35
combined routes				0.92
inhalative	systemic	short-term		

16.3.8. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.12
combined routes				0.70

16.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

16.3.10. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA)	0.23
inhalative	systemic	long-term		0.30
combined routes				0.52
inhalative	systemic	short-term		

16.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

16.3.12. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

16.3.13. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57

inhalative	systemic	long-term		0.25
combined routes				0.82

16.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES17: Functional Fluids, professional

17.1. Title section

Structured Short Title	:	Widespread use by professional workers
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC9a, ERC9b
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Storage**	PROC2
CS4	**General exposures (closed systems)**	PROC1
CS5	**Drum/batch transfers**	PROC8a
CS6	**Equipment maintenance**	PROC8a
CS7	**Transfer from/pouring from containers**	PROC9
CS8	**Manual, Filling/ preparation of equipment from drums or containers.**	PROC9
CS9	**Remanufacture of reject articles**	PROC8a
CS10	**General exposures (open systems)**	PROC20
CS11	**General exposures (open systems), Elevated temperature**	PROC20

17.2. Conditions of use affecting exposure

17.2.1. Control of environmental exposure: Wide dispersive indoor use of substances in closed systems (ERC9a) / Wide dispersive outdoor use of substances in closed systems (ERC9b)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

17.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

17.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system. Provide a good standard of general ventilation (10 to 15 air changes per hour)		

17.2.4. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

17.2.5. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure material transfers are under containment or extract ventilation. Use drum pumps or carefully pour from container.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

17.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Use drum pumps or carefully pour from container.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

17.2.7. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure material transfers are under containment or extract ventilation. Use drum pumps or carefully pour from container.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

17.2.8. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics

Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Ensure material transfers are under containment or extract ventilation. Use drum pumps or carefully pour from container.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

17.2.9. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		

17.2.10. Control of worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

17.2.11. Control of worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a predominantly closed system provided with extract ventilation.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

17.3. Exposure estimation and reference to its source

17.3.1. Environmental release and exposure: Wide dispersive indoor use of substances in closed systems (ERC9a) / Wide dispersive outdoor use of substances in closed systems (ERC9b)

Additional information on exposure estimation
No exposure assessment presented for the environment.

17.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12

inhalative	systemic	long-term	25.04 mg/m³	0.30
inhalative	systemic	short-term	100.16 mg/m³	
combined routes				0.42

17.3.4. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.06
inhalative	systemic	long-term	20.87 mg/m³	0.25
inhalative	systemic	short-term	83.47 mg/m³	
combined routes				0.31

17.3.5. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.94

17.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.94

17.3.7. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.82

17.3.8. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.82

17.3.9. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	4.11 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.35
inhalative	systemic	long-term	50.08 mg/m³	0.60
inhalative	systemic	short-term	333.87 mg/m³	
combined routes				0.95

17.3.10. Worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.71 mg/kg bw/day (ECETOC TRA	0.15

			v3.0 Worker)	
inhalative	systemic	long-term	58.43 mg/m³	0.20
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.35

17.3.11. Worker exposure: Heat and pressure transfer fluids in dispersive, professional use but closed systems (PROC20)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.71 mg/kg bw/day (ECETOC TRA)	0.15
inhalative	systemic	long-term	29.21 mg/m³	0.35
combined routes				0.50
inhalative	systemic	short-term	116.85 mg/m³	

17.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES18: Use in laboratories, industrial

18.1. Title section

Structured Short Title	:	Use at industrial sites
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC2, ERC4
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Cleaning**	PROC10
CS4	**Cleaning**	PROC10
CS5	**Cleaning**	PROC10
CS6	**Cleaning**	PROC10
CS7	**Laboratory activities**	PROC15
CS8	**Laboratory activities**	PROC15

18.2. Conditions of use affecting exposure

18.2.1. Control of environmental exposure: Formulation into mixture (ERC2) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

18.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics

Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

18.2.3. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

18.2.4. Control of worker exposure: Roller application or brushing (PROC10)

Technical and organisational conditions and measures
Automate activity where possible.

Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

18.2.5. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

18.2.6. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

18.2.7. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear transfer lines prior to de-coupling.		

18.2.8. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Restrict area of openings to equipment.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

18.3. Exposure estimation and reference to its source

18.3.1. Environmental release and exposure: Formulation into mixture (ERC2) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Additional information on exposure estimation
No exposure assessment presented for the environment.

18.3.3. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	27.43 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term	mg/m³	0.49
combined routes			mg/m³	0.95

18.3.4. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA)	0.00
inhalative	systemic	long-term		0.49
combined routes				0.49

18.3.5. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.50 mg/kg bw/day (ECETOC TRA)	0.46
inhalative	systemic	long-term		0.33
combined routes				0.79

18.3.6. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.51 mg/kg bw/day (ECETOC TRA)	0.46
inhalative	systemic	long-term		0.25
combined routes				0.71

18.3.7. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA	0.03

			v3.0 Worker)	
inhalative	systemic	long-term	mg/m³	0.49
combined routes			mg/m³	0.52

18.3.8. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA)	0.03
inhalative	systemic	long-term		0.10
combined routes				0.13

18.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES19: Use in laboratories, professional

19.1. Title section

Structured Short Title	:	Widespread use by professional workers
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Cleaning**	PROC10
CS4	**Cleaning**	PROC10
CS5	**Laboratory activities**	PROC15

19.2. Conditions of use affecting exposure

19.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a)

Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

19.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Avoid direct eye contact with product, also via contamination on hands.
Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

19.2.3. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 240 min
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

19.2.4. Control of worker exposure: Roller application or brushing (PROC10)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers use up to 60 min
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

19.2.5. Control of worker exposure: Use as laboratory reagent (PROC15)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Clear transfer lines prior to de-coupling. Restrict area of openings to equipment.		

19.3. Exposure estimation and reference to its source

19.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

19.3.3. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	3.29 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.28
inhalative	systemic	long-term	50.08 mg/m³	0.6
inhalative	systemic	short-term	333.87 mg/m³	
combined routes				0.88

19.3.4. Worker exposure: Roller application or brushing (PROC10)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.10 mg/kg bw/day (ECETOC TRA)	0.09
inhalative	systemic	long-term	58.43 mg/m³	0.70
combined routes				0.80
inhalative	systemic	short-term	> 999 mg/m³	

19.3.5. Worker exposure: Use as laboratory reagent (PROC15)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term	41.73 mg/m³	0.5
inhalative	systemic	short-term	166.93 mg/m³	
combined routes				0.53

19.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES20: Rubber production and processing, industrial

20.1. Title section

Structured Short Title	:	Use at industrial sites; Formulation [mixing] of preparations and/or re-packaging (SU10).
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC1, ERC3, ERC4, ERC6d
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Material transfers, (closed systems)**	PROC1
CS4	**Bulk weighing**	PROC2
CS5	**Storage**	PROC2
CS6	**Additive premixing**	PROC3
CS7	**Additive premixing, Batch process**	PROC5
CS8	**Calendering (including Banburys)**	PROC6
CS9	**Calendering (including Banburys), With potential for aerosol generation**	PROC6
CS10	**Vulcanisation, Elevated temperature**	PROC6
CS11	**Vulcanisation, Elevated temperature, With potential for aerosol generation**	PROC6
CS12	**Vulcanisation, Manual, Elevated temperature**	PROC6
CS13	**Vulcanisation, Manual, Elevated temperature, With potential for aerosol generation**	PROC6
CS14	**Cooling cured articles, Elevated temperature**	PROC6
CS15	**Tyre build up**	PROC7
CS16	**Equipment maintenance**	PROC8a
CS17	**Material transfers**	PROC8a
CS18	**Material transfers**	PROC8b
CS19	**Small scale weighing**	PROC9
CS20	**Production of articles by dipping and pouring**	PROC13

CS21	**Pressing uncured rubber blanks**	PROC14
CS22	**Finishing operations**	PROC21

20.2. Conditions of use affecting exposure

20.2.1. Control of environmental exposure: Manufacture of the substance (ERC1) / Formulation into solid matrix (ERC3) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6d)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

20.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.

Assumes a good basic standard of occupational hygiene is implemented

20.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient

temperature.
Assumes a good basic standard of occupational hygiene is implemented

20.2.5. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.6. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		

Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.7. Control of worker exposure: Mixing or blending in batch processes (PROC5)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.8. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Minimise exposure by extracted full enclosure for the operation or equipment.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

20.2.9. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics
Covers concentrations up to 100 %
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)
Duration : Covers daily exposures up to 8 hours
Technical and organisational conditions and measures
Ensure material transfers are under containment or extract ventilation.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.
Other conditions affecting workers exposure
Temperature : Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented

20.2.10. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics
Covers concentrations up to 100 %
Physical form of product : Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by extracted full enclosure for the operation or equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.11. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to material transfer points and other openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.12. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by extracted full enclosure for the operation or equipment. Provide enhanced general ventilation by mechanical means.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.13. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by extracted full enclosure for the operation or equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient

temperature.
Assumes a good basic standard of occupational hygiene is implemented

20.2.14. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by extracted full enclosure for the operation or equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.15. Control of worker exposure: Industrial spraying (PROC7)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		

Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.16. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Drain or remove substance from equipment prior to break-in or maintenance.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.17. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.18. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.19. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.20. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.21. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.2.22. Control of worker exposure: Low energy manipulation and handling of substances bound in/on materials and/or articles (PROC21)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
No specific measures identified.		
Other conditions affecting workers exposure		
Temperature	:	Assumes use at not more than 20°C above ambient temperature.
Assumes a good basic standard of occupational hygiene is implemented		

20.3. Exposure estimation and reference to its source

20.3.1. Environmental release and exposure: Manufacture of the substance (ERC1) / Formulation into solid matrix (ERC3) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6d)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

20.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49
combined routes				0.61

20.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49
combined routes				0.61

20.3.5. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49

combined routes				0.61

20.3.6. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.12
combined routes				0.70

20.3.7. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

20.3.8. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.31
combined routes				0.77

20.3.9. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.12

combined routes				0.58

20.3.10. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.31
combined routes				0.77

20.3.11. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.12
combined routes				0.58

20.3.12. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.31
combined routes				0.77

20.3.13. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.31
combined routes				0.76

20.3.14. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.31
combined routes				0.76

20.3.15. Worker exposure: Industrial spraying (PROC7)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.25 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.71
inhalative	systemic	long-term		0.06
combined routes				0.78

20.3.16. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.742 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

20.3.17. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.12
combined routes				0.70

20.3.18. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

20.3.19. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

20.3.20. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

20.3.21. Worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	3.43 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.29
inhalative	systemic	long-term		0.25
combined routes				0.53

20.3.22. Worker exposure: Low energy manipulation and handling of substances bound in/on materials and/or articles (PROC21)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.83 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.24
inhalative	systemic	long-term		0.00
combined routes				0.24

20.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES21: Polymer processing, industrial

21.1. Title section

Structured Short Title	:	Use at industrial sites; Formulation [mixing] of preparations and/or re-packaging (SU10).
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC3, ERC4, ERC5, ERC6d
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Bulk transfers, (closed systems)**	PROC1
CS4	**Bulk weighing**	PROC1
CS5	**Storage**	PROC1
CS6	**Additive premixing**	PROC4
CS7	**Additive premixing, Batch process**	PROC5
CS8	**Calendering (including Banburys)**	PROC6
CS9	**Calendering (including Banburys), With potential for aerosol generation**	PROC6
CS10	**Equipment maintenance**	PROC8a
CS11	**Bulk transfers**	PROC8b
CS12	**Bulk transfers**	PROC8b
CS13	**Small scale weighing**	PROC9
CS14	**Production of articles by dipping and pouring**	PROC13
CS15	**Extrusion and masterbatching**	PROC14
CS16	**Injection moulding of articles**	PROC14
CS17	**Finishing operations**	PROC21

21.2. Conditions of use affecting exposure

21.2.1. Control of environmental exposure: Formulation into solid matrix (ERC3) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use at

industrial site leading to inclusion into/onto article (ERC5) / Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6d)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

21.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

21.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan. Handle substance within a closed system.		

21.2.4. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide a good standard of general ventilation (10 to 15 air changes per hour)		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

21.2.5. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Store substance within a closed system.

21.2.6. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		

21.2.7. Control of worker exposure: Mixing or blending in batch processes (PROC5)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

21.2.8. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

21.2.9. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

21.2.10. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics
Covers concentrations up to 100 %

Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Drain or remove substance from equipment prior to break-in or maintenance.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

21.2.11. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide extract ventilation to material transfer points and other openings.		

21.2.12. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		

Ensure material transfers are under containment or extract ventilation.
Other conditions affecting workers exposure
Assumes a good basic standard of occupational hygiene is implemented

21.2.13. Control of worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		

21.2.14. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Ensure material transfers are under containment or extract ventilation.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

21.2.15. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (10 to 15 air changes per hour)		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

21.2.16. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (10 to 15 air changes per hour)		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

21.2.17. Control of worker exposure: Low energy manipulation and handling of substances bound in/on materials and/or articles (PROC21)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
No specific measures identified.

21.3. Exposure estimation and reference to its source

21.3.1. Environmental release and exposure: Formulation into solid matrix (ERC3) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4) / Use at industrial site leading to inclusion into/onto article (ERC5) / Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC6d)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

21.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	
inhalative	systemic	long-term		
combined routes				

21.3.4. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.35
combined routes				0.92

21.3.5. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.49
combined routes				0.61

21.3.6. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.12
combined routes				0.70

21.3.7. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

21.3.8. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.12
combined routes				0.58

21.3.9. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	5.49 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.46
inhalative	systemic	long-term		0.12
combined routes				0.58

21.3.10. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

21.3.11. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

21.3.12. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

21.3.13. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

21.3.14. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

21.3.15. Worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.06
inhalative	systemic	long-term		0.74
combined routes				0.80

21.3.16. Worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.69 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.06
inhalative	systemic	long-term		0.74
combined routes				0.80

21.3.17. Worker exposure: Low energy manipulation and handling of substances bound in/on materials and/or articles (PROC21)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.83 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.24
inhalative	systemic	long-term		0.00
combined routes				0.24

21.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES22: Polymer processing, professional

22.1. Title section

Structured Short Title	:	Widespread use by professional workers
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC8c, ERC8d, ERC8f
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Bulk transfers, Small package filling**	PROC2
CS4	**Storage**	PROC2
CS5	**Injection moulding of articles**	PROC6
CS6	**Equipment maintenance**	PROC8a
CS7	**Material transfers**	PROC8b
CS8	**Injection moulding of articles**	PROC14

22.2. Conditions of use affecting exposure

22.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use leading to inclusion into/onto article (indoor) (ERC8c) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use leading to inclusion into/onto article (outdoor) (ERC8f)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable

22.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics

Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

22.2.3. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).		

22.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics

Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system. Provide enhanced general ventilation by mechanical means.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

22.2.5. Control of worker exposure: Calendering operations (PROC6)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Minimise exposure by extracted full enclosure for the operation or equipment.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.		

22.2.6. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP

Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Drain down system prior to equipment break-in or maintenance		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear a respirator conforming to EN140 with Type A/P2 filter or better. Wear suitable gloves tested to EN374.		

22.2.7. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Transfer via enclosed lines. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

22.2.8. Control of worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Minimise exposure by extracted full enclosure for the operation or equipment.
Conditions and measures related to personal protection, hygiene and health evaluation
Wear suitable gloves tested to EN374.

22.3. Exposure estimation and reference to its source

22.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use leading to inclusion into/onto article (indoor) (ERC8c) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d) / Widespread use leading to inclusion into/onto article (outdoor) (ERC8f)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

22.3.3. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.82

22.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.12
inhalative	systemic	long-term	25.04 mg/m³	0.30

inhalative	systemic	short-term	100.16 mg/m³	
combined routes				0.42

22.3.5. Worker exposure: Calendering operations (PROC6)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.94

22.3.6. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	8.35 mg/m³	0.10
inhalative	systemic	short-term	33.39 mg/m³	
combined routes				0.33

22.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	2.74 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term	14.61 mg/m³	0.18
inhalative	systemic	short-term	58.43 mg/m³	
combined routes				0.41

22.3.8. Worker exposure: Tabletting, compression, extrusion, pelettisation, granulation (PROC14)

Exposure route	Health effect	Exposure	Exposure level	RCR

		indicator		
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term	58.43 mg/m³	0.70
inhalative	systemic	short-term	233.71 mg/m³	
combined routes				0.73

22.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES23: Water treatment chemicals, industrial

23.1. Title section

Structured Short Title	:	Use at industrial sites
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC3, ERC4
Worker		
CS2	**General measures applicable to all activities**	CS135
CS3	**Storage**	PROC1
CS4	**Bulk transfers**	PROC2
CS5	**General exposures (closed systems)**	PROC3
CS6	**General exposures (open systems)**	PROC4
CS7	**Equipment maintenance**	PROC8a
CS8	**Drum/batch transfers**	PROC8b
CS9	**Pouring from small containers**	PROC13

23.2. Conditions of use affecting exposure

23.2.1. Control of environmental exposure: Formulation into solid matrix (ERC3) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply		
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.		

23.2.2. Control of worker exposure: General measures applicable to all activities (CS135)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid direct eye contact with product, also via contamination on hands.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Use suitable eye protection. If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

23.2.3. Control of worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Store substance within a closed system.		

23.2.4. Control of worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Product (article) characteristics

Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Handle substance within a closed system. Provide a good standard of general ventilation (10 to 15 air changes per hour)		

23.2.5. Control of worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Other conditions affecting workers exposure		
Assumes a good basic standard of occupational hygiene is implemented		

23.2.6. Control of worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours

Technical and organisational conditions and measures
Restrict area of openings to equipment. Provide a good standard of general ventilation (10 to 15 air changes per hour)

23.2.7. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Drain down system prior to equipment break-in or maintenance Provide a good standard of general ventilation (10 to 15 air changes per hour)		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

23.2.8. Control of worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Avoid spillage when withdrawing pump. Use drum pumps.		

23.2.9. Control of worker exposure: Treatment of articles by dipping and pouring (PROC13)

Product (article) characteristics		
Covers concentrations up to 100 %		
Physical form of product	:	Liquid, vapour pressure 0.5 - 10 kPa at STP
Amount used, frequency and duration of use (or from service life)		
Duration	:	Covers daily exposures up to 8 hours
Technical and organisational conditions and measures		
Provide extract ventilation to points where emissions occur.		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear suitable gloves tested to EN374.		

23.3. Exposure estimation and reference to its source

23.3.1. Environmental release and exposure: Formulation into solid matrix (ERC3) / Use of non-reactive processing aid at industrial site (no inclusion into or onto article) (ERC4)

Additional information on exposure estimation
As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

23.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.00
combined routes				0.03

23.3.4. Worker exposure: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure route	Health effect	Exposure	Exposure level	RCR

		indicator		
Dermal	systemic	long-term	1.37 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.11
inhalative	systemic	long-term		0.35
combined routes				0.46

23.3.5. Worker exposure: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition (PROC3)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	0.34 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.03
inhalative	systemic	long-term		0.12
combined routes				0.15

23.3.6. Worker exposure: Chemical production where opportunity for exposure arises (PROC4)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.30
combined routes				0.87

23.3.7. Worker exposure: Transfer of substance or mixture (charging/discharging) at non dedicated-facilities (PROC8a)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.17
combined routes				0.40

23.3.8. Worker exposure: Transfer of substance or mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	6.86 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.57
inhalative	systemic	long-term		0.25
combined routes				0.82

23.3.9. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure route	Health effect	Exposure indicator	Exposure level	RCR
Dermal	systemic	long-term	13.71 mg/kg bw/day (ECETOC TRA v3.0 Worker)	0.23
inhalative	systemic	long-term		0.25
combined routes				0.48

23.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. W
Environment - not applicable

ES24: Use in Agrochemicals, consumer

24.1. Title section

Structured Short Title	:	Consumer use; Various products (PC27, PC12).
Substance	:	4-methylpentan-2-one EC-No.: 203-550-1

Environment		
CS1		ERC8a, ERC8d
Consumer		
CS2	**Lawn and garden preparations**	PC12
CS3	**Not applicable**	PC27

24.2. Conditions of use affecting exposure

24.2.1. Control of environmental exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d)

Amount used, frequency and duration of use (or from service life)		
Release type	:	Not applicable

24.2.2. Control of consumer exposure: Fertilizers (PC12)

Product (article) characteristics		
Covers concentrations up to 50 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
For each use event, assumes swallowed amount of	:	< 0 kg
Use frequency	:	Covers frequency up to: 1 uses per day
Use frequency	:	Covers frequency up to: 1 uses per day

Use frequency	:	Covers frequency up to: 365 times per year
Duration	:	Covers exposure up to 480 min
Duration	:	Covers use up to 480 min
Other conditions affecting consumers exposure		
Room size	:	Use in room with a volume of minimum 20 m3
Temperature	:	Covers use at ambient temperatures.

24.2.3. Control of consumer exposure: Plant protection products (PC27)

Product (article) characteristics		
Covers concentrations up to 50 %		
Physical form of product	:	Liquid, vapour pressure < 10 Pa
Amount used, frequency and duration of use (or from service life)		
For each use event, assumes swallowed amount of	:	< 0 kg
Use frequency	:	Covers frequency up to: 1 uses per day
Duration	:	Covers exposure up to 480 min
Use frequency	:	Covers frequency up to: 365 times per year
Use frequency	:	Covers frequency up to: 1 uses per day
Duration	:	Covers use up to 480 min
Other conditions affecting consumers exposure		
Room size	:	Use in room with a volume of minimum 20 m3
Temperature	:	Covers use at ambient temperatures.

24.3. Exposure estimation and reference to its source

24.3.1. Environmental release and exposure: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) (ERC8a) / Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) (ERC8d)

Additional information on exposure estimation
No exposure assessment presented for the environment.

24.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Health - Predicted exposures are not expected toexceed the DNMEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users shouldensure that risks are managed to at least equivalent levels.
Environment - not applicable

RICCA CHEMICAL COMPANY®

Safety Data Sheet

Classified According to OSHA Hazard Communication Standard (HCS)

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: Hydrochloric Acid, 5% (v/v)

Product Number: 3568

Other Identifying Product Numbers: 3568-1, 3568-16, 3568-30, 3568-32, 3568-5, 3568-55, 3568-5HP

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Ricca Chemical Company
Address: 448 West Fork Drive

Arlington, TX 76012 USA

Telephone: 888-467-4222

1.4. Emergency Telephone Number (24 hours)

CHEMTREC (USA)	800-424-9300
CHEMTREC (International)	1+ 703-527-3887

Safety Data Sheet

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

Hazard Class	Category	Hazard Statements	Precautionary Statements:
Skin Corrosion / Irritation	Category 1A	H314	P260, P264, P280, P301+P330+P331, P303+P361+P353, P363, P304+P340, P310, P321, P305+P351+P338, P405, P501
Eye Damage / Irritation	Category 1	H318	P280, P305+P351+P338, P310
Respiratory Sensitizer	Category 1	H334	P261, P285, P304+P341, P342+P311, P501
Specific Target Organs/Systemic Toxicity Following Single Exposure	Category 1	H370	P260, P264, P270, P307+P311, P321, P405, P501
Specific Target Organs/Systemic Toxicity Following Repeated Exposure	Category 1	H372	P260, P264, P270, P314, P501
Corrosive to Metals	Category 1	H290	P234, P390, P406
Hazardous to the Aquatic Environment (Acute)	Category 3	H402	P273, P501

2.2. GHS Label Elements

Pictograms:

Signal Word: **Danger**

Hazard Statements:

Hazard Number	Hazard Statement
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H370	Causes damage to organs.
H372	Causes damage to organs through prolonged or repeated exposure.
H402	Harmful to aquatic life.

Precautionary Statements:

Precautionary Number	Precautionary Statement
P234	Keep only in original container.
P260	Do not breathe fumes, mist, vapors, or spray.
P261	Avoid breathing fumes, mist, vapors, or spray.
P264	Wash arms, hands and face thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves and eye protection.
P285	In case of inadequate ventilation wear respiratory protection.
P301+P330+P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P304+P341	IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P307+P311	IF exposed: Call a POISON CENTER or physician.
P310	Immediately call a POISON CENTER or physician.
P314	Get medical attention if you feel unwell.
P321	Specific treatment (Wash areas of contact with water).
P342+P311	If experiencing respiratory symptoms: Call a POISON CENTER or physician.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents in accordance with local, state, federal and international regulations.

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Water	H_2O	18.01 g/mol	7732-18-5	97.84
Hydrochloric Acid	HCl	36.46 g/mol	7647-01-0	2.16

Safety Data Sheet

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. May cause irritation, redness, pain, and tearing.

Inhalation: IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.

Skin Contact: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. May cause irritation, redness, and pain.

Ingestion: IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

4.2. Most Important Symptoms and Effects, Acute and Delayed

Causes severe skin burns and eye damage. Causes serious eye damage. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Causes damage to organs. Causes damage to organs through prolonged or repeated exposure. Mildly corrosive. Wash areas of contact with water for at least 15 minutes. Hazards increase as concentration increases. EYE CONTACT: May cause irritation, redness, pain, and tearing. SKIN CONTACT: May cause irritation, redness, and pain.

4.3. Medical Attention or Special Treatment Needed

Immediately call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water). Irrigate immediately with large quantity of water for at least 15 minutes. Call a physician if irritation develops. Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen. Wash areas of contact with soap and water for at least 15 minutes. Call a physician if irritation develops. Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Use any means suitable for extinguishing surrounding fire.

5.2. Specific Hazards Arising from the Substance or Mixture

Not considered to be a fire or explosion hazard. May react with metals to release flammable Hydrogen gas.

5.3. Special Protective Equipment for Firefighters

Use protective clothing and breathing equipment appropriate for the surrounding fire.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear protective gloves and eye protection. In case of inadequate ventilation wear respiratory protection.

6.2. Cleanup and Containment Methods and Materials

Cover the spill with Sodium Carbonate or a soda ash-slaked lime mixture (50:50). Mix and add water to form slurry. Decant the liquid to the drain with excess water. Treat the solid residue as normal refuse. Wash site with soda ash solution. Always dispose of in accordance with local regulations.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

Store in corrosive resistant container with a resistant inner liner. As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Hydrochloric Acid (7647-01-0)	TLV-Ceiling	USA	2 ppm Ceiling	ACGIH - Threshold Limit Values - Ceilings (TLV-C)
Hydrochloric Acid (7647-01-0)	PEL-Ceiling	USA	5 ppm Ceiling; 7 mg/m³ Ceiling	U.S. - OSHA - Final PELs - Ceiling Limits

8.2. Exposure Controls

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: In case of inadequate ventilation wear respiratory protection. Normal room ventilation is adequate.

Skin Protection: Wear protective gloves and eye protection. Chemical resistant gloves.

Eye Protection: Wear protective gloves and eye protection. Safety glasses or goggles.

8.3. Personal Protective Equipment

Wear protective gloves and eye protection. In case of inadequate ventilation wear respiratory protection. Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

Safety Data Sheet

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance: Colorless liquid
Physical State: Liquid
Odor: Pungent
Odor Threshold: Data not available.
pH: < 1
Melting/Freezing Point: Approximately 0°C
Initial Boiling Point/Range: Approximately 100°C - Approximately 100°C
Flash Point: Data not available.
Evaporation Rate: Data not available.
Flammability: Data not available.
Flammability/Explosive Limits: Data not available.
Vapor Pressure: Data not available.
Vapor Density: Data not available.
Relative Density: 1.01
Solubility: Miscible
Partition Coefficient: Data not available.
Auto-Ignition Temperature: Data not available.
Decomposition Temperature: Data not available.
Viscosity: Data not available.
Explosive Properties: Data not available.
Oxidizing Properties: Data not available.

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Stable under normal conditions of use and storage.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Keep only in original container. Most metals, Alkalis, active metals, Cyanides, Sulfides, Sulfites, Metal Oxides, Formaldehyde.

10.4. Hazardous Decomposition Products

Will not occur.

Safety Data Sheet

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:

Not applicable.

Acute Toxicity - Dermal Exposure:

Not applicable.

Acute Toxicity - Inhalation Exposure:

Not applicable.

Acute Toxicity - Other Information:

LD50, Oral, Rabbit (Hydrochloric Acid) 900 mg/kg; Details of toxic effects not reported other than lethal dose value. LCLo, inhalation, human: 3000 ppm/5 minutes: No toxic effects noted.

Skin Corrosion and Irritation:

Causes severe skin burns and eye damage. Do not breathe fumes, mist, vapors, or spray. Wash arms, hands and face thoroughly after handling. Wear protective gloves and eye protection. IF SWALLOWED: rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Wash contaminated clothing before reuse. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water). IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Store locked up. Dispose of contents in accordance with local, state, federal and international regulations.

Serious Eye Damage and Irritation:

Causes serious eye damage. Wear protective gloves and eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Respiratory Sensitization:

May cause allergy or asthma symptoms or breathing difficulties if inhaled. Avoid breathing fumes, mist, vapors, or spray. In case of inadequate ventilation wear respiratory protection. IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or physician. Dispose of contents in accordance with local, state, federal and international regulations.

Skin Sensitization:

Not applicable.

Germ Cell Mutagenicity:

Not applicable.

Carcinogenicity:

Not applicable.

Reproductive Toxicity:

Not applicable.

Specific Target Organ Toxicity from Single Exposure:

Causes damage to organs. Do not breathe fumes, mist, vapors, or spray. Wash arms, hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. IF exposed: Call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water). Store locked up. Dispose of contents in accordance with local, state, federal and international regulations.

Specific Target Organ Toxicity from Repeated Exposure:

Causes damage to organs through prolonged or repeated exposure. Do not breathe fumes, mist, vapors, or spray. Wash arms, hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Get medical attention if you feel unwell. Dispose of contents in accordance with local, state, federal and international regulations.

Aspiration Hazard:

Not applicable.

Additional Toxicology Information:

Data not available.

SECTION 12: Ecological Information

12.1. Ecotoxicity

Harmful to aquatic life. Avoid release to the environment. Dispose of contents in accordance with local, state, federal and international regulations.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Data not available.

Safety Data Sheet

SECTION 14: Transportation Information

14.1. Transportation by Land-Department of Transportation (DOT, United States of America)

Sizes: 1 L, 4 L, 20 L, 30 Gal, 55 Gal, 500 mL

UN Number: UN1789

Proper Shipping Name: Hydrochloric Acid Solution

Hazard Class: 8

Packing Group: III

Hazard Label(s):

14.2. Transportation by Air - International Air Transport Association (IATA)

Sizes: 1 L, 4 L, 20 L, 30 Gal, 55 Gal, 500 mL

UN Number: UN1789

Proper Shipping Name: Hydrochloric Acid Solution

Hazard Class: 8

Packing Group: III

Hazard Label(s):

14.3 Transportation of Dangerous Goods (TDG, Canada)

Sizes: 1 L, 4 L, 20 L, 30 Gal, 55 Gal, 500 mL

UN Number: UN1789

Proper Shipping Name: HYDROCHLORIC ACID SOLUTION

Hazard Class: 8

Packing Group: III

Hazard Label(s):

Safety Data Sheet

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Not listed.

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Hydrochloric Acid (CAS # 7647-01-0): 500 lb TPQ (gas only)
Hydrochloric Acid (CAS # 7647-01-0): 5000 lb EPCRA RQ (gas only)

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Hydrochloric Acid (CAS # 7647-01-0): 5000 lb final RQ; 2270 kg final RQ

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Hydrochloric Acid (CAS # 7647-01-0): 1.0 % de minimis concentration (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

15.5. Massachusetts Right-to-Know Substance List

Hydrochloric Acid (CAS # 7647-01-0): Extraordinarily hazardous

15.6. Pennsylvania Right-to-Know Hazardous Substances

Hydrochloric Acid (CAS # 7647-01-0): Environmental hazard
Hydrochloric Acid (CAS # 7647-01-0): Present
Water (CAS # 7732-18-5): Present

15.7. New Jersey Worker and Community Right-to-Know Components

Hydrochloric Acid (CAS # 7647-01-0): corrosive
Hydrochloric Acid (CAS # 7647-01-0): sn 1012
Hydrochloric Acid (CAS # 7647-01-0): SN 1012 500 lb TPQ (>=37% concentration); SN 2909 500 lb TPQ (Hydrogen chloride gas only)

15.8. California Proposition 65

Not listed.

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Hydrochloric Acid (CAS # 7647-01-0): Present (DSL)
Water (CAS # 7732-18-5): Present (DSL)

15.10. United States of America Toxic Substances Control Act (TSCA) List

Hydrochloric Acid (CAS # 7647-01-0): Present [T]
Water (CAS # 7732-18-5): Present

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Hydrochloric Acid (CAS # 7647-01-0): 231-595-7
Hydrochloric Acid (CAS # 7647-01-0): 231-715-8
Water (CAS # 7732-18-5): 231-791-2
Water (CAS # 7732-18-5): 232-148-9

Safety Data Sheet

SECTION 16: Other Information

16.1. Full Text of Hazard Statements and Precautionary Statements

May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Causes damage to organs. Causes damage to organs through prolonged or repeated exposure. Harmful to aquatic life.

Keep only in original container. Do not breathe fumes, mist, vapors, or spray. Wash arms, hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves and eye protection. In case of inadequate ventilation wear respiratory protection.

IF SWALLOWED: rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed: Call a POISON CENTER or physician. Get medical attention if you feel unwell. Specific treatment (Wash areas of contact with water). If experiencing respiratory symptoms: Call a POISON CENTER or physician. Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.

Store locked up. Store in corrosive resistant container with a resistant inner liner.

Dispose of contents in accordance with local, state, federal and international regulations.

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.

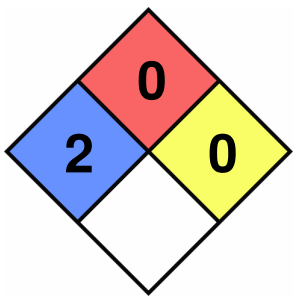
Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.

Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.

Biohazardous Infectious Materials Hazard Class: Not Applicable.

16.3. National Fire Protection Association (NFPA) Rating

Health: 2
Flammability: 0
Reactivity: 0
Special Hazard:



Safety Data Sheet

16.4. Document Revision

Last Revision Date: 2021-08-12

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty, expressed or implied, is made and RICCA CHEMICAL COMPANY assumes no legal responsibility or liability whatsoever resulting from its use.

SAFETY DATA SHEET

Creation Date 06-Jul-2010 **Revision Date** 31-Dec-2020 **Revision Number** 12

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description: Hydrofluoric acid, 47-51% solution in water
Cat No. : H/1432/08
Synonyms Hydrofluoric acid solution; Fluohydric acid; Fluoric acid
Molecular Formula H F
Reach Registration Number 01-2119458860-33

Unique Formula Identifier (UFI) 5HVH-V9M4-2Q3K-0XXR

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

Tel: 01509 231166
Chemtrec US: (800) 424-9300
Chemtrec EU: 001 (202) 483-7616

Poison Centre - Emergency information services

Ireland : National Poisons Information Centre (NPIC) -
01 809 2166 (8am-10pm, 7 days a week)
Malta : +356 2395 2000
Cyprus : +357 2240 5611

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Substances/mixtures corrosive to metal	Category 1 (H290)

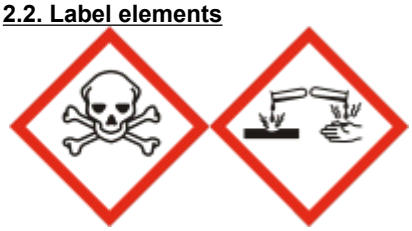
Health hazards

Acute oral toxicity	Category 2 (H300)
Acute dermal toxicity	Category 1 (H310)
Acute Inhalation Toxicity - Vapors	Category 2 (H330)
Skin Corrosion/Irritation	Category 1 A (H314)
Serious Eye Damage/Eye Irritation	Category 1 (H318)

Environmental hazards
Based on available data, the classification criteria are not met

Full text of Hazard Statements: see section 16

2.2. Label elements



Signal Word **Danger**

Hazard Statements
H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H300 + H310 + H330 - Fatal if swallowed, in contact with skin or if inhaled

Precautionary Statements
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P262 - Do not get in eyes, on skin, or on clothing
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower

2.3. Other hazards

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Hydrogen fluoride	7664-39-3	EEC No. 231-634-8	40-60	Met. Corr. 1 (H290) Acute Tox. 2 (H300)

				Acute Tox. 1 (H310) Acute Tox. 2 (H330) Skin Corr. 1A (H314) Eye Dam. 1 (H318)
Water	7732-18-5	231-791-2	40-60	-

Component	Specific concentration limits (SCL's)	M-Factor	Component notes
Hydrogen fluoride	Skin Corr. 1A :: C>=7% Skin Corr. 1B :: 1%<=C<7% Eye Irrit. 2 :: 0.1%<=C<1%	-	-

Reach Registration Number	01-2119458860-33

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General Advice Immediate and specialised first aid and medical treatment is required. Speed is of the essence. Flush with plenty of water immediately. Continue flushing during transport to hospital or medical center.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required. Dermal burns may be treated with calcium gluconate gel or slurry in water or glycerine. This compound binds the active fluorides in an insoluble form and limits burn extension and pain. Soaking or immersion with iced 0.13% Benzalkonium chloride solution may be used for skin burns and should be continued until the pain is relieved. Do not use in eyes.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Inhalation If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove to fresh air. Immediate medical attention is required. A nebulized solution of 2.5% Calcium gluconate may be administered with Oxygen by inhalation.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

4.2. Most important symptoms and effects, both acute and delayed

Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician This product contains hydrogen fluoride. Generous application of calcium gluconate gel to the affected skin may be indicated. For dermal exposure, the use of 2.5-33% calcium gluconate or carbonate gel or slurry has been recommended. The gel is either placed into a surgical glove into which the affected extremity is then placed or applied directly on the

burn. This compound binds with the active fluorides in an insoluble form and limits burn extension and pain. Calcium chloride should not be used. Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Gaseous hydrogen fluoride (HF).

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

6.2. Environmental precautions

Should not be released into the environment.

6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Do not store in metal containers.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 6.1B

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **EU** - Commission Directive (EU) 2019/1831 of 24 October 2019 establishing a fifth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC and amending Commission Directive 2000/39/EC **UK** - EH40/2005 Work Exposure Limits, Third edition. Published 2018. **IRE -** 2018 Code of Practice for the Chemical Agents Regulations, Schedule 1. Published by the Health and Safety Authority

Component	The United Kingdom	European Union	Ireland
Hydrogen fluoride	STEL: 3 ppm 15 min STEL: 2.5 mg/m³ 15 min TWA: 1.8 ppm 8 hr TWA: 1.5 mg/m³ 8 hr	TWA: 1.8 ppm (8h) TWA: 1.5 mg/m³ (8h) STEL: 3 ppm (15min) STEL: 2.5 mg/m³ (15min)	TWA: 1.5 mg/m³ 8 hr. TWA: 1.8 ppm 8 hr. F STEL: 2.5 mg/m³ 15 min STEL: 3 ppm 15 min Skin

Biological limit values
List source(s):

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS35/2 Hydrogen fluoride and fluorides in air Laboratory method using an ion selective electrode or ion chromatography

Derived No Effect Level (DNEL) No information available

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral		0.01 mg/kg/ bw/day		0.01 mg/kg bw/day
Dermal				
Inhalation	2.5 mg/m³			0.0015 mg/m³

Predicted No Effect Concentration (PNEC) No information available.

Fresh water	0.9 mg/l
Marine water	0.9 mg/l
Microorganisms in sewage treatment	51 mg/l
Soil (Agriculture)	11 mg/kg dw

8.2. Exposure controls

Engineering Measures
Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to

control hazardous materials at source

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Butyl rubber	> 480 minutes	0.35 - 0.7 mm	EN 374	As tested under EN374-3 Determination of
Neoprene	> 480 minutes	0.55 mm		Resistance to Permeation by Chemicals
Nitrile rubber	< 60 minutes	0.38 mm		
PVC	< 120 minutes			

Skin and body protection Long sleeved clothing

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

Large scale/emergency use Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced
Recommended Filter type: Acid gases filter Type E Yellow conforming to EN14387
Particulates filter conforming to EN 143

Small scale/Laboratory use Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Recommended half mask:- Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141
When RPE is used a face piece Fit Test should be conducted

Environmental exposure controls No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Liquid	
Appearance	Colorless	
Odor	pungent	
Odor Threshold	No data available	
Melting Point/Range	-35 °C / -31 °F	
Softening Point	No data available	
Boiling Point/Range	105 °C / 221 °F	
Flammability (liquid)	No data available	
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	No data available	
Flash Point	No information available	**Method -** No information available
Autoignition Temperature	No data available	
Decomposition Temperature	No data available	
pH	< 1.0	
Viscosity	No data available	

Water Solubility	Miscible	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Component	**log Pow**	
Hydrogen fluoride	-1.4	
Vapor Pressure	No data available	
Density / Specific Gravity	1.15-1.20	
Bulk Density	Not applicable	Liquid
Vapor Density	2.21	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	

9.2. Other information

Molecular Formula	H F
Molecular Weight	20

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	Corrosive to metals. Contact with metals may evolve flammable hydrogen gas.

10.4. Conditions to avoid

Incompatible products. Excess heat.

10.5. Incompatible materials

Metals. Cyanides. Sulfides. Bases. Fluorine.

10.6. Hazardous decomposition products

Gaseous hydrogen fluoride (HF).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

(a) acute toxicity;

Oral	Category 2
Dermal	Category 1
Inhalation	Category 2

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hydrogen fluoride	-	-	LC50 = 0.79 mg/L (Rat) 1 h
Water	-	-	-

(b) skin corrosion/irritation; Category 1 A

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; Based on available data, the classification criteria are not met

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation.

11.2. Information on other hazards

Endocrine Disrupting Properties Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecotoxicity effects Do not empty into drains. .

Component	Freshwater Fish	Water Flea	Freshwater Algae
Hydrogen fluoride	LC50 = 660 mg/L, 48h (Leuciscus idus)	EC50 = 270 mg/L, 48h (Daphnia species)	

12.2. Persistence and degradability

Persistence Soluble in water, Persistence is unlikely, based on information available, Miscible with water.

Degradability Not relevant for inorganic substances.

12.3. Bioaccumulative potential

Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Hydrogen fluoride	-1.4	No data available

12.4. Mobility in soil The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility. Highly mobile in soils

12.5. Results of PBT and vPvB assessment No data available for assessment.

12.6. Endocrine disrupting properties
Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects
Persistent Organic Pollutant This product does not contain any known or suspected substance
Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point.

European Waste Catalogue (EWC) According to the European Waste Catalog, Waste Codes are not product specific, but application specific.

Other Information Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Do not flush to sewer. Large amounts will affect pH and harm aquatic organisms. Solutions with low pH-value must be neutralized before discharge.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

14.1. UN number UN1790
14.2. UN proper shipping name HYDROFLUORIC ACID
14.3. Transport hazard class(es) 8
Subsidiary Hazard Class 6.1
14.4. Packing group II

ADR

14.1. UN number UN1790
14.2. UN proper shipping name HYDROFLUORIC ACID
14.3. Transport hazard class(es) 8
Subsidiary Hazard Class 6.1
14.4. Packing group II

IATA

14.1. UN number UN1790
14.2. UN proper shipping name HYDROFLUORIC ACID
14.3. Transport hazard class(es) 8
Subsidiary Hazard Class 6.1

14.4. Packing group II

14.5. Environmental hazards No hazards identified

14.6. Special precautions for user No special precautions required

14.7. Maritime transport in bulk according to IMO instruments Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories
X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Australia (AICS), Korea (ECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Hydrogen fluoride	231-634-8	-		X	X	-	X	X	X	X	KE-20198
Water	231-791-2	-		X	X	-	X	X	X	X	KE-35400

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals
Not applicable

National Regulations

WGK Classification Water endangering class = 2 (self classification)

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Hydrogen fluoride	WGK2	

Component	France - INRS (Tables of occupational diseases)
Hydrogen fluoride	Tableaux des maladies professionnelles (TMP) - RG 32

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

15.2. Chemical safety assessment

Chemical Safety Assessment/Reports (CSA/CSR) are not required for mixtures

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3
H290 - May be corrosive to metals
H300 - Fatal if swallowed
H310 - Fatal in contact with skin
H330 - Fatal if inhaled
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage

Legend

CAS - Chemical Abstracts Service
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic
TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor
ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC (volatile organic compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:

Physical hazards	On basis of test data
Health Hazards	Calculation method
Environmental hazards	Calculation method

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
First aid for chemical exposure, including the use of eye wash and safety showers.
Chemical incident response training.

Creation Date	06-Jul-2010
Revision Date	31-Dec-2020
Revision Summary	Update to CLP Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006 COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

SAFETY DATA SHEET

Creation Date 22-Sep-2009 **Revision Date** 13-Aug-2021 **Revision Number** 11

1. Identification

Product Name **Hydrogen peroxide, 30%**

Cat No. : **H325-4; H325-4LC; H325-30GAL; H325-100; H325-500; H325-500LC; NC1705534; XXHPERSODS55GAL; XXH325PD200LI; NC1744285; NC1887234**

Synonyms Hydrogen Dioxide; Peroxide; Carbamide Peroxide

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Oxidizing liquids	Category 2
Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 4
Skin Corrosion/Irritation	Category 1 A
Serious Eye Damage/Eye Irritation	Category 1

Label Elements

Signal Word
Danger

Hazard Statements
May cause fire or explosion; strong oxidizer

Causes severe skin burns and eye damage
Harmful if swallowed or if inhaled

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Wear protective gloves/protective clothing/eye protection/face protection
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep/Store away from clothing/ other combustible materials
Take any precaution to avoid mixing with combustibles
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
Rinse mouth
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Water	7732-18-5	65 - 80
Hydrogen peroxide	7722-84-1	20 - 35

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Call a physician immediately.
Inhalation	If not breathing, give artificial respiration. Remove from exposure, lie down. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.
Ingestion	Do NOT induce vomiting. Clean mouth with water. Never give anything by mouth to an unconscious person. Call a physician immediately.
Most important symptoms and effects	Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	CO_2, dry chemical, dry sand, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	Not applicable
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Oxidizing Properties	Oxidizer
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Corrosive material. The product causes burns of eyes, skin and mucous membranes. Containers may explode when heated. Oxidizer: Contact with combustible/organic material may cause fire. In the event of fire and/or explosion do not breathe fumes. Thermal decomposition can lead to release of irritating gases and vapors. May ignite combustibles (wood paper, oil, clothing, etc.).

Hazardous Combustion Products
Hydrogen. Oxygen.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	2	OX

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional Ecological Information. Avoid release to the environment. Collect spillage.
Methods for Containment and Clean	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

Up

7. Handling and storage

Handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance. Ensure adequate ventilation.

Storage

Keep container tightly closed in a dry and well-ventilated place. Keep cool and protect from sunlight. Keep away from combustible material. Keep only in the original container. Do not store in metal containers. Corrosives area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Hydrogen peroxide	TWA: 1 ppm	(Vacated) TWA: 1 ppm (Vacated) TWA: 1.4 mg/m^3 TWA: 1 ppm TWA: 1.4 mg/m^3	IDLH: 75 ppm TWA: 1 ppm TWA: 1.4 mg/m^3	TWA: 1 ppm

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *NIOSH - National Institute for Occupational Safety and Health*

Engineering Measures

Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear
Odor	pungent
Odor Threshold	No information available
pH	3.3 (30 %)
Melting Point/Range	-33 °C / -27.4 °F
Boiling Point/Range	108 °C / 226.4 °F @ 760 mmHg
Flash Point	Not applicable
Evaporation Rate	>1.0 (Butyl Acetate = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	23 mmHg @ 30 °C

Vapor Density	1.10
Specific Gravity	1.11
Solubility	Miscible with water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	H2O2
Molecular Weight	34.01

10. Stability and reactivity

Reactive Hazard Yes

Stability Oxidizer: Contact with combustible/organic material may cause fire. Light sensitive.

Conditions to Avoid Incompatible products. Excess heat. Exposure to light. Combustible material.

Incompatible Materials Strong oxidizing agents, copper, Finely powdered metals, Reducing Agent, Strong bases, Strong reducing agents, Combustible material

Hazardous Decomposition Products Hydrogen, Oxygen

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Category 4. ATE = 300 - 2000 mg/kg.

Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Mist LC50 Category 4. ATE = 1 - 5 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Hydrogen peroxide	376 mg/kg (Rat) (90%) 910 mg/kg (Rat) (20-60%) 1518 mg/kg (Rat) (8-20% sol)	>2000 mg/kg (Rabbit)	LC50 = 2000 mg/m³ (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes burns by all exposure routes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Hydrogen peroxide	7722-84-1	Not listed	Not listed	A3	Not listed	A3

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens	*Mexico - Occupational Exposure Limits - Carcinogens* *A1 - Confirmed Human Carcinogen* *A2 - Suspected Human Carcinogen* *A3 - Confirmed Animal Carcinogen* *A4 - Not Classifiable as a Human Carcinogen* *A5 - Not Suspected as a Human Carcinogen*

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Contains a substance which is:. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Hydrogen peroxide	EC50 2.5 mg/L/72h	LC50: 16.4 mg/L/96h (P.promelas)	Not listed	EC50 7.7 mg/L/24h

Persistence and Degradability Persistence is unlikely based on information available. Miscible with water

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Hydrogen peroxide	-1.1

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2014
Proper Shipping Name HYDROGEN PEROXIDE, AQUEOUS SOLUTIONS
Hazard Class 5.1
Subsidiary Hazard Class 8
Packing Group II

TDG

UN-No UN2014
Proper Shipping Name HYDROGEN PEROXIDE, AQUEOUS SOLUTION

Hazard Class	5.1
Subsidiary Hazard Class	8
Packing Group	II

IATA

UN-No	UN2014
Proper Shipping Name	HYDROGEN PEROXIDE, AQUEOUS SOLUTION
Hazard Class	5.1
Subsidiary Hazard Class	8
Packing Group	II

IMDG/IMO

UN-No	UN2014
Proper Shipping Name	HYDROGEN PEROXIDE, AQUEOUS SOLUTION
Hazard Class	5.1
Subsidiary Hazard Class	8
Packing Group	II

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Hydrogen peroxide	7722-84-1	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X		X	X	KE-35400
Hydrogen peroxide	7722-84-1	X	-	231-765-0	X	X	X	X	X	KE-20204

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Hydrogen peroxide	-	TQ: 7500 lb

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs

Hydrogen peroxide	-	1000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Hydrogen peroxide	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product contains the following DHS chemicals:
Legend - STQs = Screening Threshold Quantities, APA = A placarded amount

Component	DHS Chemical Facility Anti-Terrorism Standard
Hydrogen peroxide	Theft STQs - 400lb (concentration >=35%)

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 22-Sep-2009
Revision Date 13-Aug-2021
Print Date 13-Aug-2021
Revision Summary SDS sections updated. 7.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 6.3
Revision Date 11/07/2019
Print Date 11/25/2019

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Iron

Product Number : 44890
Brand : Aldrich
CAS-No. : 7439-89-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable solids (Category 1), H228

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H228 Flammable solid.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

P241	Use explosion-proof electrical/ ventilating/ lighting equipment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Fe
Molecular weight	:	55.85 g/mol
CAS-No.	:	7439-89-6
EC-No.	:	231-096-4

Component	Classification	Concentration
Iron, Powder, Particle size < 50 - > 5 µm		
	Flam. Sol. 2; Self-heat. 2; H228, H252	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Special powder against metal fire Dry sandUse water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable extinguishing media
Water Foam

5.2 Special hazards arising from the substance or mixture
Iron oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Store under inert gas. Moisture sensitive.
Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 1,535 °C (2,795 °F)
f)	Initial boiling point and boiling range	2,750 °C 4,982 °F
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 1.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	7.86 g/mL at 25 °C (77 °F)
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	2,500.0 - 3,500.0 kg/m3

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Acids, Oxygen, Strong oxidizing agents, Halogens, Phosphorus

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Iron oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 30,000 mg/kg
Remarks: Nutritional and Gross Metabolic:Weight loss or decreased weight gain. (Lit.)
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Overdose of iron compounds may have a corrosive effect on the gastrointestinal mucosa and be followed by necrosis, perforation, and stricture formation. Several hours may elapse before symptoms that can include epigastric pain, diarrhea, vomiting, nausea, and hematemesis occur. After apparent recovery a person may experience metabolic acidosis, convulsions, and coma hours or days later. Further complications may develop leading to acute liver necrosis that can result in death due to hepatic coma., Long term inhalation exposure to iron (oxide fume or dust) can cause siderosis. Siderosis is considered to be a benign pneumoconiosis and does not normally cause significant physiologic impairment. Siderosis can be observed on x-rays with the lungs having a mottled appearance., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 3089 Class: 4.1 Packing group: III
Proper shipping name: Metal powders, flammable, n.o.s.
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 3089 Class: 4.1 Packing group: III EMS-No: F-G, S-G
Proper shipping name: METAL POWDER, FLAMMABLE, N.O.S.

IATA
UN number: 3089 Class: 4.1 Packing group: III
Proper shipping name: Metal powder, flammable, n.o.s.

SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Iron, Powder, Particle size < 50 - > 5 µm	CAS-No. 7439-89-6	Revision Date

New Jersey Right To Know Components

Iron, Powder, Particle size < 50 - > 5 µm	CAS-No. 7439-89-6	Revision Date

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16: Other information

Further information

Copyright 2018 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.3 Revision Date: 11/07/2019 Print Date: 11/25/2019

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 6.4
Revision Date 01/13/2020
Print Date 11/19/2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Lanthanum(III) oxide

Product Number : 203556
Brand : Aldrich
CAS-No. : 1312-81-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : La2O3
Molecular weight : 325.81 g/mol
CAS-No. : 1312-81-8
EC-No. : 215-200-5

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Lanthanum oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Store under inert gas. Air sensitive. hygroscopic Keep in a dry place.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 2,305 - 2,315 °C (4,181 - 4,199 °F) at ca.1,013 hPa
f)	Initial boiling point and boiling range	4,200 °C 7,592 °F at 1,013 hPa
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	6.51 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.00007 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Auto-ignition temperature	No data available
q)	Decomposition	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

temperature

r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Avoid moisture.

10.5 Incompatible materials
Strong acids, Strong oxidizing agents, Carbon dioxide (CO2)

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Lanthanum oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - >= 10,000 mg/kg
(OECD Test Guideline 401)
LD50 Oral - Rat - > 9,968 mg/kg
Remarks: (RTECS)
LC0 Inhalation - Rat - male and female - 4 h - >= 5.3 mg/l
(OECD Test Guideline 403)
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

(Draize Test)

Respiratory or skin sensitisation
- Guinea pig
Result: Does not cause skin sensitisation.
(Maximisation Test)

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: OE5330000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	Immobilization NOEC - Daphnia magna (Water flea) - >= 100 mg/l - 48 h (OECD Test Guideline 202)

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

SECTION 14: Transport information

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

SECTION 15: Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Lanthanum oxide	1312-81-8	

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 16: Other information

Further information

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.4 Revision Date: 01/13/2020 Print Date: 11/19/2020

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Section 1 Identification

Aldon Corporation
221 Rochester Street
Avon, NY 14414
(585) 226-6177

CHEMTREC 24 Hour Emergency
Phone Number (800) 424-9300
For laboratory and industrial use only.
Not for drug, food or household use.

Product	**LEAD NITRATE**
Synonyms	Lead Dinitrate

Section 2 Hazards identification

Signal word: DANGER
Pictograms: GHS03 / GHS05 / GHS07 / GHS08 / GHS09
Target organs: Blood, Heart, Kidneys, Endocrine, Immune and Central nervous systems

GHS Classification:
Oxidizing solid (Category 2)
Acute toxicity, Oral (Category 4)
Serious eye damage (Category 1)
Acute toxicity, Inhalation (Category 4)
Reproductive toxicity (Category 1A)
Specific target organ toxicity - repeated exposure (Category 2)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label information: **Hazard statement(s):**
H272: May intensify fire; oxidizer.
H302 + H332: Harmful if swallowed or if inhaled
H318: Causes serious eye damage.
H360: May damage fertility or the unborn child.
H373: May cause damage to organs through prolonged or repeated exposure.
H410: Very toxic to aquatic life with long lasting effects.

Precautionary statement(s):
P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P220: Keep away from clothing and combustible materials.
P221: Take any precaution to avoid mixing with combustibles.
P260: Do not breathe dust.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P312: IF SWALLOWED: Rinse mouth. Call a POISON CENTER or doctor if you feel unwell.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313: IF exposed or concerned: Get medical attention.
P370+P378: In case of fire: Use water to extinguish.
P391: Collect spillage.
P405: Store locked up.
P501: Dispose of contents/container to a licensed chemical disposal agency in accordance with local/regional/national regulations.

Hazards not otherwise classified:
Health hazards not otherwise classified (HHNOC) - Not Known
Physical hazards not otherwise classified (PHNOC) - Not Known

Section 3 Composition / information on ingredients

Chemical Name	CAS #	%	EINECS
Lead nitrate	10099-74-8	100%	233-245-9

Section 4 First aid measures

INGESTION: HARMFUL IF SWALLOWED. Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: TOXIC IF INHALED. CAUSES RESPIRATORY TRACT IRRITATION. Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: CAUSES EYE IRRITATION. Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: HARMFUL IF ABSORBED THROUGH SKIN. CAUSES SKIN IRRITATION. Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire fighting measures

Suitable Extinguishing Media: Use water. Do not use dry chemicals or foams. CO_2 or Halon® may provide limited control
Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.
Specific Hazards: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Substance is a strong oxidizer which releases oxygen on heating. The oxygen will intensify any fire in the immediate surrounding. Contact with easily oxidizable, combustible substance or powdered metals may cause fire or explosion upon ignition from any source. Strong oxidizers may explode when shocked, or if exposed to heat, flame, or friction. Also may act as initiation source for dust or vapor explosions.

Section 6 Accidental release measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Remove all sources of ignition. Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and storage

Precautions for Safe Handling: Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale dusts. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

Conditions for Safe Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from ignition sources.

Section 8 Exposure controls / personal protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Lead & inorganic compounds, as Pb	TWA: 0.05 mg/m^3(A3)	TWA: 0.05 mg/m^3	TWA: 0.05 mg/m^3

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: Lead based compounds require the use of a NIOSH type N100 filter.

Section 9 Physical and chemical properties

Appearance: Solid. White granules.
Odor: No odor.
Odor threshold: Data not available.
pH: Data not available.
Melting / Freezing point: Data not available
Boiling point: Data not available
Flash point: Data not available

Evaporation rate (= 1): Data not available
Flammability (solid/gas): Data not available.
Explosion limits: Lower / Upper: Data not available
Vapor pressure (mm Hg): Data not available
Vapor density (Air = 1): Data not available
Relative density (Specific gravity): 4.53
Solubility(ies): 50 g/100g water

Partition coefficient: Data not available
Auto-ignition temperature: Decomposes
Decomposition temperature: 470°C (878°F)
Viscosity: Data not available.
Molecular formula: $Pb(NO_3)_2$
Molecular weight: 331.20

Section 10 Stability and reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Excessive temperatures and heat.

Incompatible materials: Ammonium thiocyanate, powdered carbon, lead hypophosphite.

Hazardous decomposition products: Lead oxides and nitrogen oxides.

Section 11 Toxicological information

Acute toxicity: Data not available
Skin corrosion/irritation: Data not available
Serious eye damage/irritation: Data not available
Respiratory or skin sensitization: Data not available
Germ cell mutagenicity: Data not available
Carcinogenity: Data not available
NTP: (R) Reasonably anticipated to be a human carcinogen.
IARC classified: Group 2A: Probably carcinogenic to humans.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
CA Prop 65: ⚠ WARNING! : This product can expose you to chemicals including Lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm.
Reproductive toxicity: Data not available
STOT-single exposure: The substance or mixture is classified as specific target organ toxicant, single exposure, category 2 with respiratory effects.
STOT-repeated exposure: Data not available
Aspiration hazard: Data not available
Potential health effects:
Inhalation: Toxic if inhaled. Causes respiratory tract irritation.
Ingestion: Harmful if swallowed.
Skin: Harmful if absorbed through skin. Causes skin irritation.
Eyes: Causes severe eye irritation.
Signs and symptoms of exposure: Lead is a cumulative poison and exposure to even small amounts can raise the body's content to toxic levels. Nitrates entering the body by any route can cause headache, vomiting, dizziness, cyanosis, decreased blood pressure and possible respiratory paralysis. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in the blood and urine with shock, coma and death in extreme cases.
Additional information: RTECS #: OG2100000

Section 12 Ecological information

Toxicity to fish: LC50 - Oncorhynchus mykiss (rainbow trout) - 1.5 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna (Water flea) - 0.5 - 2.0 mg/l - 48 h
Toxicity to algae: No data available
Persistence and degradability: No data available
Bioaccumulative potential: No data available
Mobility in soil: No data available
PBT and vPvB assessment: No data available
Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport information

UN/NA number: UN1469
Shipping name: Lead nitrate
Hazard class: 5.1, (6.1)
Packing group: II
Reportable Quantity: 10 lbs (4.54 kg)
Marine pollutant: Yes
Exceptions: Limited quantity equal to or less than 0.5 Kg
2016 ERG Guide # 141

Section 15 Regulatory information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	CA Prop 65
Lead nitrate	Listed	Listed	Not listed	Listed	Not listed	⚠ WARNING -Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

Section 16 Other information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

Form 06/2015

Revision Date: January 15, 2020 **Supercedes:** March 7, 2019

SAFETY DATA SHEET

Creation Date 06-May-2010 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Lead(II) oxide**

Cat No. : **10728**

CAS-No 1317-36-8
Synonyms C.I. 77577; Lead monooxide, Lead protoxide, Litharge; Lead(II) oxide

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 4
Carcinogenicity	Category 1B
Reproductive Toxicity	Category 1A
Specific target organ toxicity - (repeated exposure)	Category 1

Target Organs - Blood, Central nervous system (CNS), Peripheral Nervous System (PNS), Kidney.

Label Elements

Signal Word
Danger

Hazard Statements
May cause cancer
May damage the unborn child. Suspected of damaging fertility
Causes damage to organs through prolonged or repeated exposure

Harmful if swallowed or if inhaled

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Lead monoxide	1317-36-8	>95

4. First-aid measures

General Advice Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. In the event of fire and/or explosion do not breathe fumes. Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
Thermal decomposition can lead to release of irritating gases and vapors. lead oxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. Should not be released into the environment.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Use only under a chemical fume hood. Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Lead monoxide	TWA: 0.05 mg/m^3		IDLH: 100 mg/m^3 TWA: 0.050 mg/m^3	TWA: 0.05 mg/m^3

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
NIOSH IDLH: *NIOSH - National Institute for Occupational Safety and Health*

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Tight sealing safety goggles. Face protection shield.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	886 °C / 1626.8 °F
Boiling Point/Range	1470 °C / 2678 °F
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	10 mmHg @ 1085 °C
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	Slightly soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	O Pb
Molecular Weight	223.19

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Thermal decomposition can lead to release of irritating gases and vapors, lead oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Lead monoxide	LD50 > 10000 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization May cause sensitization by skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Lead monoxide	1317-36-8	Group 2A	Reasonably Anticipated	A3	X	Not listed

IARC (International Agency for Research on Cancer)
IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)
NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)
A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mutagenic Effects No information available

Reproductive Effects Possible risk of impaired fertility.

Developmental Effects May cause harm to the unborn child.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure Blood Central nervous system (CNS) Peripheral Nervous System (PNS) Kidney

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause

long-term adverse effects in the aquatic environment. May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Lead monoxide	Not listed	Pimephales promelas: LC50=0.3 mg/L 96h	Not listed	EC50=0.13 mg/L 48h

Persistence and Degradability May persist based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Technical Name Lead monoxide
Hazard Class 9
Packing Group III

TDG

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Hazard Class 9
Packing Group III

IATA

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Hazard Class 9
Packing Group III

IMDG/IMO

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Hazard Class 9
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Lead monoxide	1317-36-8	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Lead monoxide	1317-36-8	X	-	215-267-0	X	X	X	X	KE-21926

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Lead monoxide	1317-36-8	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Lead monoxide	-	-	X	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Lead monoxide	X		-

OSHA - Occupational Safety and Health Administration Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Lead monoxide	30 µg/m³ Action Level 50 µg/m³ TWA	-

CERCLA Not applicable

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Lead monoxide	1317-36-8	Carcinogen	-	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Lead monoxide	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Creation Date 06-May-2010
Revision Date 14-Feb-2020
Print Date 14-Feb-2020

Revision Summary SDS authoring systems update, replaces ChemGes SDS No. 1317-36-8.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

RICCA CHEMICAL COMPANY®

Safety Data Sheet

Classified According to OSHA Hazard Communication Standard (HCS)

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: Light's Solution, Oxidation-Reduction Potential (ORP) Standard

Product Number: 4330

Other Identifying Product Numbers: 4330-1, 4330-16, 4330-32

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Ricca Chemical Company
Address: 448 West Fork Drive

Arlington, TX 76012 USA

Telephone: 888-467-4222

1.4. Emergency Telephone Number (24 hours)

CHEMTREC (USA)	800-424-9300
CHEMTREC (International)	1+ 703-527-3887

Safety Data Sheet

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

Hazard Class	Category	Hazard Statements	Precautionary Statements:
Acute Toxicity - Inhalation	Category 3	H331	P261, P271, P304+P340, P311, P321, P403+P233, P405, P501
Skin Corrosion / Irritation	Category 1A	H314	P260, P264, P280, P301+P330+P331, P303+P361+P353, P363, P304+P340, P310, P321, P305+P351+P338, P405, P501
Eye Damage / Irritation	Category 1	H318	P280, P305+P351+P338, P310
Germ Cell Mutagenicity	Category 2	H341	P201, P202, P280, P308+P313, P405, P501
Specific Target Organs/Systemic Toxicity Following Single Exposure	Category 1	H370	P260, P264, P270, P307+P311, P321, P405, P501
Specific Target Organs/Systemic Toxicity Following Repeated Exposure	Category 1	H372	P260, P264, P270, P314, P501
Corrosive to Metals	Category 1	H290	P234, P390, P406
Hazardous to the Aquatic Environment (Acute)	Category 2	H401	P273, P501

2.2. GHS Label Elements

Pictograms:

Signal Word: **Danger**

Safety Data Sheet

Hazard Statements:

Hazard Number	Hazard Statement
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H341	Suspected of causing genetic defects.
H370	Causes damage to organs.
H372	Causes damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.

Precautionary Statements:

Precautionary Number	Precautionary Statement
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P234	Keep only in original container.
P260	Do not breathe fumes, mist, vapors, or spray.
P261	Avoid breathing fumes, mist, vapors, or spray.
P264	Wash arms, hands and face thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves and eye protection.
P301+P330+P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy t(
P307+P311	IF exposed: Call a POISON CENTER or physician.
P308+P313	IF exposed or concerned: Get medical attention.
P310	Immediately call a POISON CENTER or physician.
P311	Call a POISON CENTER or physician.
P314	Get medical attention if you feel unwell.
P321	Specific treatment (Wash areas of contact with water. If possible, wipe off areas of contact with dry cloth be
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents in accordance with local, state, federal and international regulations.

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

Safety Data Sheet

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Water	H_2O	18.01 g/mol	7732-18-5	82.68
Sulfuric Acid	H_2SO_4	98.07 g/mol	7664-93-9	9.29
Ferric Ammonium Sulfate Dodecahydrate	$NH_4Fe(SO_4)_2 \cdot 12H_2O$	482.19 g/mol	7783-83-7	4.42
Ferrous Ammonium Sulfate Hexahydrate	$Fe(NH_4)_2(SO_4)_2 \cdot 6H_20$	405.00 g/mol	7783-85-9	3.60

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. May cause irritation, redness, pain, and tearing.

Inhalation: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Skin Contact: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. May cause irritation, redness, and pain.

Ingestion: IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

4.2. Most Important Symptoms and Effects, Acute and Delayed

Causes severe skin burns and eye damage. Causes serious eye damage. Toxic if inhaled. Suspected of causing genetic defects. Causes damage to organs. Causes damage to organs through prolonged or repeated exposure. Corrosive liquid. May irritate eyes and skin. Wash areas of contact with plenty of water for at least 15 minutes. If ingested, dilute with large quantity of water. Do not induce vomiting. Call a physician. EYE CONTACT: May cause irritation, redness, pain, and tearing. SKIN CONTACT: May cause irritation, redness, and pain.

4.3. Medical Attention or Special Treatment Needed

Immediately call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water. If possible, wipe off areas of contact with dry cloth before flushing with water).

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Use dry chemical, alcohol foam, or carbon dioxide for extinguishing the surrounding fire. Water may be ineffective in extinguishing flames but should be used to cool adjacent containers.

5.2. Specific Hazards Arising from the Substance or Mixture

Contact with most metals causes formation of flammable and explosive hydrogen gas.

5.3. Special Protective Equipment for Firefighters

Use protective clothing and NIOSH-approved breathing equipment appropriate for the surrounding fire.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear protective gloves and eye protection.

6.2. Cleanup and Containment Methods and Materials

Cover the spill with Sodium Carbonate or a soda ash-slaked lime mixture (50:50). Mix and add water to form slurry. Decant the liquid to the drain with excess water. Treat the solid residue as normal refuse unless there are regulations prohibiting this practice due to the iron content. Always dispose of in accordance with local regulations.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

Store in corrosive resistant container with a resistant inner liner. As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage. Do not mix with bases. Contact with water will generate heat.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Sulfuric Acid (7664-93-9)	TWA	USA	1 mg/m³ TWA	U.S. - OSHA - Final PELs - Time Weighted Averages (TWAs)
Sulfuric Acid (7664-93-9)	TLV-TWA	USA	0.2 mg/m³ TWA (thoracic fraction)	ACGIH - Threshold Limit Values - Time Weighted Averages (TLV-TWA)
Ferric Ammonium Sulfate Dodecahydra	TLV-TWA	USA	1 mg/m³ TWA (as Fe)	ACGIH - Threshold Limit Values - Time Weighted Averages (TLV-TWA)
Ferrous Ammonium Sulfate Hexahydra	TLV-TWA	USA	1 mg/m³ TWA (as Fe)	ACGIH - Threshold Limit Values - Time Weighted Averages (TLV-TWA)

8.2. Exposure Controls

Engineering Controls: Use only outdoors or in a well-ventilated area. No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Wear protective gloves and eye protection. Chemical resistant gloves.

Eye Protection: Wear protective gloves and eye protection. Safety glasses or goggles.

8.3. Personal Protective Equipment

Wear protective gloves and eye protection. Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance: Light yellow liquid
Physical State: Liquid
Odor: Data not available.
Odor Threshold: Data not available.
pH: Data not available.
Melting/Freezing Point: Approximately 0°C
Initial Boiling Point/Range: Approximately 100°C - Approximately 100°C
Flash Point: Data not available.
Evaporation Rate: Data not available.
Flammability: Data not available.
Flammability/Explosive Limits: Data not available.
Vapor Pressure: Data not available.
Vapor Density: Data not available.
Relative Density: 1.09
Solubility: Miscible
Partition Coefficient: Data not available.
Auto-Ignition Temperature: Data not available.
Decomposition Temperature: Data not available.
Viscosity: Data not available.
Explosive Properties: Data not available.
Oxidizing Properties: Data not available.

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Stable under normal conditions of use and storage.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Keep only in original container. Organics, chlorates, carbides, fulminates, picrates, alkalines, reducing agents, nitrates, Acetic Acid, oxidizing agents, metals.

10.4. Hazardous Decomposition Products

Will not occur.

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:

Not applicable.

Acute Toxicity - Dermal Exposure:

Not applicable.

Acute Toxicity - Inhalation Exposure:

Toxic if inhaled. Avoid breathing fumes, mist, vapors, or spray. Use only outdoors or in a well-ventilated area. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water. If possible, wipe off areas of contact with dry cloth before flushing with water). Store in a well- ventilated place. Keep container tightly closed. Store locked up. Dispose of contents in accordance with local, state, federal and international regulations.

Acute Toxicity - Other Information:

LD50, Oral, Rat: 2140 mg/kg (Sulfuric Acid), 3250 mg/kg (Ferrous Ammonium Sulfate Hexahydrate), details of toxic effects not reported other than lethal dose value. LC50, Inhalation, Rat: (Sulfuric Acid) 510 mg/m3/2H, No toxic effect noted.

Skin Corrosion and Irritation:

Causes severe skin burns and eye damage. Do not breathe fumes, mist, vapors, or spray. Wash arms, hands and face thoroughly after handling. Wear protective gloves and eye protection. IF SWALLOWED: rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. Wash contaminated clothing before reuse. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water. If possible, wipe off areas of contact with dry cloth before flushing with water). IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Store locked up. Dispose of contents in accordance with local, state, federal and international regulations.

Serious Eye Damage and Irritation:

Causes serious eye damage. Wear protective gloves and eye protection. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Respiratory Sensitization:

Not applicable.

Skin Sensitization:

Not applicable.

Germ Cell Mutagenicity:

Suspected of causing genetic defects. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves and eye protection. IF exposed or concerned: Get medical attention. Store locked up. Dispose of contents in accordance with local, state, federal and international regulations.

Carcinogenicity:

Not applicable.

Reproductive Toxicity:

Not applicable.

Specific Target Organ Toxicity from Single Exposure:

Causes damage to organs. Do not breathe fumes, mist, vapors, or spray. Wash arms, hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. IF exposed: Call a POISON CENTER or physician. Specific treatment (Wash areas of contact with water. If possible, wipe off areas of contact with dry cloth before flushing with water). Store locked up. Dispose of contents in accordance with local, state, federal and international regulations.

Specific Target Organ Toxicity from Repeated Exposure:

Causes damage to organs through prolonged or repeated exposure. Do not breathe fumes, mist, vapors, or spray. Wash arms, hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Get medical attention if you feel unwell. Dispose of contents in accordance with local, state, federal and international regulations.

Aspiration Hazard:

Not applicable.

Additional Toxicology Information:

Data not available.

SECTION 12: Ecological Information

12.1. Ecotoxicity

Toxic to aquatic life. Avoid release to the environment. Dispose of contents in accordance with local, state, federal and international regulations.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

Safety Data Sheet

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Data not available.

SECTION 14: Transportation Information

14.1. Transportation by Land-Department of Transportation (DOT, United States of America)

Sizes: 1 L, 4 L, 500 mL

UN Number: UN3264

Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, n.o.s. (Sulphuric Acid)

Hazard Class: 8

Packing Group: III

Hazard Label(s):

14.2. Transportation by Air - International Air Transport Association (IATA)

Sizes: 1 L, 4 L, 500 mL

UN Number: UN3264

Proper Shipping Name: Corrosive Liquid, Acidic, Inorganic, n.o.s. (Sulphuric Acid)

Hazard Class: 8

Packing Group: III

Hazard Label(s):

14.3 Transportation of Dangerous Goods (TDG, Canada)

Sizes: 1 L, 4 L, 500 mL

UN Number: UN3264

Proper Shipping Name: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (sulphuric acid)

Hazard Class: 8

Packing Group: III

Hazard Label(s):

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Not listed.

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Sulfuric Acid (CAS # 7664-93-9): 1000 lb EPCRA RQ

Sulfuric Acid (CAS # 7664-93-9): 1000 lb TPQ

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Sulfuric Acid (CAS # 7664-93-9): 1000 lb final RQ; 454 kg final RQ

Ferrous Ammonium Sulfate Hexahydrate (CAS # 7783-85-9): 1000 lb final RQ; 454 kg final RQ

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Sulfuric Acid (CAS # 7664-93-9): 1.0 % de minimis concentration (acid aerosols including mists, vapors, gas, fog, and other airborne forms of any particle size)

15.5. Massachusetts Right-to-Know Substance List

Sulfuric Acid (CAS # 7664-93-9): Extraordinarily hazardous

Ferrous Ammonium Sulfate Hexahydrate (CAS # 7783-85-9): Present

15.6. Pennsylvania Right-to-Know Hazardous Substances

Sulfuric Acid (CAS # 7664-93-9): Environmental hazard

Sulfuric Acid (CAS # 7664-93-9): Present

Water (CAS # 7732-18-5): Present

Ferric Ammonium Sulfate Dodecahydrate (CAS # 7783-83-7): Environmental hazard

Ferric Ammonium Sulfate Dodecahydrate (CAS # 7783-83-7): Present

Ferrous Ammonium Sulfate Hexahydrate (CAS # 7783-85-9): Environmental hazard

Ferrous Ammonium Sulfate Hexahydrate (CAS # 7783-85-9): Present

Safety Data Sheet

15.7. New Jersey Worker and Community Right-to-Know Components

Sulfuric Acid (CAS # 7664-93-9): carcinogen; corrosive; reactive - second degree
Sulfuric Acid (CAS # 7664-93-9): sn 1761
Sulfuric Acid (CAS # 7664-93-9): SN 1761 500 lb TPQ
Ferrous Ammonium Sulfate Hexahydrate (CAS # 7783-85-9): sn 0928

15.8. California Proposition 65

Sulfuric Acid (CAS # 7664-93-9): carcinogen, 3/14/2003

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Sulfuric Acid (CAS # 7664-93-9): Present (DSL)
Water (CAS # 7732-18-5): Present (DSL)
Ferric Ammonium Sulfate Dodecahydrate (CAS # 7783-83-7): Present (DSL)
Ferrous Ammonium Sulfate Hexahydrate (CAS # 7783-85-9): Present (DSL)

15.10. United States of America Toxic Substances Control Act (TSCA) List

Sulfuric Acid (CAS # 7664-93-9): Present
Water (CAS # 7732-18-5): Present
Ferric Ammonium Sulfate Dodecahydrate (CAS # 7783-83-7): Present
Ferrous Ammonium Sulfate Hexahydrate (CAS # 7783-85-9): Present

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Sulfuric Acid (CAS # 7664-93-9): 231-639-5
Sulfuric Acid (CAS # 7664-93-9): 237-464-0
Water (CAS # 7732-18-5): 231-791-2
Water (CAS # 7732-18-5): 232-148-9
Ferric Ammonium Sulfate Dodecahydrate (CAS # 7783-83-7): 233-382-4
Ferrous Ammonium Sulfate Hexahydrate (CAS # 7783-85-9): 233-151-8

Safety Data Sheet

SECTION 16: Other Information

16.1. Full Text of Hazard Statements and Precautionary Statements

May be corrosive to metals. Causes severe skin burns and eye damage. Causes serious eye damage. Toxic if inhaled. Suspected of causing genetic defects. Causes damage to organs. Causes damage to organs through prolonged or repeated exposure. Toxic to aquatic life.

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep only in original container. Do not breathe fumes, mist, vapors, or spray. Wash arms, hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves and eye protection.

IF SWALLOWED: rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed: Call a POISON CENTER or physician. Get medical attention if you feel unwell. Specific treatment (Wash areas of contact with water. If possible, wipe off areas of contact with dry cloth before flushing with water). Wash contaminated clothing before reuse. Absorb spillage to prevent material damage.

Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in corrosive resistant container with a resistant inner liner.

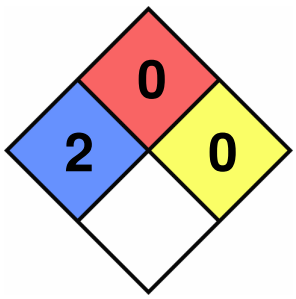
Dispose of contents in accordance with local, state, federal and international regulations.

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.
Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.
Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.
Biohazardous Infectious Materials Hazard Class: Not Applicable.

16.3. National Fire Protection Association (NFPA) Rating

Health: 2
Flammability: 0
Reactivity: 0
Special Hazard:



16.4. Document Revision

Last Revision Date: 2020-06-18

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty , expressed or implied, is made and RICCA CHEMICAL COMPANY assumes no legal responsibility or liability whatsoever resulting from its use .

SAFETY DATA SHEET

Version 6.4
Revision Date 01/15/2020
Print Date 05/29/2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Manganese

Product Number : 266167
Brand : Aldrich
CAS-No. : 7439-96-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Short-term (acute) aquatic hazard (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram: none

Signal word: none

Hazard statement(s)
H401: Toxic to aquatic life.

Precautionary statement(s)
P273: Avoid release to the environment.
P501: Dispose of contents/ container to an approved waste disposal plant.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : Mn
Molecular weight : 54.94 g/mol
CAS-No. : 7439-96-5
EC-No. : 231-105-1

Component	Classification	Concentration
Manganese		
	Aquatic Acute 2; H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

5.2 Special hazards arising from the substance or mixture
Manganese/manganese oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Moisture sensitive. Handle and store under inert gas.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Manganese	7439-96-5	C	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Ceiling limit is to be determined from breathing-zone air		

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

		samples.		
		TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	3 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Not classifiable as a human carcinogen varies		
		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Not classifiable as a human carcinogen varies		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: chips Colour: grey, brown, silver
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 1,244 °C (2,271 °F) - lit.
f)	Initial boiling point and boiling range	1,962 °C 3,564 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	7.3 g/mL at 25 °C (77 °F)
n)	Water solubility	0.0007 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Avoid moisture.

10.5 Incompatible materials
acids, Halogens, Bases, Phosphorus, Sulphur oxides, Hydrogen peroxide, Oxidizing agents, Nitric acid, Sodium Hydroxide, Carbon dioxide (CO2), Nitryl Flouride, Steam

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Manganese/manganese oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - > 2,000 mg/kg
(OECD Test Guideline 420)
LC50 Inhalation - Rat - male and female - 4 h - > 5.14 mg/l
(OECD Test Guideline 403)
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation - 72 h
(OECD Test Guideline 405)

Respiratory or skin sensitisation
- Mouse
Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test NOEC - Oncorhynchus mykiss (rainbow trout) - 3.6 mg/l - 96 h (OECD Test Guideline 203) Remarks: No toxicity at the limit of solubility
Toxicity to daphnia and other aquatic invertebrates	Immobilization NOEC - Daphnia magna (Water flea) - 1.6 mg/l - 48 h (OECD Test Guideline 202) Remarks: No toxicity at the limit of solubility
Toxicity to algae	Growth inhibition EC50 - Desmodesmus subspicatus (green algae) - 4.5 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	Respiration inhibition EC50 - Sludge Treatment - 1,000 mg/l - 3 h (OECD Test Guideline 209)

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16: Other information

Further information

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.4 Revision Date: 01/15/2020 Print Date: 05/29/2020

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

1. Identification

Product identifier: MANGANESE SULFATE

Other means of identification
Product No.: 2550, 6192

Recommended use and restriction on use
Recommended use: Not determined.
Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Avantor Performance Materials, LLC.
3477 Corporate Parkway
Center Valley, PA 18034

Telephone:
Customer Service: 855-282-6867
Fax: 610-573-2610
Contact Person: Environmental Health & Safety
E-mail: info@avantormaterials.com

Emergency telephone number:
CHEMTREC: 1-800-424-9300 within US and Canada

2. Hazard(s) identification

Hazard Classification

Health Hazards

Specific Target Organ Toxicity - Repeated Exposure	Category 2[1.]

Target Organs
1.brain

Unknown toxicity - Health

Acute toxicity, oral	100 %
Acute toxicity, dermal	100 %
Acute toxicity, inhalation, vapor	100 %
Acute toxicity, inhalation, dust or mist	100 %

Environmental Hazards

Chronic hazards to the aquatic environment	Category 2

Unknown toxicity - Environment

Acute hazards to the aquatic environment	100 %

Chronic hazards to the aquatic environment	100 %

Label Elements

Hazard Symbol:

Signal Word: Warning

Hazard Statement: May cause damage to organs through prolonged or repeated exposure. Toxic to aquatic life with long lasting effects.

Precautionary Statements

Prevention: Avoid release to the environment. Do not breathe dust/fume/gas/mist/vapors/spray.

Response: Get medical advice/attention if you feel unwell. Collect spillage.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	Content in percent (%)*
MANGANESE SULFATE MONOHYDRATE		10034-96-5	98 - 100%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Rinse mouth. Call a POISON CENTER/doctor if you feel unwell.

Inhalation: Move to fresh air. Get medical attention if symptoms persist.

Skin Contact: Wash skin thoroughly with soap and water. Get medical attention if symptoms occur. Wash contaminated clothing before reuse.

Eye contact: Flush thoroughly with water. If irritation occurs, get medical assistance.

Most important symptoms/effects, acute and delayed

Symptoms:	May cause skin and eye irritation.
Hazards:	None known.

Indication of immediate medical attention and special treatment needed

Treatment:	Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards:	No unusual fire or explosion hazards noted.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media:	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media:	None known.
Specific hazards arising from the chemical:	During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Special fire fighting procedures:	Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.
Special protective equipment for fire-fighters:	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:	Keep unauthorized personnel away. Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment.
Methods and material for containment and cleaning up:	Sweep up and place in a clearly labeled container for chemical waste. Clean surface thoroughly to remove residual contamination.
Notification Procedures:	Prevent entry into waterways, sewer, basements or confined areas. Stop leak if you can do so without risk. Inform authorities if large amounts are involved.
Environmental Precautions:	Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling: Use personal protective equipment as required. Avoid contact with eyes, skin, and clothing. Avoid inhalation of dust. Wash thoroughly after handling. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

Conditions for safe storage, including any incompatibilities: Keep containers tightly closed. Store in cool, dry place. Store in a well-ventilated place.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

Chemical Identity	Type	Exposure Limit Values	Source
MANGANESE SULFATE MONOHYDRATE - as Mn	TWA	0,2 mg/m3	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2) (07 2009)
MANGANESE SULFATE MONOHYDRATE - as Mn	TWA	0,2 mg/m3	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
MANGANESE SULFATE MONOHYDRATE - Respirable fraction. - as Mn	TWA	0,02 mg/m3	Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2013)
MANGANESE SULFATE MONOHYDRATE - Inhalable fraction. - as Mn	TWA	0,1 mg/m3	Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2013)
MANGANESE SULFATE MONOHYDRATE - as Mn	TWA	0,2 mg/m3	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)
MANGANESE SULFATE MONOHYDRATE - as Mn	8 HR ACL	0,2 mg/m3	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)
	15 MIN ACL	0,6 mg/m3	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)
MANGANESE SULFATE MONOHYDRATE - Dust. - as Mn	TWA	5 mg/m3	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (12 2008)
MANGANESE SULFATE MONOHYDRATE - Inhalable fraction. - as Mn	TWA	0,1 mg/m3	US. ACGIH Threshold Limit Values (02 2013)
MANGANESE SULFATE MONOHYDRATE - Respirable fraction. - as Mn	TWA	0,02 mg/m3	US. ACGIH Threshold Limit Values (02 2013)

Appropriate Engineering Controls No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Use tight fitting goggles if dust is generated.

Skin Protection
Hand Protection: Wear protective gloves.

Other:	Wear suitable protective clothing.
Respiratory Protection:	In case of inadequate ventilation use suitable respirator. During dust-raising work: Dust and mist respirator.
Hygiene measures:	Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state:	Solid
Form:	Powder.
Color:	light pink
Odor:	Odorless
Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	700 °C
Initial boiling point and boiling range:	850 °C (Decomposes)
Flash Point:	Not applicable
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	No data available.
Vapor density:	No data available.
Density:	2,95 g/ml (20 °C)
Relative density:	2,95 (20 °C)
Solubility(ies)	
Solubility in water:	Soluble
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

10. Stability and reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical Stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization does not occur.
Conditions to avoid:	Contact with incompatible materials.
Incompatible Materials:	Strong oxidizing agents. Powdered metals.

Hazardous Decomposition Products: Thermal decomposition may produce oxides of sulfur.

11. Toxicological information

Information on likely routes of exposure

Inhalation: May cause irritation to the respiratory system.

Skin Contact: May cause irritation.

Eye contact: Dust in the eyes will cause irritation.

Ingestion: Irritating. May cause nausea, stomach pain and vomiting.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral
Product: No data available.

Dermal
Product: No data available.

Inhalation
Product: No data available.

Repeated dose toxicity
Product: No data available.

Skin Corrosion/Irritation
Product: May cause skin irritation.

Serious Eye Damage/Eye Irritation
Product: May irritate eyes.

Respiratory or Skin Sensitization
Product: Not a skin sensitizer.

Carcinogenicity
Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

ACGIH Carcinogen List:
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive toxicity
Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure
Product: None known.

Specific Target Organ Toxicity - Repeated Exposure
Product: Brain. - May cause damage to organs through prolonged or repeated exposure.

Aspiration Hazard
Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: There are no data on the degradability of this product.

BOD/COD Ratio
Product: No data available.

Bioaccumulative potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in soil: No data available.

Other adverse effects: Toxic to aquatic life with long lasting effects.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

TDG
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable

15. Regulatory information

Canada Federal Regulations
List of Toxic Substances (CEPA, Schedule 1)

Export Control List (CEPA 1999, Schedule 3)

National Pollutant Release Inventory (NPRI)

Greenhouse Gases

Controlled Drugs and Substances Act

Precursor Control Regulations

International regulations

Montreal protocol
Not applicable

Stockholm convention
Not applicable

Rotterdam convention
Not applicable

Kyoto protocol
Not applicable

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
EU EINECS List:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Philippines PICCS:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Canada NDSL Inventory:	Not in compliance with the inventory.
New Zealand Inventory of Chemicals:	Not in compliance with the inventory.
Japan ISHL Listing:	Not in compliance with the inventory.
Japan Pharmacopoeia Listing:	Not in compliance with the inventory.

16.Other information, including date of preparation or last revision

Revision Date: 21.05.2018

Version #: 2.1

Further Information: No data available.

Disclaimer: The information provided in this Safety Data Sheet (SDS) was prepared based on data believed to be accurate as of the date of this SDS. TO THE GREATEST EXTENT PERMITTED BY LAW, AVANTOR PERFORMANCE MATERIALS (“AVANTOR”) EXPRESSLY DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES REGARDING THE INFORMATION CONTAINED HEREIN INCLUDING, WITHOUT LIMITATION, AS TO ACCURACY, COMPLETENESS, FITNESS FOR PURPOSE OR USE, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY AND STABILITY. This SDS is intended as a guide to the appropriate use, handling, storage and disposal of the product to which it relates by properly trained personnel, and is not intended to be comprehensive. Users of Avantor’s products are advised to perform their own tests and to exercise their own judgment to determine the safety, suitability and appropriate use, handling, storage and disposal of each product and product combination for their own purposes and uses. TO THE GREATEST EXTENT PERMITTED BY LAW, AVANTOR DISCLAIMS LIABILITY FOR, AND BY USING AVANTOR’S PRODUCTS PURCHASER AGREES THAT UNDER NO CIRCUMSTANCES SHALL AVANTOR BE LIABLE FOR, SPECIAL, INDIRECT, INCIDENTAL , PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY TYPE OR KIND, INCLUDING WITHOUT LIMITATION, FOR LOSS OF PROFITS, REPUTATIONAL DAMAGE, PRODUCT RECALL OR BUSINESS INTERRUPTION.

SECTION 1: Identification

1.1. Identification

Product form : Substance
Trade name : Methanol

1.2. Recommended use and restrictions on use

Recommended use : Solvents, Fuels, Feedstock
Restrictions on use : None known

1.3. Supplier

Southern Chemical Corporation
2 Northpoint Drive
Houston, TX 77060 - United States
T +1-832-448-7100

1.4. Emergency telephone number

Emergency number : Chemtrec (800) 424-9300

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Flammable liquids Category 2	H225	Highly flammable liquid and vapor
Acute toxicity (oral) Category 3	H301	Toxic if swallowed
Acute toxicity (dermal) Category 3	H311	Toxic in contact with skin
Acute toxicity (inhalation:vapor) Category 3	H331	Toxic if inhaled
Specific target organ toxicity (single exposure) Category 1	H370	Causes damage to organs (optic nerve) (oral)

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US) :

Signal word (GHS US) : Danger
Hazard statements (GHS US) : H225 - Highly flammable liquid and vapor
H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled
H370 - Causes damage to organs (optic nerve) (oral)
Precautionary statements (GHS US) : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 - Keep container tightly closed.
P240 - Ground/Bond container and receiving equipment.
P241 - Use explosion-proof electrical, lighting, ventilating equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P260 - Do not breathe mist, spray, vapors.

P264 - Wash hands thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear eye protection, protective gloves.
P301+P310 - If swallowed: Immediately call a poison center or doctor.
P330 - Rinse mouth.
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P312 - Call a poison center or doctor if you feel unwell.
P363 - Wash contaminated clothing before reuse.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P311 - Call a poison center or doctor.
P308+P311 - If exposed or concerned: Call a poison center or doctor.
P370+P378 - In case of fire: Use alcohol resistant foam, carbon dioxide (CO2), dry extinguishing powder, Water spray to extinguish.
P403+P235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 - Dispose of contents or container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Name : Methanol

Name	Product identifier	%
Methanol	CAS-No.: 67-56-1	100

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. Call a poison center or a doctor if you feel unwell.

First-aid measures after skin contact : Take off contaminated clothing. Wash skin with plenty of water. Call a poison center or a doctor if you feel unwell. Wash contaminated clothing before reuse.

First-aid measures after eye contact : Rinse eyes with water as a precaution. If eye irritation persists: Get medical advice/attention.

First-aid measures after ingestion : Rinse mouth. Call a doctor immediately, even if there are no immediate symptoms. Symptoms may be delayed.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects : Toxic if inhaled. Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness. Toxic in contact with skin. Symptoms similar to those listed under ingestion. Toxic if swallowed. Causes damage to organs (optic nerve) (Ingestion). If swallowed there is a risk of blindness. Ingestion may cause nausea, vomiting and diarrhea. Depression of the central nervous system, headaches, dizziness, drowsiness, loss of coordination. May cause eye irritation.

Inhalation : Toxic if inhaled. Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness.

Skin : Toxic in contact with skin. Symptoms similar to those listed under ingestion.

Eyes : May cause eye irritation.

Ingestion : Toxic if swallowed. If swallowed there is a risk of blindness. Ingestion may cause nausea, vomiting and diarrhea. Depression of the central nervous system, headaches, dizziness, drowsiness, loss of coordination.

4.3. Immediate medical attention and special treatment, if necessary

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Immediate specific treatment is necessary in case of poisoning.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Water spray. Dry chemical powder, alcohol-resistant foam, carbon dioxide (CO2).

Unsuitable extinguishing media : Use of heavy stream of water may spread fire.

5.2. Specific hazards arising from the chemical

Fire hazard : Highly flammable liquid and vapor. A methanol fire may not be visible to the naked eye. At or above flash point, vapors present may burn in open or explode if confined when mixed with air and exposed to ignition source. Vapors are heavier than air and may travel considerable distance to an ignition source and flash back to source of vapors. Special attention should be given to low areas/pits where flammable vapors can accumulate. On combustion, forms: carbon oxides (CO and CO2).

5.3. Special protective equipment and precautions for fire-fighters

Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing. On heating, there is a risk of bursting due to internal pressure build-up. Cool down the containers exposed to heat with a water spray. Fight fire from safe distance and protected location.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate area. Eliminate all ignition sources. Ventilate area. Wear suitable protective clothing. Do not get in eyes, on skin, or on clothing. Do not breathe vapors. Stop leak if safe to do so.

6.1.1. For non-emergency personnel

Protective equipment : Wear recommended personal protective equipment.

Emergency procedures : Evacuate unnecessary personnel. No flames, no sparks. Eliminate all sources of ignition. Ventilate spillage area. Do not breathe vapors. Do not get in eyes, on skin, or on clothing. Wear suitable protective clothing.

6.1.2. For emergency responders

No additional information available

RCC-CW001546

6.2. Environmental precautions

Avoid release to the environment. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up

For containment : Ventilate spillage area. Remove all sources of ignition. Use non-sparking tools. Absorb with an inert material and place in an appropriate waste disposal container. Recover large spills by pumping (use an explosion proof or hand pump). Control the vapors with a fine water spray. Do not flush down sewers.

Other information : Ensure all national/local regulations are observed.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For disposal of contaminated materials refer to section 13 : "Disposal considerations".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Ensure adequate ventilation. Do not breathe vapors. Avoid contact with eyes, skin and clothing. Wear personal protective equipment. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Flammable vapors can accumulate in head space of closed systems. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof equipment. Take precautionary measures against static discharge. Ground/bond container and receiving equipment. Use only non-sparking tools. Keep container closed when not in use. Do not re-use empty containers. Empty containers retain product residue and can be hazardous. Flammable vapors may accumulate in the container.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container tightly closed. Store in a well-ventilated place. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Methanol (67-56-1)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Methanol
ACGIH OEL TWA [ppm]	200 ppm
ACGIH OEL STEL [ppm]	250 ppm
Remark (ACGIH)	TLV® Basis: Headache; eye dam; dizziness; nausea. Notations: Skin; BEI
Regulatory reference	ACGIH 2021
USA - ACGIH - Biological Exposure Indices	
Local name	METHANOL
BEI (BLV)	15 mg/l Parameter: Methanol - Medium: urine - Sampling time: End of shift - Notations: B, Ns
Regulatory reference	ACGIH 2021
USA - OSHA - Occupational Exposure Limits	
Local name	Methyl alcohol

Methanol (67-56-1)	
OSHA PEL (TWA)	260 mg/m³
OSHA PEL (TWA)	200 ppm
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure adequate ventilation. Do not exceed the occupational exposure limits (OEL). Use spark-/explosionproof appliances and lighting system. Use explosion-proof equipment.

8.3. Individual protection measures/Personal protective equipment

Hand protection:

Wear Neoprene or nitrile rubber gloves. Consult supplier for specific recommendations.

Skin and body protection:

Use chemically protective clothing. Wear impervious rubber safety shoes

Respiratory protection:

In operations where exposure limits are exceeded or exposure levels are excessive, an approved respirator should be used. Respirator selection and use should be based on contaminant type, form and concentration. Follow applicable regulations and good Industrial Hygiene practice.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Appearance	:	Clear, colorless liquid.
Color	:	Colorless
Odor	:	Alcohol
Odor threshold	:	59 ppm
pH	:	No data available
Melting point	:	-144 °F Not applicable
Freezing point	:	-144 °F
Boiling point	:	148.1 °F
Flash point	:	51.8 °F
Relative evaporation rate (butyl acetate=1)	:	5.9
Relative evaporation rate (ether=1)	:	5.3
Flammability (solid, gas)	:	Not applicable.
Vapor pressure	:	12.8 kPa
Relative vapor density at 20 °C	:	1.11
Relative density	:	0.791 – 0.793
Molecular mass	:	32.04 g/mol
Solubility	:	Soluble in water. Soluble in acetone. Soluble in chloroform. Soluble in ether.
Partition coefficient n-octanol/water (Log Pow)	:	-0.82 – -0.66
Auto-ignition temperature	:	725 °F
Decomposition temperature	:	No data available
Viscosity, kinematic	:	No data available
Viscosity, dynamic	:	0.55 cP
Explosion limits	:	Lower explosive limit (LEL): 6 vol % Upper explosive limit (UEL): 36.5 vol %
Explosive properties	:	No data available
Oxidizing properties	:	No data available

RCC-CW001548

9.2. Other information

VOC content : 100 %

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Reacts with (strong) oxidizers. Fire and explosion hazards.

10.4. Conditions to avoid

Keep away from open flames, hot surfaces and sources of ignition.

10.5. Incompatible materials

Keep away from oxidizers, strong acids and strong bases. Hydrocarbons, halogenated.

10.6. Hazardous decomposition products

Thermal decomposition may produce : Carbon oxides (CO, CO2). Formic acid. Formaldehyde.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Toxic if swallowed.
Acute toxicity (dermal) : Toxic in contact with skin.
Acute toxicity (inhalation) : Toxic if inhaled.

Methanol	
ATE US (oral)	100 mg/kg body weight
ATE US (dermal)	300 mg/kg body weight
ATE US (vapors)	3 mg/l/4h
LD50 oral rat	1187 – 2769 mg/kg body weight Animal: rat
LD50 dermal rat	17100 mg/kg

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Not classified
Respiratory or skin sensitization : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified

Methanol (67-56-1)	
NOAEL (animal/male, F0/P)	< 1000 mg/kg body weight

STOT-single exposure : Causes damage to organs (optic nerve) (oral).
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified

RCC-CW001549

Viscosity, kinematic : No data available

Symptoms/effects : Toxic if inhaled. Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness. Toxic in contact with skin. Symptoms similar to those listed under ingestion. Toxic if swallowed. Causes damage to organs (optic nerve) (Ingestion). If swallowed there is a risk of blindness. Ingestion may cause nausea, vomiting and diarrhea. Depression of the central nervous system, headaches, dizziness, drowsiness, loss of coordination. May cause eye irritation.

Inhalation : Toxic if inhaled. Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness.

Skin : Toxic in contact with skin. Symptoms similar to those listed under ingestion.

Eyes : May cause eye irritation.

Ingestion : Toxic if swallowed. If swallowed there is a risk of blindness. Ingestion may cause nausea, vomiting and diarrhea. Depression of the central nervous system, headaches, dizziness, drowsiness, loss of coordination.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

Methanol (67-56-1)	
LC50 - Fish [1]	15400 mg/l Test organisms (species): Lepomis macrochirus
EC50 - Crustacea [1]	18260 mg/l Daphnia magna (Water flea)
NOEC (chronic)	208 mg/l Test organisms (species): Daphnia magna Duration: '21 d'

12.2. Persistence and degradability

Methanol (67-56-1)	
Persistence and degradability	Readily biodegradable.
ThOD	0

12.3. Bioaccumulative potential

Methanol	
BCF - Fish [1]	1 mg/l
Partition coefficient n-octanol/water (Log Pow)	-0.82 – -0.66
Bioaccumulative potential	No bioaccumulation.

12.4. Mobility in soil

Methanol	
Mobility in soil	Expected to be highly mobile in soil

12.5. Other adverse effects

No additional information available

RCC-CW001550

SECTION 13: Disposal considerations

13.1. Disposal methods

Regional legislation (waste) : Dispose in a safe manner in accordance with local/national regulations.

SECTION 14: Transport information

In accordance with Department of Transport / Transportation of Dangerous Goods / IMDG / IATA

DOT	TDG	IMDG	IATA
14.1. UN number			
1230	Not applicable	1230	1230
14.2. Proper Shipping Name			
Methanol	Not applicable	METHANOL	Methanol
14.3. Transport hazard class(es)			
3	Not applicable	3 (6.1)	3 (6.1)
Not applicable			
14.4. Packing group			
II	Not applicable	II	II
14.5. Environmental hazards			
Dangerous for the environment: No	Not applicable	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No
No supplementary information available			

14.6. Special precautions for user

DOT

UN-No.(DOT) : UN1230

DOT Special Provisions (49 CFR 172.102) : IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized.
T7 - 4 178.274(d)(2) Normal..... 178.275(d)(3)
TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.

DOT Packaging Exceptions (49 CFR 173.xxx) : 150

DOT Packaging Non Bulk (49 CFR 173.xxx) : 202

DOT Packaging Bulk (49 CFR 173.xxx) : 242

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 1 L

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	60 L
DOT Vessel Stowage Location	:	B - (i) The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) ‘‘On deck only’’ on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.
DOT Vessel Stowage Other	:	40 - Stow ‘‘clear of living quarters’’

TDG

Emergency Response Guide (ERG) Number	:	131

IMDG

Special provision (IMDG)	:	279
Limited quantities (IMDG)	:	1 L
Excepted quantities (IMDG)	:	E2
Packing instructions (IMDG)	:	P001
IBC packing instructions (IMDG)	:	IBC02
Tank instructions (IMDG)	:	T7
Tank special provisions (IMDG)	:	TP2
EmS-No. (Fire)	:	F-E - FIRE SCHEDULE Echo - NON-WATER-REACTIVE FLAMMABLE LIQUIDS
EmS-No. (Spillage)	:	S-D - SPILLAGE SCHEDULE Delta - FLAMMABLE LIQUIDS
Stowage category (IMDG)	:	B
Flash point (IMDG)	:	12°C c.c.
Properties and observations (IMDG)	:	Colourless, volatile liquid. Flashpoint: 12°C c.c. Explosive limits: 6% to 36.5% Miscible with water.Toxic if swallowed; may cause blindness. Avoid skin contact.

IATA

PCA Excepted quantities (IATA)	:	E2
PCA Limited quantities (IATA)	:	Y341
PCA limited quantity max net quantity (IATA)	:	1L
PCA packing instructions (IATA)	:	352
PCA max net quantity (IATA)	:	1L
CAO packing instructions (IATA)	:	364
CAO max net quantity (IATA)	:	60L
Special provision (IATA)	:	A113
ERG code (IATA)	:	3L

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

Methanol (67-56-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313 Listed on EPA Hazardous Air Pollutant (HAPS)	
CERCLA RQ	5000 lb

RCC-CW001552

15.2. International regulations

CANADA

Methanol (67-56-1)
Listed on the Canadian DSL (Domestic Substances List)

National regulations

No additional information available

15.3. US State regulations

Methanol (67-56-1)					
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significant risk level (NSRL)	Maximum allowable dose level (MADL)
No	Yes	No	No		47000 µg/day (inhalation); 23,000 µg/day (oral)

Component	State or local regulations
Methanol(67-56-1)	U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities; U.S. - Massachusetts - Right To Know List; U.S. - New Jersey - Right to Know Hazardous Substance List

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Full text of H-phrases	
H225	Highly flammable liquid and vapor
H301	Toxic if swallowed
H311	Toxic in contact with skin
H331	Toxic if inhaled
H370	Causes damage to organs

Abbreviations and acronyms	
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level

RCC-CW001553

Abbreviations and acronyms	
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disrupting properties

Safety Data Sheet (SDS), USA

The information and recommendations herein are taken from data contained in independent industry-recognized references and are believed to be accurate and represent the best information currently available to us. Southern Chemical Corporation makes no representation or warranties, either expressed or implied, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein to the product to which the information refers. Users should conduct their own investigations to determine the suitability of the information to their particular purpose. Accordingly, Southern Chemical Corporation will not be responsible for loss or damages resulting from use of or reliance upon this information.

SAFETY DATA SHEET

Revision Date 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Molybdenum powder**

Cat No. : **10031**

CAS-No 7439-98-7
Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable solids	Category 2
Reproductive Toxicity	Category 1B
Specific target organ toxicity (single exposure)	Category 2

Label Elements

Signal Word
Danger

Hazard Statements
Flammable solid
May damage fertility or the unborn child
May cause damage to organs

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Response
IF exposed or concerned: Get medical attention/advice
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Molybdenum	7439-98-7	99.99

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

Inhalation Remove from exposure, lie down. Remove to fresh air.

Ingestion Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. If possible drink milk afterwards.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available

Method -	No information available
Autoignition Temperature	Not applicable
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Contact with water liberates toxic gas. Water reactive. Produce flammable gases on contact with water.

Hazardous Combustion Products
Thermal decomposition can lead to release of irritating gases and vapors.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2 *	2	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required.
Environmental Precautions	See Section 12 for additional Ecological Information.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

Handling	Avoid contact with skin and eyes. Avoid contact with skin and clothing. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Avoid breathing vapors or mists. Do not ingest. If swallowed then seek immediate medical assistance. Wash thoroughly after handling.
Storage	Keep away from water or moist air.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Molybdenum	TWA: 10 mg/m³ TWA: 3 mg/m³	(Vacated) TWA: 10 mg/m³	IDLH: 5000 mg/m³	TWA: 10 mg/m³ TWA: 3 mg/m³

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *NIOSH - National Institute for Occupational Safety and Health*

Engineering Measures	Ensure adequate ventilation, especially in confined areas. Ventilation systems.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Grey
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	2622 °C / 4751.6 °F
Boiling Point/Range	4825 °C / 8717 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	10.28
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	Mo
Molecular Weight	95.94

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Strong oxidizing agents, Oxidizing agent
Hazardous Decomposition Products	Thermal decomposition can lead to release of irritating gases and vapors
Hazardous Polymerization	No information available.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information	No acute toxicity information is available for this product
Component Information	
Toxicologically Synergistic Products	No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Molybdenum	7439-98-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

.

Persistence and Degradability Insoluble in water

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3089
Proper Shipping Name METAL POWDERS, FLAMMABLE, N.O.S.
Technical Name Molybdenum
Hazard Class 4.1
Packing Group II

TDG

UN-No UN3089
Proper Shipping Name Metal powder, flammable, n.o.s.
Hazard Class 4.1
Packing Group II

IATA

UN-No UN3089
Proper Shipping Name Metal powder, flammable, n.o.s.
Hazard Class 4.1
Packing Group II

IMDG/IMO

UN-No	UN3089
Proper Shipping Name	Metal powder, flammable, n.o.s.
Hazard Class	4.1
Packing Group	II

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Molybdenum	7439-98-7	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Molybdenum	7439-98-7	X	-	231-107-2	X	X	X	X	KE-25427

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Molybdenum	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Revision Date 14-Feb-2020
Print Date 14-Feb-2020
Revision Summary SDS authoring systems update, replaces ChemGes SDS No. 7439-98-7/1.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 6.7
Revision Date 08/17/2021
Print Date 08/29/2021

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Nitric acid

Product Number : 225711
Brand : Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Oxidizing liquids (Category 3), H272
Corrosive to Metals (Category 1), H290
Acute toxicity, Inhalation (Category 3), H331
Skin corrosion (Category 1A), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Hazard statement(s)

H272	May intensify fire; oxidizer.
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H331	Toxic if inhaled.

Precautionary statement(s)

P210	Keep away from heat.
P220	Keep/Store away from clothing/ combustible materials.
P221	Take any precaution to avoid mixing with combustibles.
P234	Keep only in original container.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P390	Absorb spillage to prevent material damage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Corrosive to the respiratory tract.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
nitric acid			
CAS-No. EC-No. Index-No. Registration number	7697-37-2 231-714-2 007-004-00-1 01-2119487297-23-XXXX	Ox. Liq. 2; Met. Corr. 1; Acute Tox. 3; Skin Corr. 1A; Eye Dam. 1; H272, H290, H331, H314, H318 Concentration limits: >= 1 %: Met. Corr. 1, H290; 0 - < 70.0001 %: Acute Tox. 3, H331; >= 70.0001 %: Acute Tox. 1, H330; >= 20 %: Skin	>= 70 - < 70.0001 %

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	Corr. 1A, H314; 5 - < 20 %: Skin Corr. 1B, H314; 65 - < 99 %: Ox. Liq. 3, H272; >= 99 %: Ox. Liq. 2, H272; >= 3 %: Eye Dam. 1, H318; 1 - < 3 %: Eye Irrit. 2, H319; 1 - < 5 %: Skin Irrit. 2, H315;	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nitrogen oxides (NOx)
Not combustible.
Has a fire-promoting effect due to release of oxygen.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
No metal containers.
Tightly closed. Keep locked up or in an area accessible only to qualified or authorized persons. Do not store near combustible materials.

Storage class
Storage class (TRGS 510): 5.1B: Oxidizing hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
nitric acid	7697-37-2	TWA	2 ppm	USA. ACGIH Threshold Limit Values (TLV)
		STEL	4 ppm	USA. ACGIH Threshold Limit Values (TLV)
		ST	4 ppm 10 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	2 ppm 5 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	2 ppm 5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	2 ppm 5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	4 ppm 10 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 120 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Acid-resistant protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	< 1.0
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	120.5 °C 248.9 °F - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	49 hPa at 50 °C (122 °F)
l)	Vapor density	No data available
m)	Density	1.413 g/cm3 at 20 °C (68 °F) - lit.
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

p)	Autoignition temperature	Not applicable
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	The substance or mixture is classified as oxidizing with the category 3.

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Alkali metals, Organic materials, Acetic anhydride, Acetonitrile, Alcohols, Acrylonitrile, Ammonia, Crotonaldehyde, Halogenated hydrocarbon, Acids, Bases, Metals, hexalithium disilicide, Hydrogen peroxide, Ketones, metal acetylides, Water, Fluorine, Amines, Thiols, cadmium, Bromine, Copper, Hydrazine, Hydrazinium nitrate, Nitro compounds, Cyanides, Phosphorus trihydride (phosphine), Diphosphine, Halides, Organic halides, May set fire to wood or paper., Polyethers, Methyl vinyl etherMetals

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Mixture

Acute toxicity
Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.
Acute toxicity estimate Inhalation - 4 h - 3.57 mg/l
(Calculation method)
Symptoms: Possible symptoms:, mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract
Dermal: No data available

Skin corrosion/irritation
Mixture causes severe burns.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Serious eye damage/eye irritation
Mixture causes serious eye damage. Risk of blindness!

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Inhalation may provoke the following symptoms:, spasm, inflammation and edema of the bronchi, spasm, inflammation and edema of the larynx, pneumonitis, pulmonary edema, Symptoms and signs of poisoning are:, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed., Large doses may cause: conversion of hemoglobin to methemoglobin, producing cyanosis; marked fall in blood pressure, leading to collapse, coma, and possibly death.
Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Components

nitric acid

Acute toxicity
Oral: No data available
Acute toxicity estimate Inhalation - 4 h - 2.5 mg/l
(Expert judgment)
Dermal: No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Causes severe burns.
Remarks: (IUCLID)
Causes poorly healing wounds.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes burns.
Remarks: (IUCLID)
Causes serious eye damage.

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity

Mixture
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

Components

nitric acid
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 2031 Class: 8 (5.1) Packing group: II
Proper shipping name: Nitric acid
Reportable Quantity (RQ): 1428 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 2031 Class: 8 (5.1) Packing group: II EMS-No: F-A, S-Q
Proper shipping name: NITRIC ACID

IATA
UN number: 2031 Class: 8 (5.1) Packing group: II
Proper shipping name: Nitric acid
IATA Passenger: Not permitted for transport

SECTION 15: Regulatory information

SARA 302 Components

	CAS-No.	Revision Date
nitric acid	7697-37-2	2007-07-01

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
nitric acid	7697-37-2	2007-07-01

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.7 Revision Date: 08/17/2021 Print Date: 08/29/2021

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Creation Date 04-Feb-2011 **Revision Date** 25-Apr-2019 **Revision Number** 6

1. Identification

Product Name **Nickel atomic absorption standard solution**

Cat No. : **AC196150000; AC196151000; AC196155000**

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Skin Corrosion/irritation	Category 1 A
Serious Eye Damage/Eye Irritation	Category 1
Respiratory Sensitization	Category 1
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals
Causes severe skin burns and eye damage
May cause respiratory irritation

May cause cancer by inhalation
May damage the unborn child

Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
In case of inadequate ventilation wear respiratory protection
Use only outdoors or in a well-ventilated area
Keep only in original container
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Spills
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects
WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	<98
Nitric acid	7697-37-2	2-5
Nickel(II) nitrate, hexahydrate (1:2:6)	13478-00-7	0.5

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical

attention is required.

Inhalation Move to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required. If not breathing, give artificial respiration.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms and effects Causes eye burns. May cause allergic skin reaction. Causes burns by all exposure routes. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Nitrogen oxides (NOx)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Environmental Precautions Should not be released into the environment. Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not breathe vapors/dust. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Nitric acid	TWA: 2 ppm STEL: 4 ppm	(Vacated) TWA: 2 ppm (Vacated) TWA: 5 mg/m³ (Vacated) STEL: 4 ppm (Vacated) STEL: 10 mg/m³ TWA: 2 ppm TWA: 5 mg/m³	IDLH: 25 ppm TWA: 2 ppm TWA: 5 mg/m³ STEL: 4 ppm STEL: 10 mg/m³	TWA: 2 ppm STEL: 4 ppm
Nickel(II) nitrate, hexahydrate (1:2:6)	TWA: 0.1 mg/m³	(Vacated) TWA: 0.1 mg/m³	IDLH: 10 mg/m³ TWA: 0.015 mg/m³	TWA: 0.1 mg/m³

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Blue green
Odor	Odorless
Odor Threshold	No information available
pH	< 1
Melting Point/Range	No data available
Boiling Point/Range	101 °C / 213.8 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	1.032
Solubility	miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available

Decomposition Temperature No information available
Viscosity No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong bases, Strong reducing agents

Hazardous Decomposition Products Nitrogen oxides (NOx)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions Corrosive to metals.

11. Toxicological information

Acute Toxicity

Product Information
Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	Not listed	Not listed
Nitric acid	Not listed	Not listed	LC50 = 2500 ppm. (Rat) 1h
Nickel(II) nitrate, hexahydrate (1:2:6)	LD50 = 1620 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes eye burns Irritating to skin

Sensitization No information available

Carcinogenicity This product contains one or more substances which are classified by IARC as carcinogenic to humans (Group I), probably carcinogenic to humans (Group 2A) or possibly carcinogenic to humans (Group 2B). The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Nitric acid	7697-37-2	Not listed	Not listed	Not listed	Not listed	Not listed
Nickel(II) nitrate, hexahydrate (1:2:6)	13478-00-7	Group 1	Known	Not listed	X	Not listed

IARC: (International Agency for Research on Cancer)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects Product is or contains a chemical which is a known or suspected reproductive hazard.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nitric acid	Not listed	LC50: = 72 mg/L, 96h (Gambusia affinis)	Not listed	Not listed

Persistence and Degradability Soluble in water Persistence is unlikely based on information available. Miscible with water

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Nitric acid	-2.3

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2031
Proper Shipping Name NITRIC ACID
Hazard Class 8
Subsidiary Hazard Class 5.1
Packing Group II

TDG

UN-No UN2031
Proper Shipping Name NITRIC ACID
Hazard Class 8
Packing Group II

IATA

UN-No UN2031
Proper Shipping Name NITRIC ACID
Hazard Class 8

Packing Group II

IMDG/IMO

UN-No UN2031
Proper Shipping Name NITRIC ACID
Hazard Class 8
Packing Group II

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Nitric acid	7697-37-2	X	ACTIVE	-
Nickel(II) nitrate, hexahydrate (1:2:6)	13478-00-7	-	-	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	-	X	X	KE-35400
Nitric acid	7697-37-2	X	-	231-714-2	X	X	X	X	KE-25911
Nickel(II) nitrate, hexahydrate (1:2:6)	13478-00-7	-	-	-	X	-	X	X	-

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nitric acid	7697-37-2	2-5	1.0
Nickel(II) nitrate, hexahydrate (1:2:6)	13478-00-7	0.5	0.1 1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nitric acid	X	1000 lb	-	-
Nickel(II) nitrate, hexahydrate (1:2:6)	-	-	X	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Nickel(II) nitrate, hexahydrate (1:2:6)	X		-

OSHA - Occupational Safety and Health Administration Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Nitric acid	-	TQ: 500 lb

CERCLA Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nitric acid	1000 lb	1000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Nickel(II) nitrate, hexahydrate (1:2:6)	13478-00-7	Carcinogen Developmental Male Reproductive	-	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Nitric acid	X	X	X	X	X
Nickel(II) nitrate, hexahydrate (1:2:6)	-	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product contains the following DHS chemicals:
Legend - STQs = Screening Threshold Quantities, APA = A placarded amount

Component	DHS Chemical Facility Anti-Terrorism Standard
Nitric acid	Release STQs - 15000lb Theft STQs - 400lb

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 04-Feb-2011
Revision Date 25-Apr-2019
Print Date 25-Apr-2019
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Safety Data Sheet

Revision: 2/9/2021

Ethanedioic acid dihydrate

Section 1 - Chemical Product and Company Identification

Glentronics, Inc
645 Heathrow Drive, Lincolnshire, IL 60069
Tel: +1 (847) 415 6400 - Fax: +1 (847) 415 6410
stopflooding.com

Product/Chemical Name: **Oxalic Acid, Dihydrate**
Chemical Formula: $C_2H_2O_4.2H_2O$
CAS Number: 6153-56-6
Other Designations: Ethanedioic acid dihydrate
Emergency Telephone: CHEMTREC 1-703-527-3887 (International); 1-800-424-9300 (North America)
General Use: **THIS PRODUCT IS NOT INTENDED FOR USE IN PESTICIDES**

Section 2 - Hazards Identification

HMIS	
H	2
F	0
R	0
PPE†	
†Sec. 8	

Potential Health Effects

Primary Entry Routes: Inhalation; skin and/or eye contact
Target Organs: Kidneys, eyes, skin and mucous membranes
HAZARDS IDENTIFICATION
Classification of the substance or mixture
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Dermal (Category 4), H312
Serious eye damage (Category 1), H318
GHS Label elements, including precautionary statements
Pictogram

Signal word Danger

Hazard statement(s)
H302 + H312 Harmful if swallowed or in contact with skin
H318 Causes serious eye damage.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear eye protection/ face protection.
P280 Wear protective gloves/ protective clothing.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P363 Wash contaminated clothing before reuse.
P501 Dispose of contents/ container to an approved waste disposal plant.
Hazards not otherwise classified (HNOC) or not covered by GHS - none
Acute Effects
Inhalation: May cause irritation of the upper respiratory tract with pain, burns and inflammation.
Eye: Contact with eyes may cause severe irritation, and possible eye burns.
Skin: Prolonged and/or repeated contact may cause irritation and/or dermatitis. Contact with skin causes irritation and positive burns, especially if the skin is wet or moist.
Ingestion: Cause gastrointestinal tract burns. May cause kidney damage. Cause severe pain, nausea, vomiting, diarrhea, and shock. May cause hemorrhaging of the digestive tract.

Carcinogenicity: IARC, NTP, OSHA and Prop 65 do not list this product as a carcinogen.
Medical Conditions Aggravated by Long-Term Exposure: Over exposure can cause hypocalcaemia and kidney injury
Chronic Effects: Not available.

Section 3 - Composition / Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
6153-56-6	Oxalic Acid, Dihydrate (Ethanedioic acid, Dihydrate)	100%	205-634-3

Appearance/General Info:

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Oxalic Acid, Dihydrate (Ethanedioic acid, Dihydrate)	1 mg/m^3	2 mg/m^3	None listed

Section 4 - First Aid Measures

Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately.
Eye Contact: Immediately flush eyes with plenty of water for at lease 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately
Skin Contact: Immediately flush skin with plenty of water for at lease 15 minutes, while removing contaminated clothing and shoes. DIscard contaminated clothing in a manner, which limits further exposure. Get medical aid immediately
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: Treat symptomatically and supportively.
Antidote: The use of Calcium gluconate to precipitate the oxalate should be determined by only qualified Medical personnel

Section 5 - Fire-Fighting Measures

Flash Point: 157 °C (314.6 °F)
Flash Point Method:
Burning Rate: NA
Autoignition Temperature: NA
LEL: NA
UEL: NA
Flammability Classification: NA
Extinguishing Media: For small fires, use water spray, dry chemical, carbon dioxide or chemical foam.
Unusual Fire or Explosion Hazards: Decomposes at melting point.
Hazardous Combustion Products: NA
Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.
Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full-face piece operated in pressure-demand or positive-pressure mode.

Section 6 - Accidental Release Measures

Spill /Leak Procedures: Absorb spill with inert material, (e.g., dry sand or earth), then place into a chemical waste container. Clean up spills immediately, observing precautions in the protective equipment selection.
Large Spills
Containment: For large spills, dike far ahead of liquid spill for later disposal. Do not release into sewers or waterways.
Cleanup: Absorb the liquid and scrub the area with detergent and water.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Wash thoroughly after handling. Use only in a well ventilated area. Do not get on skin or in eyes. Do not ingest or inhale.
Storage Requirements: Store in tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.
Regulatory Requirements:

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible limits.

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.
Administrative Controls:
Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear an MSHA/NIOSH-approved respirator.
Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.
Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance and Odor: White, Odorless
Odor Threshold: N/A
Vapor Pressure: Negligible
Vapor Density (Air=1): 4.3
Formula Weight: 126.04
Density/Specific Gravity (H_2O=1, at 4 °C): 1.65
pH: 1.3 (0.1M Solution)

Water Solubility: 138 gm/L 20 °C
Other Solubilities:
Boiling Point: NA
Freezing/Melting Point: 216 °F sublimes
Viscosity: NA
Refractive Index: NA
Surface Tension: NA
% Volatile: NA
Evaporation Rate: Negligible

Section 10 - Stability and Reactivity

Stability: stable under normal temperature and pressure.
Polymerization: Has not been reported.
Chemical Incompatibilities: React with furfuryl alcohol, silver, sodium chloride, and sodium hypochlorite. Contact with oxidizing materials may result in an explosive reaction
Conditions to Avoid: Incompatible materials, combustible materials, alkaline materials, strong oxidants.
Hazardous Decomposition Products: CO, CO_2

Section 11- Toxicological Information

Toxicity Data:*

Acute toxicity
LD50 Oral - Rat - 1,080 mg/kg
Inhalation: No data available
Skin corrosion/irritation
Skin – Rabbit -Result: Mild skin irritation
Serious eye damage/eye irritation
Eyes – Rabbit-Result: Risk of serious damage to eyes.
Respiratory or skin sensitization ; No data available

Chronic Effects: no data available.
Carcinogenicity: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA
Mutagenicity: no data available.
Teratogenicity: no data available.

Section 12 - Ecological Information

Ecotoxicity: Shore crab LC50 = 240 mg/L/48H Chronic plant toxicity = 100 ppm
Environmental Fate: not available.
Environmental Degradation: not available.
Soil Absorption/Mobility: not available.

Section 13 - Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.
Disposal Regulatory Requirements: Not listed as a banned from land disposal according to RCRA.
Container Cleaning and Disposal: NA

Section 14 - Transport Information

Not regulated for transportation

US DOT(49 CFR 172.101): PSN: Hazard Class: UN Number: Packing Group:	**IATA** PSN: Hazard Class: UN Number: Packing Group:
TDG PSN: Hazard Class: UN Number: Packing Group:	**IMDG/IMO** PSN: Hazard Class: UN Number: Packing Group:

Section 15 - Regulatory Information

US Federal TSCA Regulations:

CAS# 6153-56-6 is not a TSCA Inventory. It is a hydrate and exempt from TSCA Inventory requirements (10CFR.3(u)(2))

Health Safety Reporting List

None of the Chemicals are on the Health & Safety reporting list

SARA Section 302 (RQ)

None of the chemicals in this material have an RQ

Section 302 (TPQ)

None of the chemicals in this material have a TPQ

Section 313

None of the chemicals reportable under Section 313

Clean Air Act

This Material does not contain any Hazardous air pollutants

This Material does not contain any Class 1 Ozone depletors

This Material does not contain any Class 2 Ozone depletors

Clean Water Act

None of the chemicals in this product are listed as Hazardous Substance under the CWA

None of the chemicals in this product are listed as priority Pollutants under the CWA

None of the chemicals in this product are listed as Toxic Pollutants under the CWA

OSHA

OSHA considers none of the chemicals in this product highly hazardous

STATE

Oxalic acid Dihydrate can be found on the following state right to know lists: Pennsylvania.

California No Significant Risk Level:

None of the chemicals in this product are listed.

International Regulations

European labeling in accordance with EC Directives.

Hazard symbols: XN

CAS # 6153-56-6 is not listed on Canada's Ingredient Disclosure list.

None of the chemicals in this product are listed on the DSL/NDSL list. This product has a WHMIS classification of D1B, E.

Section 16 - Other Information

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Glentronics, Inc. be liable for any claims, losses, or damage of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Glentronics, Inc. has been advised of the possibility of such damages.

Safety Data Sheet

Phenolphthalein

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Phenolphthalein

Synonyms/Generic Names: 3,3-Bis(4-hydroxyphenyl)-1(3H)-isobenzofuranone; 3,3-Bis(p-hydroxyphenyl)phthalide; Agoral; Alophen; alpha-(p-Hydroxyphenyl)-alpha-(4-oxo-2,5-cyclohexadien-1-ylidene)-o-toluic acid; alpha Di(phydroxyphenyl)phthalide; Colax; Correctol; Dialose Ex-Lax

Product Number: 4005

Product Use: Industrial, Manufacturing or Laboratory use

Manufacturer: Columbus Chemical Industries, Inc.
N4335 Temkin Rd.
Columbus, WI. 53925

For More Information Call: 920-623-2140 (Monday-Friday 8:00-4:30)
www.columbuschemical.com

In Case of Emergency Call: CHEMTREC - 800-424-9300 or 703-527-3887 (24 Hours/Day, 7 Days/Week)

2. HAZARDS IDENTIFICATION

Target Organs: Adrenal medulla, Kidney, Thymus, Bowel

Signal Word: Danger

Pictograms:

GHS Classification:

Germ cell mutagenicity	Category 2
Carcinogenicity	Category 1B
Reproductive toxicity	Category 2

GHS Label Elements, including precautionary statements:

Hazard Statements:

H341	Suspected of causing genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.

Precautionary Statements:

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P405	Store locked up.

P501	Dispose of contents/container in accordance with local regulations.

Potential Health Effects

Eyes	May cause eye irritation.
Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Ingestion	May be harmful if swallowed.

NFPA Ratings

Health	1
Flammability	1
Reactivity	0
Specific hazard	Not Available

HMIS Ratings

Health	1
Fire	1
Reactivity	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Weight %	CAS #	EINECS# / ELINCS#	Formula	Molecular Weight
Phenolphthalein	>99	77-09-8	201-004-7	$C_{20}H_{14}O_4$	318.32 g/mol

4. FIRST-AID MEASURES

Eyes	Rinse with plenty of water for at least 15 minutes and seek medical attention.
Inhalation	Move casualty to fresh air and keep at rest. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Skin	Flush with plenty of water for at least 15 minutes while removing contaminated clothing and wash using soap. Get medical attention.
Ingestion	**Do Not Induce Vomiting!** Never give anything by mouth to an unconscious person. If conscious, wash out mouth with water. Get medical attention.

5. FIRE-FIGHTING MEASURES

Suitable (and unsuitable) extinguishing media	May be combustible at high temperature. Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use appropriate media for adjacent fire. Cool containers with water.
Special protective equipment and precautions for firefighters	Wear self-contained, approved breathing apparatus and full protective clothing, including eye protection and boots.
Specific hazards arising from the chemical	Emits toxic fumes (carbon oxides) under fire conditions. (See also Stability and Reactivity section).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	See section 8 for recommendations on the use of personal protective equipment.
Environmental precautions	Prevent spillage from entering drains. Any release to the environment may be subject to federal/national or local reporting requirements.
Methods and materials for containment and cleaning up	Sweep up and place in suitable, closed containers for disposal. Clean surfaces thoroughly with water to remove residual contamination. Dispose of all waste and cleanup materials in accordance with regulations.

7. HANDLING AND STORAGE

Precautions for safe handling
See section 8 for recommendations on the use of personal protective equipment. Use with adequate ventilation. Wash thoroughly after using. Keep container closed when not in use. Avoid formation of dusts.

Conditions for safe storage, including any incompatibilities
Store in cool, dry well ventilated area. Keep away from incompatible materials (see section 10 for incompatibilities).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure controls: Contains no substances with occupational exposure limit values.

Personal Protection

Eyes	Wear chemical safety glasses or goggles.
Inhalation	Provide local exhaust, preferably mechanical. If exposure levels are excessive, use an approved respirator.
Skin	Wear nitrile or rubber gloves, apron or lab coat. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Other	Not Available

Other Recommendations
Provide eyewash stations, quick-drench showers and washing facilities accessible to areas of use and handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color, etc.)	White to off white crystals.
Odor	Odorless.
Odor threshold	Not Available
pH	Not Available
Melting point/freezing point	260°C (500°F)
Initial boiling point and boiling range	>450°C (842°F)
Flash point	Not Flammable
Evaporation rate	Not Available
Flammability (solid, gas)	Not Flammable
Upper/lower flammability or explosive limit	Not Explosive
Vapor pressure	<0000001hPa at 20°C (68°F)
Vapor density	Not Available
Density	1.296 g/cm3 at 20°C (68°F)
Solubility (ies)	0.00336 g/l at 20°C (68°F)
Partition coefficient: n-octanol/water	low Pow 0.9 at 25°C (77°F)
Auto-ignition temperature	397°C (746.6°F)
Decomposition temperature	Not Available

10. STABILITY AND REACTIVITY

Chemical Stability	Stable
Possibility of Hazardous Reactions	Will not occur.
Conditions to Avoid	Not Available

Incompatible Materials	Strong oxidizing agents.
Hazardous Decomposition Products	Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Phenolphthalein

Skin	Not Available
Eyes	Not Available
Respiratory	Not Available
Ingestion	Not Available

Carcinogenicity

IARC	2B - Group 2B: Possibly carcinogenic to humans (Phenolphthalein).
ACGIH	No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP	2: Reasonably anticipated to be carcinogens (Phenolphthalein).
OSHA	No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs & Symptoms of Exposure

Skin	Irritation, redness, itchiness.
Eyes	Irritation, redness, watering eyes, itchiness.
Respiratory	Irritation, coughing, wheezing.
Ingestion	Irritation, nausea, vomiting, diarrhea. Phenolphthalein acts as a laxative.

Chronic Toxicity	Possible human carcinogen. -Carcinogenicity - rat – Oral; Tumorigenic: Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder: Tumors. Endocrine: Adrenal cortex tumors. -Carcinogenicity - mouse – Oral; Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. Skin and Appendages: Other: Tumors.
Teratogenicity	Not Available
Mutagenicity	In vitro tests showed mutagenic effects. -Genotoxicity in vitro - Hamster – ovary; Cytogenetic analysis -Genotoxicity in vivo - mouse – Oral; Micronucleus test
Embryotoxicity	Not Available
Specific Target Organ Toxicity	Not Available
Reproductive Toxicity	Suspected human reproductive toxicant.
Respiratory/Skin Sensitization	Not Available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Phenolphthalein

Aquatic Vertebrate	Not Available
Aquatic Invertebrate	Not Available
Terrestrial	Not Available
Persistence and Degradability	Not Available
Bioaccumulative Potential	Not Available
Mobility in Soil	Not Available
PBT and vPvB Assessment	Not Available
Other Adverse Effects	Not Available

13. DISPOSAL CONSIDERATIONS

Waste Product or Residues	Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product or residue.
Product Containers	Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product may significantly change the characteristics of the material and alter the waste classification and proper disposal methods.

14. TRANSPORTATION INFORMATION

US DOT	Not Dangerous Goods
TDG	Not Dangerous Goods
IMDG	Not Dangerous Goods
Marine Pollutant	No
IATA/ICAO	Not Dangerous Goods

15. REGULATORY INFORMATION

TSCA Inventory Status	All ingredients are listed on the TSCA Active inventory.
DSL / NDSL	All ingredients are listed on the DSL inventory.
California Proposition 65	Listed: Phenolphthalein
Massachusetts: Toxic or Hazardous Substance List	Listed: Phenolphthalein
New Jersey: Right to Know Hazardous Substance List	Listed: Phenolphthalein
Pennsylvania: Hazardous Substance List	Not Listed
Rhode Island: Hazardous Substance List	Not Listed
SARA 302	Not Listed
SARA 304	Not Listed
SARA 311	Chronic Health Hazard
SARA 312	Chronic Health Hazard
SARA 313	Listed: Phenolphthalein
WHMIS Canada	Class D2A – Poisonous and infectious material – other effects – Very toxic Class D2B - Poisonous and infectious material – other effects – Toxic

16. OTHER INFORMATION

Revision	Date
Revision 1	08-02-2012
Revision 2	11/20/2013
Revision 3	02/23/2015
Revision 4	04/08/2021

Disclaimer: The information provided in this Safety Data Sheet (“SDS”) is correct to the best of our knowledge, information and belief at the date of publication. The information in this SDS relates only to the specific Product identified under Section 1, and does not relate to its use in combination with other materials or products, or its use as to any particular process. Those handling, storing or using the Product should satisfy themselves that they have current information regarding the particular way the Product is handled, stored or used and that the same is done in accordance with federal, state and local law. WE DO NOT MAKE ANY WARRANTY, EXPRESS OR IMPLIED, INCLUDING (WITHOUT LIMITATION) WARRANTIES WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN OR WITH RESPECT TO FITNESS FOR ANY PARTICULAR USE. WE DO NOT ASSUME RESPOSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, INJURY, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THIS PRODUCT.

AccuStandard, Inc.
125 Market St., New Haven, CT 06513 USA
Tel: 203-786-5290 Fax: 203-786-5287

SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 - Product Identifiers

Catalog Name: AA41W-1

Description: Phosphorus AA Standard

1.2 - Relevant Identified Uses of the Substance or Mixture

Laboratory Chemical Reference Material

1.3 - Supplier Details

Company: AccuStandard, Inc.
125 Market St.
New Haven, CT 06513 USA

Telephone Number: 203-786-5290

Fax: 203-786-5287

Email: edocs@accustandard.com

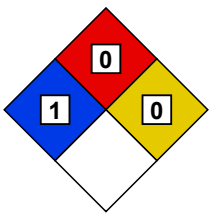
1.4 - Emergency Telephone Number

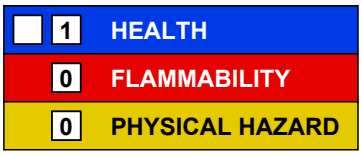
Emergency Phone #: AccuStandard, Inc.
1-203-502-7070 (USA)
+001-203-502-7070 (International)

24 hours / 7 days a week

SECTION 2 - HAZARDS IDENTIFICATION

2.1 - GHS Label Elements





Signal Word: Warning

Hazard Codes:

H335 - May be irritating to mucous membrane and upper respiratory system. (Specific target organ toxicity, single exposure; Respiratory tract irritation, category 3)

Precautionary Codes:

P202 - This product should only by used by persons trained in the safe handling of hazardous chemicals.

P233 - Store in a tightly closed container. (P404)

P262 - Do not get in eyes, on skin or clothing.

P264 - Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

SECTION 2 - HAZARDS IDENTIFICATION *- continued*

2.1 - GHS Label Elements *- continued*

P284 - Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), or a risk assessment shows air-purifying respirators are appropriate, use of a NIOSH/MSHA approved air supplied respirator is advised. Use a full-face respirator with multi-purpose combination (US) or type ABEK (EN14387) respirator cartridges in absence of proper environmental control. Always use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Engineering and/or administrative controls should be implemented to reduce exposure.

P330 - Ingestion: Wash out mouth with water. Never give anything by mouth to an unconscious person. Call a physician or poison control center if adverse effects develop.

P338 - Eye contact: Immediately flush with plenty of water. After initial flushing, remove and contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

P360 - Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

2.2 - Other Hazards

2.2.2 - Potential Health Effects

May be irritating to eyes.

May be irritating to skin.

May be irritating to mucous membrane and upper respiratory system. (Specific target organ toxicity, single exposure; Respiratory tract irritation, category 3)

May be harmful if inhaled. (Acute toxicity, inhalation, category 5)

May be harmful if swallowed. (Acute toxicity, oral, category 5)

2.2.3 - Routes of Entry

Inhalation, ingestion or skin contact.

2.2.4 - Carcinogenicity

This product is or contains a component that is not listed (ACGIH, IARC, NTP, OSHA) as a cancer causing agent.

SECTION 3 - COMPOSITION / ANALYTES DATA

Description: Phosphorus AA Standard

Synonyms: N/A

Molecular Weight: N/A

Molecular Formula: N/A

			ACGIH -TLV (mg/m³)			OSHA -PEL (mg/m³)		
Analyte	CAS #	% Concentration	TWA	STEL	Skin	TWA	STEL	Skin
Ammonium phosphate monobasic	7722-76-1	0.371						
Water	7732-18-5	99.629						

SECTION 4 - FIRST AID MEASURES

4.1 - First Aid Procedures - General

Get medical assistance for all cases of overexposure.

4.2 - Eye Contact

Eye contact: Immediately flush with plenty of water. After initial flushing, remove and contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. (P338)

SECTION 4 - FIRST AID MEASURES *- continued*

4.3 - Skin Contact

Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse. (P360)

4.4 - Inhalation

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

4.5 - Ingestion

Ingestion: Wash out mouth with water. Never give anything by mouth to an unconscious person. Call a physician or poison control center if adverse effects develop. (P330)

SECTION 5 - FIRE FIGHTING MEASURES

5.1 - Flammable Properties

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

5.2 - Extinguishing Media

Use any extinguishing media suitable for adjacent material.

5.3 - Protection of Firefighters

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

6.1 - Spill Response

Wear a self-contained breathing apparatus and appropriate Personal protection. Prevent contact with skin or eyes. Ventilate area. Stop leak if you can do so without risk. Absorb on sand or vermiculite, take up and containerize for proper disposal. Flush spill area with water. Comply with Federal, State, and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tightly closed container. (P404)

Store at controlled room temperature.

Avoid breathing vapors or mists.

Do not get in eyes, on skin or clothing. (P262)

Avoid prolonged or repeated exposure.

This product should only by used by persons trained in the safe handling of hazardous chemicals. (P202)

SECTION 8 - EXPOSURE CONTROLS

8.1 - Engineering Controls/PPE

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available. (P264)

SECTION 8 - EXPOSURE CONTROLS *- continued*

8.2 - General Hygene Considerations

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), or a risk assessment shows air-purifying respirators are appropriate, use of a NIOSH/MSHA approved air supplied respirator is advised. Use a full-face respirator with multi-purpose combination (US) or type ABEK (EN14387) respirator cartridges in absence of proper environmental control. Always use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Engineering and/or administrative controls should be implemented to reduce exposure.

Material should be handled or transferred in an approved fume hood or with adequate ventilation.

Protective gloves should be worn to prevent skin contact.

(Chloroprene, natural rubber, nitrile, or equivalent)

Safety glasses with side shields must be worn at all times.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear liquid

Odor: N/A

Odor Threshold: N/A

pH: N/A

Melting Point: 0 °C (32 °F)

Boiling Point: 100 °C (212 °F)

Flash Point: Noncombustible

Evaporation Rate (Butyl Acetate=1): N/A

Flammability Class: N/A

Lower Flammability Level: N/A

Upper Flammability Level: N/A

Vapor Pressure: 17.5 mmHg (20 °C)

Vapor Density (Air = 1): N/A

Specific Gravity: 1.000 g/cm3

Solubility in Water: Very soluble

Partition Coefficient: N/A

Autoignition Temperature: N/A

Decomposition Temperature: N/A

Viscosity: N/A

VOC Content: N/A

Percent Volatile: N/A

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable

Materials to Avoid: None indicated

Hazardous Decomposition: None indicated

Hazardous Polymerization: Will not occur

Condition to Avoid: None indicated

SECTION 11 - TOXICOLOGICAL INFORMATION

Human Health Toxicity

See section 2 for specific toxicological information for the ingredients of this product.

LD50 (Oral): N/A

LD50 (Dermal) : N/A

LC50 (Inhalation): N/A

Although there is no specific human health toxicity information available for this product, because it is water based, it is not expected to exhibit toxic properties. Exposure to all chemicals should be kept to a minimum.

No other information related to the toxicological properties of this product is available at this time.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Toxicity

By complying with sections 6 and 7 there should be no release to the environment.

LC50 (Fish): N/A

EC50 (Aquatic Invertebrate): N/A

BCF: N/A

Although there is no specific environmental toxicity information available for this product, it is not expected to be an environmental hazard based on the properties of similar products.

No other information related to the ecological properties of this product is available at this time.

SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

Transportation Information (DOT/IATA)

UN Number: NR

Class: NR

Packing Group: NR

Proper Shipping Name: Not Regulated for Transport

Poison by Inhalation: No

Marine Pollutant: No

SECTION 15 - REGULATORY INFORMATION

All components are listed on the TSCA Inventory.

For laboratory, research and development use only. Not for manufacturing or commercial purposes.

In addition to federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI, GHS and CHIPs regulations. Chemicals are classified using the Globally Harmonized System for Classification and Labeling of Chemicals and CLP Regulation (EC) No. 1272/2008.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. The manufacturer will not assume any liability for the accuracy and completeness of this information. Final determination of the suitability of the material is the responsibility of the user. Although certain hazards are described herein, the user should not presume that these are the only hazards that exist. Since conditions and manner of use are outside of the manufacturers control, we make

NO WARRANTY OF MERCHANTABILITY, EXPRESSED OR IMPLIED, AND ASSUME NO LIABILITY RESULTING FROM ITS USE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

Alteration of any information contained herein without written permission from the manufacturer is strictly prohibited.

HMIS/NFPA HAZARD INDEX

0 - Minimal
1 - Slight
2 - Moderate
3 - Serious
4 - Severe

* - Additional Hazard

GHS HAZARD INDEX

Category 1 - Most Severe
Category 5 - Least Severe

**** End of Document ****

RCC-CW001596

SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier
Product Name Potassium Chloride

Other means of identification
Product Code(s) 76401

Safety data sheet number M00288

Recommended use of the chemical and restrictions on use
Recommended Use Laboratory reagent.
Uses advised against Consumer use.
Restrictions on use For Laboratory Use Only.

Details of the supplier of the safety data sheet

Manufacturer Address
Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number
+1(303) 623-5716 - 24 Hour Service

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status
This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Not a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Signal word
None

Hazard statements
The product contains no substances which at their given concentration, are considered to be hazardous to health

Other Hazards Known
May be harmful if swallowed

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Chemical Name	Potassium chloride
Chemical Family	Inorganic salt.
Formula	KCl
CAS No	7447-40-7
Chemical nature	Inorganic Compound.

4. FIRST AID MEASURES

Description of first aid measures

General advice No hazards which require special first aid measures. Use first aid treatment according to the nature of the injury.

Inhalation Remove to fresh air.

Eye contact Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact Wash skin with soap and water.

Ingestion Clean mouth with water and drink afterwards plenty of water.

Most important symptoms and effects, both acute and delayed

Symptoms See Section 11 for additional Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Caution: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical No information available.

Hazardous combustion products This material will not burn.

Special protective equipment for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Ensure adequate ventilation.

Environmental precautions

Environmental precautions See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Take up mechanically, placing in appropriate containers for disposal.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required. Wear breathing apparatus if exposed to vapors/dusts/aerosols.

Hand Protection Wear suitable gloves.

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin and body protection No special protective equipment required.

General Hygiene Considerations Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not

allow into any sewer, on the ground or into any body of water.

Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Solid
Appearance crystalline
Color white
Odor None
Odor threshold No data available

Property	Values	Remarks • Method
Molecular weight	74.55 g/mole	
pH	5.5 - 8.0	@ 20 °C
Melting point/freezing point	773 °C / 1423.4 °F	
Boiling point / boiling range	1413 °C / 2575.4 °F	
Evaporation rate	Not applicable	
Vapor pressure	Not applicable	
Relative vapor density	No data available	
Specific gravity (water = 1 / air = 1)	1.98	
Partition Coefficient (n-octanol/water)	log K_{ow} ~ 0	
Soil Organic Carbon-Water Partition Coefficient	log K_{oc} ~ 0	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Completely soluble	347000 mg/L	20 °C / 68 °F

Solubility in other solvents

Chemical Name	Solubility classification	Solubility	Solubility Temperature
Acids	Completely soluble	347000 mg/L	20 °C / 68 °F
Glycerol	Soluble	> 1000 mg/L	25 °C / 77 °F
Ethyl alcohol	Slightly soluble	> 0.1 mg/L	25 °C / 77 °F
Acetone	Insoluble	< 0.1 mg/L	25 °C / 77 °F
Ether	Insoluble	< 0.1 mg/L	25 °C / 77 °F

Other information

Metal Corrosivity

Steel Corrosion Rate	No data available
Aluminum Corrosion Rate	No data available

Volatile Organic Compounds (VOC) Content
This Product is by Weight 100% an Individual Pure Chemical Substance

Explosive properties

Upper explosion limit	No data available
Lower explosion limit	No data available

Flammable properties

Flash point	Not applicable

Flammability Limit in Air

Upper flammability limit:	No data available
Lower flammability limit:	No data available

Oxidizing properties	No data available.
Bulk density	No data available

10. STABILITY AND REACTIVITY

Reactivity
Not applicable.

Chemical stability
Stable under normal conditions.

Explosion data
Sensitivity to Mechanical Impact None.
Sensitivity to Static Discharge None.

Possibility of hazardous reactions
None under normal processing.

Hazardous polymerization
Hazardous polymerization does not occur.

Conditions to avoid
None known based on information supplied.

Incompatible materials
Strong oxidizing agents, strong acids, and strong bases.

Hazardous decomposition products
Potassium oxide. Chlorides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation	No known effect based on information supplied.
Eye contact	No known effect based on information supplied.
Skin contact	No known effect based on information supplied.
Ingestion	No known effect based on information supplied.
Symptoms	No information available.

Acute toxicity
Based on available data, the classification criteria are not met

Product Acute Toxicity Data
If available, see ingredient data below.

Ingredient Acute Toxicity Data
No data available.

Unknown Acute Toxicity
0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)
Not applicable
The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	No information available
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	No information available
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Skin corrosion/irritation
Based on available data, the classification criteria are not met.

Product Skin Corrosion/Irritation Data
If available, see ingredient data below.

Ingredient Skin Corrosion/Irritation Data
No data available.

Serious eye damage/irritation
Based on available data, the classification criteria are not met.

Product Serious Eye Damage/Eye Irritation Data
If available, see ingredient data below.

Ingredient Eye Damage/Eye Irritation Data
No data available.

Respiratory or skin sensitization
Based on available data, the classification criteria are not met.

Product Sensitization Data
If available, see ingredient data below.

Ingredient Sensitization Data
No data available.

STOT - single exposure

Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Single Exposure Data
If available, see ingredient data below.

Ingredient Specific Target Organ Toxicity Single Exposure Data
No data available.

STOT - repeated exposure
Based on available data, the classification criteria are not met.

Product Specific Target Organ Toxicity Repeat Dose Data
If available, see ingredient data below.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data
No data available.

Carcinogenicity
Based on available data, the classification criteria are not met.

Product Carcinogenicity Data
If available, see ingredient data below.

Ingredient Carcinogenicity Data
No data available.

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Germ cell mutagenicity
Based on available data, the classification criteria are not met.

Product Germ Cell Mutagenicity *invitro* Data
If available, see ingredient data below.

Ingredient Germ Cell Mutagenicity *invitro* Data
No data available.

Product Germ Cell Mutagenicity *invivo* Data
If available, see ingredient data below.

Ingredient Germ Cell Mutagenicity *invivo* Data
No data available.

Reproductive toxicity
Based on available data, the classification criteria are not met.

Product Reproductive Toxicity Data
No data available.

Ingredient Reproductive Toxicity Data
No data available.

Aspiration hazard
Based on available data, the classification criteria are not met.

12. ECOLOGICAL INFORMATION

Ecotoxicity Based on available data, the classification criteria are not met.

Unknown aquatic toxicity 0 % of the mixture consists of component(s) of unknown hazards to the aquatic environment.

Product Ecological Data

Aquatic Acute Toxicity
If available, see ingredient data below.

Aquatic Chronic Toxicity
If available, see ingredient data below.

Ingredient Ecological Data

Aquatic Acute Toxicity
Test data reported below.

Aquatic Chronic Toxicity
No data available.

Persistence and degradability

Product Biodegradability Data
No data available.

Bioaccumulation
There is no data for this product
Product Bioaccumulation Data
No data available.

Partition Coefficient (n-octanol/water) log K_{ow} ~ 0

Mobility

Soil Organic Carbon-Water Partition Coefficient log K_{oc} ~ 0

Other adverse effects
No information available

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Do not reuse empty containers.

US EPA Waste Number Not applicable

Special instructions for disposal Dilute material with excess water making a weaker than 5% solution. If permitted by regulation. Open hot water tap completely, slowly pour the material to the drain. Check with local municipal and state authorities and waste contractors for pertinent local information

regarding the proper disposal of chemicals.

14. TRANSPORT INFORMATION

DOT	Not regulated
TDG	Not regulated
IATA	Not regulated
IMDG	Not regulated
Note:	No special precautions necessary.

Additional information
There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods.
If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA	Complies
DSL/NDSL	Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL - Existing substances	Complies
PICCS	Complies
TCSI	Complies
AICS	Complies
NZIoC	Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	No
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No

Reactive Hazard	No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals

IMERC: Not applicable

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated by state right-to-know regulations.

U.S. EPA Label Information

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments
None

Additional information

Global Automotive Declarable Substance List (GADSL)
Not applicable
NFPA and HMIS Classifications

NFPA	**Health hazards** - 0	**Flammability** - 0	**Instability** - 0	**Physical and chemical properties** -
HMIS	**Health hazards** - 1	**Flammability** - 0	**Physical hazards** - 0	**Personal protection** - X - I

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH	*Immediately Dangerous to Life or Health*
ACGIH	ACGIH (American Conference of Governmental Industrial Hygienists)
NDF	*no data*

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that

some reference state regulations of these "liberated" exposure limits in their state regulations.

SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By	Hach Product Compliance Department
Issue Date	21-11-2019
Revision Date	15-Apr-2021
Revision Note	None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY©2021

End of Safety Data Sheet

Potassium Iodide

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations And According To The Hazardous Products Regulation (February 11, 2015).

Revision Date: 07/07/2021 Date of Issue: 11/24/2014 Supersedes Date: 08/05/2016 Version: 2.0

SECTION 1: IDENTIFICATION

1.1. Product Identifier

Product Form: Substance

Product Name: Potassium Iodide

Rosemount Part Number: 24164-00, 24164-01

1.2. Intended Use of the Product

Sensor Maintenance

1.3. Name, Address, and Telephone of the Responsible Party

Company

Emerson Automation Solutions | Rosemount
6021 Innovation Blvd.
Shakopee, MN 55379
1-866-347-3427

1.4. Emergency Telephone Number

Emergency Number : ChemTel LLC
(800)255-3924 (North America)
+1 (813)248-0585 (International)

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

GHS-US/CA Classification

STOT RE 1 H372

Full text of hazard classes and H-statements : see section 16

2.2. Label Elements

GHS-US/CA Labeling

Hazard Pictograms (GHS-US/CA) :

GHS08

Signal Word (GHS-US/CA) : Danger

Hazard Statements (GHS-US/CA) : H372 - Causes damage to organs (thyroid gland) through prolonged or repeated exposure (oral).

Precautionary Statements (GHS-US/CA) : P260 - Do not breathe dust.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P314 - Get medical advice/attention if you feel unwell.
P501 - Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

2.3. Other Hazards

Exposure may aggravate pre-existing eye, skin, or respiratory conditions.

2.4. Unknown Acute Toxicity (GHS-US/CA)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Name	Synonyms	Product Identifier	% *	GHS Ingredient Classification
Potassium iodide (KI)	Potassium iodide	(CAS-No.) 7681-11-0	100	STOT RE 1, H372

Full text of H- and EUH-statements: see section 16

*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

3.2. Mixture

Not applicable

SECTION 4: FIRST AID MEASURES

4.1. Description of First-aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

Skin Contact: Drench affected area with water for at least 15 minutes. Remove contaminated clothing. Obtain medical attention if irritation develops or persists.

Eye Contact: Rinse cautiously with water for at least 5 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists.

Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

4.2. Most Important Symptoms and Effects Both Acute and Delayed

General: Causes damage to organs (thyroid gland) through prolonged or repeated exposure (oral).

Inhalation: Prolonged exposure may cause irritation.

Skin Contact: Prolonged exposure may cause skin irritation.

Eye Contact: May cause slight irritation to eyes.

Ingestion: Ingestion may cause nausea, vomiting and diarrhea. May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. May cause allergic reactions in some individuals.

Chronic Symptoms: May cause damage to organs (thyroid gland) through prolonged or repeated exposure (oral).

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Water spray, carbon dioxide, foam, dry chemical.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not flammable.

Explosion Hazard: Product is not explosive.

Reactivity: May react with strong acids and oxidizers.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Iodine vapour. Potassium oxides.

5.4. Reference to Other Sections

Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Avoid generating dust. Do not breathe dust. Do not get in eyes, on skin, or on clothing.

6.1.1. For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protective equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel. Evacuate unnecessary personnel.

6.1.2. For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area.

6.2. Environmental Precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and Materials for Containment and Cleaning Up

For Containment: Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams. Avoid creating or spreading dust.

Methods for Cleaning Up: Clean up spills immediately and dispose of waste safely. Recover the product by vacuuming, shoveling or sweeping. Transfer spilled material to a suitable container for disposal. Contact competent authorities after a spill.

6.4. Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Precautions for Safe Handling: Do not breathe dust. Avoid contact with eyes, skin and clothing. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from direct sunlight, extremely high or low temperatures and incompatible materials.

Incompatible Materials: Strong acids. Strong oxidizers. Metal.

7.3. Specific End Use(s)

Sensor Maintenance

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), or Canadian provincial governments.

8.2. Exposure Controls

Appropriate Engineering Controls: Ensure adequate ventilation, especially in confined areas. Suitable eye/body wash equipment should be available in the vicinity of any potential exposure. Ensure all national/local regulations are observed.

Personal Protective Equipment: Protective goggles. Gloves. Protective clothing.

Materials for Protective Clothing: Chemically resistant materials and fabrics.

Hand Protection: Wear protective gloves.

Eye and Face Protection: Chemical safety goggles.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Environmental Exposure Controls: Do not allow the product to be released into the environment.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State	:	Solid
Appearance	:	White crystals
Odor	:	Not available
Odor Threshold	:	Not available
pH	:	7 – 9
Evaporation Rate	:	Not available
Melting Point	:	681 °C (1257.8 °F)
Freezing Point	:	Not available
Boiling Point	:	1323 °C (2413.4 °F)
Flash Point	:	Not available

Auto-ignition Temperature	:	Not available
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	0.1 kPa at 731 °C (1347.8 °F)
Relative Vapor Density at 20°C	:	Not available
Relative Density	:	3.12 (water = 1)
Specific Gravity	:	Not available
Solubility	:	Water: > 1400 g/l at 25 °C (77 °F)
Partition Coefficient: N-Octanol/Water	:	Not available
Viscosity	:	Not available

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity: May react with strong acids and oxidizers.

10.2. Chemical Stability: Stable under recommended handling and storage conditions (see section 7).

10.3. Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

10.4. Conditions to Avoid: Direct sunlight, extremely high or low temperatures, and incompatible materials. Generation of airborne dust.

10.5. Incompatible Materials: Strong acids. Strong oxidizers. Metal.

10.6. Hazardous Decomposition Products: Thermal decomposition may produce: Iodine vapour. Potassium oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on Toxicological Effects - Product

Acute Toxicity (Oral): Not classified

Acute Toxicity (Dermal): Not classified

Acute Toxicity (Inhalation): Not classified

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Not classified

Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Not classified

Specific Target Organ Toxicity (Repeated Exposure): Causes damage to organs (thyroid gland) through prolonged or repeated exposure (oral).

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Prolonged exposure may cause irritation.

Symptoms/Injuries After Skin Contact: Prolonged exposure may cause skin irritation.

Symptoms/Injuries After Eye Contact: May cause slight irritation to eyes.

Symptoms/Injuries After Ingestion: Ingestion may cause nausea, vomiting and diarrhea. May cause burns or irritation of the linings of the mouth, throat, and gastrointestinal tract. May cause allergic reactions in some individuals.

Chronic Symptoms: May cause damage to organs (thyroid gland) through prolonged or repeated exposure (Oral).

11.2. Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Potassium iodide (KI) (7681-11-0)	
LD50 Dermal Rat	> 2000 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General: Not classified.

Potassium iodide (KI) (7681-11-0)	
LC50 Fish	896 mg/l (96h/Oncorhynchus mykiss)

RCC-CW001611

12.2. Persistence and Degradability

Potassium Iodide	
Persistence and Degradability	Not established.

12.3. Bioaccumulative Potential

Potassium Iodide	
Bioaccumulative Potential	Not established.

Potassium iodide (KI) (7681-11-0)	
BCF Fish	0.267 mg/l

12.4. Mobility in Soil Not available

12.5. Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste Disposal Recommendations: Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

Ecology - Waste Materials: Avoid release to the environment.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

14.1. In Accordance with DOT Not regulated for transport

14.2. In Accordance with IMDG Not regulated for transport

14.3. In Accordance with IATA Not regulated for transport

14.4. In Accordance with TDG Not regulated for transport

SECTION 15: REGULATORY INFORMATION

15.1. US Federal Regulations

Potassium Iodide	
SARA Section 311/312 Hazard Classes	Health hazard - Specific target organ toxicity (single or repeated exposure)

Potassium iodide (KI) (7681-11-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. US State Regulations

Neither this product nor its chemical components appear on any US state lists, or its chemical components are not required to be disclosed

15.3. Canadian Regulations

Potassium iodide (KI) (7681-11-0)
Listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Date of Preparation or Latest Revision : 07/26/2021

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Hazardous Products Regulations (HPR) SOR/2015-17.

GHS Full Text Phrases:

STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
H372	Causes damage to organs through prolonged or repeated exposure

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

NA GHS SDS 2015 (Can, US)

SAFETY DATA SHEET

1. Identification

Product identifier: Potassium Oxalate, Monohydrate

Other means of identification

Synonyms: Ethanedioic acid, dipotassium salt, monohydrate
Product No.: 3212

Recommended use and restriction on use

Recommended use: For Laboratory, Research or Manufacturing Use.
Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Avantor Performance Materials, LLC
100 Matsonford Rd, Suite 200
Radnor, PA 19087

Telephone: Customer Service: 855-282-6867
Fax:
Contact Person: Product Information Compliance
E-mail: info@avantormaterials.com

Emergency telephone number:

CHEMTREC: 1-800-424-9300 within US and Canada (24 hrs/day, 7 days/week)

2. Hazard identification

Hazard Classification

Health Hazards

Acute toxicity (Oral)	Category 4
Acute toxicity (Dermal)	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2A

Unknown toxicity - Health

Acute toxicity, dermal	100 %
Acute toxicity, inhalation, dust or mist	100 %

Label Elements

Hazard Symbol:

Signal Word: Warning

Hazard Statement: Harmful if swallowed or in contact with skin.
Causes skin irritation.
Causes serious eye irritation.

Precautionary Statements

Prevention: Wear protective gloves/protective clothing/eye protection/face protection. Wash thoroughly after handling. Do not eat, drink or smoke when using this product.

Response: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Take off immediately all contaminated clothing and wash it before reuse. IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth. Call a POISON CENTER/doctor if you feel unwell.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: None.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	Content in percent (%)*
Potassium oxalate, monohydrate	Ethanedioic acid, dipotassium salt, monohydrate	6487-48-5	98,50 - 100,00%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Rinse mouth. Call a physician or poison control center immediately. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Get medical attention immediately.

Skin Contact: Wash skin thoroughly with soap and water. Call a POISON CENTER/doctor if you feel unwell. Wash contaminated clothing before reuse.

Eye contact: Flush thoroughly with water. If irritation occurs, get medical assistance.

Most important symptoms/effects, acute and delayed

Symptoms: May cause irritation to skin, eyes and respiratory tract.

Hazards: None known.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: In case of fire and/or explosion do not breathe fumes.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable extinguishing media: None known.

Specific hazards arising from the chemical: During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Move containers from fire area if you can do so without risk. Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: Keep unauthorized personnel away. Ventilate closed spaces before entering them. Use personal protective equipment. See Section 8 of the SDS for Personal Protective Equipment.

Methods and material for containment and cleaning up: Sweep up and place in a clearly labeled container for chemical waste. Clean surface thoroughly to remove residual contamination.

Notification Procedures: Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.

Environmental Precautions: Avoid discharge into drains, water courses or onto the ground. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling: Use personal protective equipment as required. Avoid contact with eyes, skin, and clothing. Avoid inhalation of dust. Do not taste or swallow. Do not eat, drink or smoke when using the product. Wash thoroughly after handling.

Conditions for safe storage, including any incompatibilities: Keep containers tightly closed. Store in cool, dry place. Store in a well-ventilated place. Keep material from heat, light, sparks and flame.

8. Exposure controls/personal protection

Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

Appropriate Engineering Controls: No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection

Hand Protection: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory Protection: In case of inadequate ventilation use suitable respirator. Air-purifying respirator with a high efficiency particulate filter.

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state:	Solid
Form:	Crystals
Color:	Colorless
Odor:	Odorless
Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	160 °C
Initial boiling point and boiling range:	No data available.
Flash Point:	Not applicable
Evaporation rate:	No data available.
Flammability (solid, gas):	No data available.
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	No data available.
Flammability limit - lower (%):	No data available.
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.

Vapor pressure:	No data available.
Vapor density:	No data available.
Density:	2,13 g/cm3 (20 °C)
Relative density:	2,13 (20 °C)
Solubility(ies)	
Solubility in water:	300 g/l (20 °C)
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	No data available.
Auto-ignition temperature:	No data available.
Decomposition temperature:	No data available.
Viscosity:	No data available.

Other information

Molecular weight:	184,24 g/mol ($KOCOCOOK \cdot H_2O$)

10. Stability and reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical Stability:	Material is stable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization does not occur.
Conditions to avoid:	Heat, sparks, flames. Contact with incompatible materials.
Incompatible Materials:	Strong acids. Strong oxidizing agents.
Hazardous Decomposition Products:	Oxides of Carbon.

11. Toxicological information

Information on likely routes of exposure

Inhalation:	May cause irritation to the respiratory system.
Skin Contact:	Harmful in contact with skin. Causes skin irritation.
Eye contact:	Causes serious eye irritation.
Ingestion:	Harmful if swallowed. May cause irritation of the gastrointestinal tract.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral

Product:	LD 50 (Rat): 415 - 525 mg/kg

Dermal

Product:	No data available.

Inhalation

Product:	No data available.

Repeated dose toxicity
Product: No data available.

Skin Corrosion/Irritation
Product: Causes skin irritation.

Serious Eye Damage/Eye Irritation
Product: Causes serious eye irritation.

Respiratory or Skin Sensitization
Product: Not a skin nor a respiratory sensitizer.

Carcinogenicity
Product: This substance has no evidence of carcinogenic properties.

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:
No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:
No carcinogenic components identified

ACGIH Carcinogen List:
No carcinogenic components identified

Germ Cell Mutagenicity

In vitro
Product: No mutagenic components identified

In vivo
Product: No mutagenic components identified

Reproductive toxicity
Product: No components toxic to reproduction

Specific Target Organ Toxicity - Single Exposure
Product: None known.

Specific Target Organ Toxicity - Repeated Exposure
Product: None known.

Aspiration Hazard
Product: Not classified

Other effects: None known.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish
Product: LC 50 (Carp (Leuciscus idus melanotus), 48 h): 160 mg/l

Aquatic Invertebrates

Product: EC 50 (Water flea (Daphnia magna), 48 h): 162,2 mg/l

Chronic hazards to the aquatic environment:

Fish
Product: No data available.

Aquatic Invertebrates
Product: No data available.

Toxicity to Aquatic Plants
Product: No data available.

Persistence and Degradability

Biodegradation
Product: The product is readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative potential
Bioconcentration Factor (BCF)
Product: No data available on bioaccumulation.

Partition Coefficient n-octanol / water (log Kow)
Product: No data available.

Mobility in soil: The product is water soluble and may spread in water systems.

Other adverse effects: The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

TDG
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable

15. Regulatory information

Canada Federal Regulations

List of Toxic Substances (CEPA, Schedule 1)

Not Regulated

Export Control List (CEPA 1999, Schedule 3)

Not Regulated

National Pollutant Release Inventory (NPRI)

Canada. National Pollutant Release Inventory (NPRI) Substances, Part 5, VOCs with Additional Reporting Requirements

NPRI PT5	Not Regulated

Canada. National Pollutant Release Inventory (NPRI) (Schedule 1, Parts 1-4)

NPRI	Not Regulated

Greenhouse Gases

Not Regulated

Controlled Drugs and Substances Act

CA CDSI	Not Regulated
CA CDSII	Not Regulated
CA CDSIII	Not Regulated
CA CDSIV	Not Regulated
CA CDSV	Not Regulated
CA CDSVII	Not Regulated
CA CDSVIII	Not Regulated

Precursor Control Regulations

Not Regulated

International regulations

Montreal protocol

Not applicable

Stockholm convention

Not applicable

Rotterdam convention

Not applicable

Kyoto protocol

Not applicable

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
Japan ISHL Listing:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Mexico INSQ:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Philippines PICCS:	On or in compliance with the inventory
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory

16. Other information

Revision Date: 06.10.2020

Version #: 2.0

Source of information: Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, information from the Toxicology Data Network (TOXNET), European Chemical Agency (ECHA) substance dossiers, IARC Monographs, US National Toxicology Program data, the Agency for Toxic Substances and Disease Registry, other manufacturer's SDSs and other sources, as appropriate.

Further Information: No data available.

Disclaimer: The information provided in this Safety Data Sheet (SDS) was prepared based on data believed to be accurate as of the date of this SDS. TO THE GREATEST EXTENT PERMITTED BY LAW, AVANTOR PERFORMANCE MATERIALS ("AVANTOR") EXPRESSLY DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES REGARDING THE INFORMATION CONTAINED HEREIN INCLUDING, WITHOUT LIMITATION, AS TO ACCURACY, COMPLETENESS, FITNESS FOR PURPOSE OR USE, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY AND STABILITY. This SDS is intended as a guide to the appropriate use, handling, storage and disposal of the product to which it relates by properly trained personnel, and is not intended to be comprehensive. Users of Avantor's products are advised to perform their own tests and to exercise their own judgment to determine the safety, suitability and appropriate use, handling, storage and disposal of each product and product combination for their own purposes and uses. TO THE GREATEST EXTENT PERMITTED BY LAW, AVANTOR DISCLAIMS LIABILITY FOR, AND BY USING AVANTOR'S PRODUCTS PURCHASER AGREES THAT UNDER NO CIRCUMSTANCES SHALL AVANTOR BE LIABLE FOR, SPECIAL, INDIRECT, INCIDENTAL , PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY TYPE OR KIND, INCLUDING WITHOUT LIMITATION, FOR LOSS OF PROFITS, REPUTATIONAL DAMAGE, PRODUCT RECALL OR BUSINESS INTERRUPTION.

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: August 22, 2020

1 Identification

· **Product identifier**

· **Trade name: Potassium Permanganate, 0.10N**
· **Product code:** PP1385-P

· **Recommended use and restriction on use**
· **Recommended use:** Laboratory chemicals
· **Restrictions on use:** No relevant information available.

· **Details of the supplier of the Safety Data Sheet**
· **Manufacturer/Supplier:**
AquaPhoenix Scientific, Inc.
860 Gitts Run Road
Hanover, PA 17331 USA
Tel +1 (717)632-1291
Toll-Free: (866)632-1291
info@aquaphoenixsci.com
· **Distributor:**
AquaPhoenix Scientific
860 Gitts Run Road,
Hanover, PA 17331
(717) 632-1291

· **Emergency telephone number:**
ChemTel Inc.
(800)255-3924 (North America)
+1 (813)248-0585 (International)

2 Hazard(s) identification

· **Classification of the substance or mixture**
Repr. 2 H361 Suspected of damaging fertility or the unborn child.

· **Label elements**
· **GHS label elements**
The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms:**

GHS08

· **Signal word:**
None.
Warning
· **Hazard statements:**
None.
H361 Suspected of damaging fertility or the unborn child.
· **Precautionary statements:**
None.
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

(Cont'd. on page 2)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: August 22, 2020

Trade name: Potassium Permanganate, 0.10N

(Cont'd. of page 1)

P308+P313 IF exposed or concerned: Get medical advice/attention.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Other hazards** There are no other hazards not otherwise classified that have been identified.

3 Composition/information on ingredients

· **Chemical characterization: Substances**

· **Components:**		
7722-64-7	potassium permanganate Ox. Sol. 2, H272 Repr. 2, H361; STOT RE 2, H373 Skin Corr. 1C, H314; Eye Dam. 1, H318 Acute Tox. 4, H302	0.316%
7732-18-5	Water	99.684%

· **Additional information:**
For the listed ingredient(s), the identity and/or exact percentage(s) are being withheld as a trade secret.
For the wording of the listed Hazard Statements, refer to section 16.

4 First-aid measures

· **Description of first aid measures**
· **General information:** No special measures required.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Rinse with warm water.
If skin irritation is experienced, consult a doctor.
· **After eye contact:**
Remove contact lenses if worn.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· **After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; immediately call for medical help.
· **Most important symptoms and effects, both acute and delayed:**
Gastric or intestinal disorders when ingested.
· **Danger:** No relevant information available.
· **Indication of any immediate medical attention and special treatment needed:**
No relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **For safety reasons unsuitable extinguishing agents:** No relevant information available.
· **Special hazards arising from the substance or mixture**

(Cont'd. on page 3)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: August 22, 2020

Trade name: Potassium Permanganate, 0.10N

(Cont'd. of page 2)

Formation of toxic gases is possible during heating or in case of fire.
Substance/product is oxidizing when dry.

· **Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Ensure adequate ventilation.
For large spills, wear protective clothing.
· **Environmental precautions**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Methods and material for containment and cleaning up**
Wipe up small spills with paper towel and discard.
For larger spills, add sawdust, chalk or other inert binding material, then sweep up and discard.
Dispose of the collected material according to regulations.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling**
· **Precautions for safe handling:**
Prevent formation of aerosols.
Avoid splashes or spray in enclosed areas.
· **Information about protection against explosions and fires:** Substance/product is oxidizing when dry.

· **Conditions for safe storage, including any incompatibilities**
· **Requirements to be met by storerooms and receptacles:** Avoid storage near extreme heat.
· **Information about storage in one common storage facility:**
Store away from foodstuffs.
Do not store together with acids.
· **Further information about storage conditions:**
Keep containers tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
· **Specific end use(s)** No relevant information available.

8 Exposure controls/personal protection

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be

(Cont'd. on page 4)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: August 22, 2020

Trade name: Potassium Permanganate, 0.10N

(Cont'd. of page 3)

monitored at the workplace.

· **Exposure controls**
· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
· **Engineering controls:** No relevant information available.
· **Breathing equipment:** Not required under normal conditions of use.
· **Protection of hands:**

Protective gloves

· **Material of gloves**
Nitrile rubber, NBR
Neoprene gloves
Butyl rubber, BR
Natural rubber, NR
Sensibilization by the components in the glove materials is possible.
· **Eye protection:**

Safety glasses

Follow relevant national guidelines concerning the use of protective eyewear.
· **Body protection:** Protection may be required for spills.
· **Limitation and supervision of exposure into the environment** No special requirements.
· **Risk management measures** No special requirements.

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **Appearance:**	
Form:	Liquid
Color:	Light
· **Odor:**	Odorless
· **Odor threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Melting point/Melting range:**	0 °C (32 °F)
· **Boiling point/Boiling range:**	100 °C (212 °F)
· **Flash point:**	The product is not flammable.
· **Flammability (solid, gaseous):**	Not applicable.
· **Auto-ignition temperature:**	Not determined.
· **Decomposition temperature:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.

(Cont'd. on page 5)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: August 22, 2020

Trade name: Potassium Permanganate, 0.10N

(Cont'd. of page 4)

· **Explosion limits**	
Lower:	Not determined.
Upper:	Not determined.
· **Oxidizing properties:**	Non-oxidizing.
· **Vapor pressure at 20 °C (68 °F):**	23 hPa (17.3 mm Hg)
· **Density at 20 °C (68 °F):**	1.01 g/cm³ (8.43 lbs/gal)
· **Relative density:**	Not determined.
· **Vapor density:**	Not determined.
· **Evaporation rate:**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Fully miscible.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Other information**	No relevant information available.

10 Stability and reactivity

· **Reactivity:** No relevant information available.
· **Chemical stability:** Stable under normal temperatures and pressures.
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **Possibility of hazardous reactions**
Reacts with strong acids and oxidizing agents.
Reacts with certain metals.
Toxic fumes may be released if heated above the decomposition point.
· **Conditions to avoid** No relevant information available.
· **Incompatible materials** No relevant information available.
· **Hazardous decomposition products**
Under fire conditions only:
Toxic metal oxide smoke

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:** Based on available data, the classification criteria are not met.

· **LD/LC50 values that are relevant for classification:**		
7722-64-7 potassium permanganate		
Oral	LD50	1090 mg/kg (rat)

· **Primary irritant effect:**
· **On the skin:** Based on available data, the classification criteria are not met.
· **On the eye:** Based on available data, the classification criteria are not met.

(Cont'd. on page 6)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: August 22, 2020

Trade name: Potassium Permanganate, 0.10N

(Cont'd. of page 5)

· **Sensitization:** Based on available data, the classification criteria are not met.

· **IARC (International Agency for Research on Cancer):**
None of the ingredients are listed.

· **NTP (National Toxicology Program):**
None of the ingredients are listed.

· **OSHA-Ca (Occupational Safety & Health Administration):**
None of the ingredients are listed.

· **Probable route(s) of exposure:**
Ingestion.
Inhalation.
Eye contact.
Skin contact.
· **Acute effects (acute toxicity, irritation and corrosivity):** No relevant information available.
· **Repeated dose toxicity:** No relevant information available.
· **Germ cell mutagenicity:** Based on available data, the classification criteria are not met.
· **Carcinogenicity:** Based on available data, the classification criteria are not met.
· **Reproductive toxicity:** Based on available data, the classification criteria are not met.
· **STOT-single exposure:** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure:** Based on available data, the classification criteria are not met.
· **Aspiration hazard:** Based on available data, the classification criteria are not met.

12 Ecological information

· **Toxicity**

· **Aquatic toxicity**	
7722-64-7 potassium permanganate	
LC50	0.47 mg/l (fish)
EC50	0.06 mg/l (daphnia)

· **Persistence and degradability** No relevant information available.
· **Bioaccumulative potential:** No relevant information available.
· **Mobility in soil:** No relevant information available.
· **Additional ecological information**
· **General notes:**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Harmful to aquatic organisms
· **Other adverse effects** No relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Smaller quantities can be disposed of with household waste.
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and

(Cont'd. on page 7)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: August 22, 2020

Trade name: Potassium Permanganate, 0.10N

(Cont'd. of page 6)

disposal for hazardous and nonhazardous wastes.

· **Uncleaned packagings**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

· **UN-Number** · **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.
· **UN proper shipping name** · **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.
· **Transport hazard class(es)** · **DOT, ADR/RID/ADN, IMDG, IATA** · **Class**	Not regulated.
· **Packing group** · **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.
· **Environmental hazards**	Not applicable.
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **United States (USA)**
· **SARA**

· **Section 302 (extremely hazardous substances):**

None of the ingredients are listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act)**

7722-64-7	potassium permanganate
7732-18-5	Water

· **Proposition 65 (California)**

· **Chemicals known to cause cancer:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity for females:**

(Cont'd. on page 8)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: August 22, 2020

Trade name: Potassium Permanganate, 0.10N

(Cont'd. of page 7)

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity for males:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

· **EPA (Environmental Protection Agency):**

7722-64-7	potassium permanganate	D

· **IARC (International Agency for Research on Cancer):**

None of the ingredients are listed.

· **Canadian Domestic Substances List (DSL):**

None of the ingredients are listed.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Abbreviations and acronyms:**

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
OSHA: Occupational Safety & Health Administration
Ox. Sol. 2: Oxidizing solids – Category 2
Acute Tox. 4: Acute toxicity – Category 4
Skin Corr. 1C: Skin corrosion/irritation – Category 1C
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Repr. 2: Reproductive toxicity – Category 2
STOT RE 2: Specific target organ toxicity (repeated exposure) – Category 2

· **Sources**

Website, European Chemicals Agency (echa.europa.eu)
Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/overview/home.do)
Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)
Patty's Industrial Hygiene, 6th ed., Rose, Vernon, ed. ISBN: 978-0-470-07488-6
Casarett and Doull's Toxicology: The Basic Science of Poisons, 8th Ed., Klaasen, Curtis D., ed., ISBN: 978-0-07-176923-5.
Safety Data Sheets, Individual Manufacturers

SDS Prepared by:
ChemTel
1305 North Florida Avenue
Tampa, Florida USA 33602-2902
Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573
Website: www.chemtel.com

AMERICAN DENTAL SUPPLY, INC.
1075 N. Gilmore Street
Allentown, PA 18109-3210
www.americandentalsupply.net
(800) 558-5925

SAFETY DATA SHEET

SECTION 1: IDENTIFICATION OF PRODUCT

PRODUCT NAME: **POTASSIUM SULFATE,** DRY POWDER
APPLICATION: POTASSIUM SULFATE CAS # 7778-80-5
EMERGENCY CONTACT: **INFOTRAC: 1-352-323-3500, TOLL-FREE 1-800-535-5053**

SECTION 2: HAZARDS IDENTIFICATION (CLASSIFICATION)

WARNING: IRRITANT

SECTION 2A: PHYSICAL HAZARDS
N/A
SECTION 2B: HEALTH HAZARDS
THRESHOLD LIMIT VALUE: TLV (ACGIH): NONE ESTABLISHED BY OSHA
SKIN: H313: MAY BE HARMFUL IN CONTACT WITH SKIN. CATEGORY 5:
EYES: H320: CAUSES EYE IRRITATION. CATEGORY 2B:
INHALATION: H333: MAY BE HARMFUL IF INHALED. CATEGORY 5:
INGESTION: H302: HARMFUL IF SWALLOWED. CATEGORY 4:
CARCINOGENICITY: NO INGREDIENTS IDENTIFIED AS CARCINOGEN OR POTENTIAL CARCINOGEN BY NTP, IARC OR OSHA.

SECTION 3: COMPOSITION / INGREDIENTS

MIXTURE: ○ Yes ◉ No
POTASSIUM SULFATE, 100%

SECTION 4: FIRST AID MEASURES

SKIN: P302+352: IF ON SKIN: WASH WITH PLENTY OF SOAP AND WATER.
P332+313: IF SKIN IRRITATION OCCURS: CONTACT A POISON CENTER OR DOCTOR/PHYSICIAN.

EYES: P305+351+338: IF IN EYES: RINSE CAUTIOUSLY WITH WATER FOR SEVERAL MINUTES. REMOVE CONTACT LENSES IF PRESENT AND EASY TO DO. CONTINUE RINSING. P337+313: IF EYE IRRITATION PERSISTS GET MEDICAL ADVICE/ATTENTION.

INHALATION: NOT LIKELY IN NORMAL USE. P304+340: IF INHALED: REMOVE VICTIM TO FRESH AIR AND KEEP AT REST IN A POSITION COMFORTABLE FOR BREATHING. P342+311: IF EXPERIENCING RESPIRATORY SYMPTOMS: CALL A POISON CENTER OR DOCTOR/PHYSICIAN.

INGESTION: P310: IMMEDIATELY CALL A POISON CENTER OR DOCTOR/PHYSICIAN. P301+330+331: IF SWALLOWED: RINSE MOUTH. DO NOT INDUCE VOMITING

SECTION 5: FIREFIGHTING MEASURES

FLASH POINT: MATERIAL IS NON-FLAMMABLE.
FLAMMABLE LIMITS: N/A
FIRE EXTINGUISHING MEDIA: P370+378: IN CASE OF FIRE: USE THE FOLLOWING FOR EXTINCTION: ANY SUITABLE FOR ADJACENT COMBUSTIBLE MATERIALS.

SPECIAL FIRE FIGHTING PROCEDURES: NONE FOR LAB QUANTITIES.
UNUSUAL FIRE AND EXPLOSION HAZARD: NONE

SECTION 6: ACCIDENTAL RELEASE MEASURES

N/A

PRECAUTIONS:

PROCEDURES: WEAR APPROPRIATE PROTECTIVE CLOTHING. SWEEP UP AND PLACE IN APPROVED CONTAINER IN A BAG. MATERIAL MAY BE SPONGED UP.

SECTION 7: HANDLING AND STORAGE (LAB QUANTITIES)

P102: KEEP OUT OF REACH OF CHILDREN. P402+404: STORE IN A DRY PLACE. STORE IN A CLOSED CONTAINER. P403+235+410: STORE IN A WELL VENTILATED PLACE. KEEP COOL. PROTECT FROM SUNLIGHT. FOR LABORATORY OR OFFICE USE ONLY. DO NOT MIX WITH OTHER MATERIALS UNLESS DIRECTED TO DO SO. NORMAL PRECAUTIONS OF LABORATORY GOOD HOUSEKEEPING PRACTICES SHOULD BE FOLLOWED.

SECTION 8: EXPOSURE CONTROLS (PERSONAL PROTECTION)

VENTILATION: MECHANICAL (GENERAL) IS ACCEPTABLE.

SKIN: P281: USE PERSONAL PROTECTIVE EQUIPMENT AS REQUIRED. NITRILE OR RUBBER IMPERMEABLE GLOVES.

EYES: P281: USE PERSONAL PROTECTIVE EQUIPMENT AS REQUIRED. SAFETY GLASSES OR GOGGLES. DO NOT WEAR CONTACT LENSES WHEN HANDLING CHEMICALS.

RESPRIATORY: NONE REQUIRED IN NORMAL USE.

OTHER: EYE WASH STATION.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: WHITE CRYSTALLINE POWDER, ODORLESS, BITTER TASTE.

PH OF SOLUTION: 6.8 - 7.2 (1%)

MELTING POINT: ^{0}F: N/A

BOILING POINT: ^{0}F: N/A

SPECIFIC GRAVITY: (H2O=1): APPROX. 2.7

EVAPORATION RATE: (BuAC =1): N/A

VAPOR DENSITY: (AIR =1): N/A

PERCENT VOLATILE: 0%

VAPOR PRESSURE: (mm Hg): N/A

WATER SOLUBILITY: SOLUBLE

SECTION 10: REACTIVITY DATA

STABILITY: STABLE.

CONDITIONS TO AVOID: NONE

INCOMPATIBILITY (MATERIALS TO AVOID): NONE

HAZARDOUS DECOMPOSITION PRODUCTS: THERMAL DECOMPOSITION WILL LIBERATE IRRITATING SULFUR OXIDES.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

REACTIVITY WITH WATER: N/A

SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE EXPOSURE: SIGNS AND SYMPTOMS:

SKIN: MAY CAUSE SLIGHT IRRITATION.

EYES: CONTACT WILL CAUSE IRRITATION.

INHALATION: INHALATION OF DUST CAN CAUSE RESPIRATORY IRRITATION.

INGESTION: SWALLOWING CAN CAUSE SEVERE GASTROINTESTINAL IRRITATION.

CHRONIC EXPOSURE: NO HUMAN DATA REPORTED

SENSITIZER: NO HUMAN DATA REPORTED

CARCINOGENICITY: NO INGREDIENTS IDENTIFIED AS CARCINOGEN OR POTENTIAL CARCINOGEN BY NTP, IARC OR OSHA.

TERATOGENICITY: N/A

EMBRYOTOXICITY: N/A

MUTAGENICITY: N/A

PRE-EXISTING CONDITIONS: N/A

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXITY: LAB QUANTITIES ARE NOT EXPECTED TO BE SIGNIFICANT.

DEGRADABILITY: EXPECTED TO BE LOW.

BIOACCUMULATION: NOT EXPECTED TO BIOACCUMULATE.

MOBILITY IN SOIL: EXPECTED TO BE HIGH. COMPONENTS ARE WATER SOLUBLE.

SECTION 13: DISPOSAL INFORMATION

CAN FLUSH DOWN LAB DRAIN WITH AN EXCESS OF WATER OR DISPOSE OF IN REGULAR TRASH.

SECTION 14: TRANSPORT INFORMATION

UN NUMBER: N/A
SHIPPING NAME: N/A
CLASS: N/A
PACKING GROUP: N/A
MARINE POLLUTANT: N/A
WARNING SYMBOL: N/A
OTHER: THE MATERIAL, IN LAB QUANTITIES, IS NOT REGULATED AS A HAZARD IN TRANSPORTATION BY THE US DOT.

SECTION 15: REGULATORY INFORMATION

LABELING: N/A
NFPA RATINGS: HEALTH HAZARD: 2 FIRE & EXPLOSION: 0 REACTIVITY: 0 SPECIAL PROTECTION: B
NATIONAL REGULATIONS:
TSCA: ALL COMPONENTS ARE ON THE TSCA INVENTORY LIST.

SARA: SARA SECTION 302: EXTREMELY HAZARDOUS SUBSTANCES: NONE LISTED.
SARA SECTION 313: N/A
INAPPLICABLE: NO COMPONENTS ARE SUBJECT TO TSCA SNUR LISTING.

FOREIGN REGULATIONS:
ALL COMPONENTS ARE ON THE EU EINECS INVENTORY LIST AND THE CANADIAN DSL.

SECTION 16: OTHER INFORMATION

COPYRIGHT 2014. NO UNAUTHORIZED COPIES MAY BE MADE WITHOUT THE EXPRESS WRITTEN PERMISSION OF AMERICAN DENTAL SUPPLY, INC., ALLENTOWN, PA. ALL RIGHTS RESERVED
SALES INFORMATION: 1-800-558-5925 (8 AM TO 6 PM EST, MONDAY TO FRIDAY)
CA PROP. 65 LISTING: THIS PRODUCT DOES NOT CONTAIN ANY CHEMICAL KNOWN TO STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM

Revision Date: 1/14/2021 Information Furnished By: L. D. Hochhauser
Product Development Mgr.

The above information is believed to be accurate and represents information currently available to us. Reasonable care has been taken in the preparation of this document; however, all the properties of this product may not have been completely evaluated. Users should make their own investigations to determine the suitability of the information for their particular purposes. We make no warrantee of merchantability or any other warrantee, expressed or implied, with respect to such information, and we assume no liability resulting from its use or from improper use or handling of the product. “N/A” indicates that at the time of preparation of this SDS, this information may not have been available or is not applicable or regulated. As additional information becomes available, SDS will be updated.

SAFETY DATA SHEET

Creation Date 15-Feb-2010 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Potassium thiocyanate**

Cat No. : **14318**

CAS-No 333-20-0
Synonyms Potassium rhodanide

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 4

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed, in contact with skin or if inhaled

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
Call a POISON CENTER or doctor/physician if you feel unwell
Wash contaminated clothing before reuse
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects
Contact with acids liberates very toxic gas

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Potassium thiocyanate	333-20-0	>95

4. First-aid measures

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation
Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required. If not breathing, give artificial respiration.

Ingestion
Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects
. Metabolism may release cyanide, which may result in headache, dizziness, weakness, collapse, unconsciousness, and possible death: May cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood)

Notes to Physician
Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature
Explosion Limits
Upper No data available
Lower No data available
Oxidizing Properties Not oxidising

Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Nitrogen oxides (NOx). Sulfur oxides. Potassium oxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	1	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation. Avoid contact with skin and eyes. Keep people away from and upwind of spill/leak.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Avoid release to the environment. Collect spillage. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from acids.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Potassium thiocyanate		(Vacated) TWA: 5 mg/m^3	IDLH: 25 mg/m^3	

Legend

OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *NIOSH - National Institute for Occupational Safety and Health*

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Crystalline Solid
Appearance	Colorless - White
Odor	Odorless
Odor Threshold	No information available
pH	5.3-8.7 5% aq.solution
Melting Point/Range	170 - 179 °C / 338 - 354.2 °F
Boiling Point/Range	Decomposes
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	<1 hPa @ 20 °C
Vapor Density	Not applicable
Specific Gravity	1.886
Bulk Density	750 - 1000 kg/m^3
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	
Decomposition Temperature	500 °C
Viscosity	Not applicable
Molecular Formula	C K N S
Molecular Weight	97.18

10. Stability and reactivity

Reactive Hazard Yes

Stability Light sensitive. Moisture sensitive. Air sensitive.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Exposure to light. Exposure to moist air or water. Exposure to air.

Incompatible Materials Strong oxidizing agents, Acids, Strong bases

Hazardous Decomposition Products Nitrogen oxides (NOx), Sulfur oxides, Potassium oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions Contact with acids liberates very toxic gas.

11. Toxicological information

Acute Toxicity

Product Information
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Potassium thiocyanate	LD50 = 854 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Potassium thiocyanate	333-20-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Metabolism may release cyanide, which may result in headache, dizziness, weakness, collapse, unconsciousness, and possible death: May cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood)

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Potassium thiocyanate	Not listed	Oncorhynchus mykiss: LC50: 11 mg/l/96h	Not listed	Dahnia Magna: EC50: 2.8 mg/l/96h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and

national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Potassium thiocyanate	333-20-0	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Potassium thiocyanate	333-20-0	X	-	206-370-1	X	X	X	X	KE-29216

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Potassium thiocyanate	333-20-0	>95	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Potassium thiocyanate	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Potassium thiocyanate	X		-

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Potassium thiocyanate	-	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	Y
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Creation Date	15-Feb-2010
Revision Date	14-Feb-2020
Print Date	14-Feb-2020
Revision Summary	SDS authoring systems update, replaces ChemGes SDS No. 333-20-0/2.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Safety Data Sheet

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH)

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Substance name: **Propane**
Code: 815868
REACH Registration Number: Not applicable
Issue date: 26-May-2021

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Fuel
Chemical feedstock

Uses advised against: Other uses are not recommended unless an assessment demonstrates potential exposures will be controlled.

1.3. Details of the supplier of the safety data sheet

Manufacturer/Supplier: JET Tankstellen Deutschland GmbH
Caffamacherreihe 1
20355 Hamburg
Tel.: +49 40 63801 – 0

SDS Information: URL: www.Phillips66.com/SDS
JETDSafetyDataSheets@p66.com

1.4. Emergency telephone number

CHEMTREC Global +1 703 527 3887
CHEMTREC Germany 0800-181-7059
CHEMTREC Switzerland +0800 564 402

Poison Centre Charité - Universitätsmedizin Berlin: +49 30 19240 (24 Hours)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

CLP Classification (EC No 1272/2008)

H220 - Flammable gases -- Category 1
H280 -- Gases under pressure -- Liquefied gas

2.2. Label elements

DANGER

H220 - Extremely flammable gas
H280 - Contains gas under pressure; may explode if heated
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P243 - Take precautionary measures against static discharge
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P410 + P403 - Protect from sunlight. Store in a well-ventilated place

2.3. Other hazards

May displace oxygen and cause rapid suffocation

Does not meet the criteria for persistent, bioaccumulative and toxic (PBT) or very persistent, very bioaccumulative (vPvB) substances.

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical Name	CASRN	EINECS	REACH Reg. No	Concentration[1]	Classification[2]
Propane	74-98-6	200-827-9	--	95 - 100	Flam. Gas 1, H220 Press. Gas,
Butane	106-97-8	203-448-7	--	<5	Flam. Gas 1, H220 Press. Gas

[1] All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
[2] Regulation EC 1272/2008..

Odorised products contain small quantities (<0.1%) ethyl mercaptan as an olfactory indicator.

SECTION 4: First aid measures

4.1. Description of first aid measures

Eye Contact: For contact with the liquefied gas, remove contact lenses if present and easy to do, hold eyelids apart and gently flush the affected eye(s) with lukewarm water. Seek immediate medical attention.

Skin Contact: Liquefied gases may cause cryogenic burns or injury. Treat burned or frostbitten skin by flushing or immersing the affected area(s) in lukewarm water. Do not rub affected area. Do not remove clothing that adheres due to freezing. After sensation has returned to the frostbitten skin, keep skin warm, dry, and clean. If blistering occurs, apply a sterile dressing. Seek immediate medical attention.

Inhalation: If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If breathing is difficult, oxygen or artificial respiration should be administered by qualified personnel. If symptoms persist, seek medical attention.

Ingestion: This material is a gas under normal atmospheric conditions and ingestion is unlikely.

4.2. Most important symptoms and effects, both acute and delayed

Light hydrocarbon gases are simple asphyxiants and can cause anesthetic effects at high concentrations. Symptoms of overexposure, which are reversible if exposure is stopped, can include shortness of breath, drowsiness, headaches, confusion, decreased coordination, visual disturbances and vomiting. Continued exposure can lead to hypoxia (inadequate oxygen), rapid breathing, cyanosis (bluish discolouration of the skin), numbness of the extremities, unconsciousness and death.

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Dry chemical or carbon dioxide is recommended. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

5.2. Special hazards arising from the substance or mixture

Unusual Fire & Explosion Hazards: Extremely flammable gas. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe) Vapours may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapour/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. If container is not properly cooled, it can rupture in the heat of a fire.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion.

5.3. Special protective actions for fire-fighters

For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Stop spill/release if it can be done safely. If this cannot be done, allow fire to burn. Move undamaged containers from immediate hazard area if it can be done safely. Stay away from ends of container. Water spray may be useful in minimizing or dispersing vapours and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Beware of accumulation of gas in low areas or contained areas, where explosive concentrations may occur. Prevent from entering drains or any place where accumulation may occur. Ventilate area and allow to evaporate. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorised personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

6.2. Environmental precautions

Stop and contain spill/release if it can be done safely. Water spray may be useful in minimizing or dispersing vapours. If spill occurs on water notify appropriate authorities and advise shipping of any hazard.

6.3. Methods and material for containment and cleaning up

Notify relevant authorities in accordance with all applicable regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take precautionary measures against static discharge. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely flammable. Gas can accumulate in confined spaces and limit oxygen available for breathing. Use only with adequate ventilation Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes for specific bonding/grounding requirements). Do not enter confined spaces such as tanks or pits without following proper entry procedures.
Propane and odorant are heavier than air and will collect and pool along the ground or floor. Odorant, therefore, may not be detectable above the location of propane storage or service (for example, odorant in propane released or leaked into the basement of a dwelling may not be detected above the basement).WARNING - The intensity of the odorant may fade over prolonged storage or in the presence of rust, when placed initially in new or freshly-cleaned storage vessels, or when exposed to masonry.
The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of incomplete combustion products (e.g. carbon monoxide, oxides of sulphur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.

7.2. Conditions for safe storage, including any incompatibilities

Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet Country or Committee standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death.

7.3. Specific end use(s)

Refer to supplemental exposure scenarios if attached.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
Occupational Exposure Limits:

Chemical Name	ACGIH	Austria	Germany	Switzerland	Phillips 66
Propane	Simple asphyxiant	TWA-8hr: 1000 ppm (TMW) TWA-8hr: 1800 mg/m^3 (TMW) STEL: 2000 ppm KZW 3 X 60 min STEL: 3600 mg/m^3 KZW 3 X 60 min	TWA-8hr: 1000 ppm (AGW) TWA-8hr: 1800 mg/m^3 (AGW)	TWA-8hr: 1000 ppm (MAK) TWA-8hr: 1800 mg/m^3 (MAK) STEL: 4000 ppm (KZW) STEL: 7200 mg/m^3 (KZW)	---
Butane	STEL: 1000 ppm Butane, isomers	TWA-8hr: 800 ppm (TMW) TWA-8hr: 1900 mg/m^3 (TMW) STEL: 1600 ppm KZW 3 X 60 min STEL: 3800 mg/m^3 KZW 3 X 60 min	TWA-8hr: 1000 ppm (AGW) TWA-8hr: 2400 mg/m^3 (AGW)	TWA-8hr: 800 ppm (MAK) TWA-8hr: 1900 mg/m^3 (MAK) STEL: 3200 ppm (KZW) STEL: 7600 mg/m^3 (KZW)	---

STEL = Short Term Exposure Limit (15 minutes); TWA = Time Weighted Average (8 hours); --- = No Occupational Exposure Limit Local regulations may be more stringent than regional or national requirements

Biological Limit Values: None

Relevant DNEL and PNEC: No information available

Environmental Predicted No-Effect Concentration (PNEC): No information available

8.2. Exposure controls
Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.
Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds EN 166 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.
Skin/Hand Protection: Wear thermal insulating gloves and face shield or eye protection when working with materials that present thermal hazards (hot or cold).
Respiratory Protection: An approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection programme that follows recommendations for the selection, use, care and maintenance of respiratory protective devices in EN 529:2005 should be followed whenever workplace conditions warrant a respirator's use.
Environmental Exposure Controls: Refer to Sections 6, 7, 12 and 13.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Data represent typical values and are not intended to be specifications. N/A = Not Applicable; N/D = Not Determined

Appearance:	Colourless
Physical form of product:	Liquefied gas
Odour:	No distinct odour (or skunk, rotten egg or garlic if odorant added)
Odour threshold:	N/D
pH:	N/A
Melting / freezing point:	-189.7 °C
Initial boiling point and boiling range:	-42.1 °C
Flash point:	< -40 °C
Method:	N/A
Evaporation Rate (nBuAc=1):	N/D
Flammability (solid, gas):	Extremely flammable
Upper Explosive Limits (vol % in air):	10.9
Lower Explosive Limits (vol % in air):	1.7
Vapour pressure:	8.3 bar @ 20°C
Vapour density:	>1 (air = 1)
Relative density:	0.51 @ 15°C (water = 1)
Solubility(ies):	Soluble in organic solvents. Soluble in water, 0.0298 mg/l
Partition coefficient n-octanol /water (log KOW):	N/D
Autoignition temperature:	470 °C
Decomposition temperature:	N/D
Viscosity:	N/D
Explosive properties:	N/D
Oxidising properties:	N/D

9.2. Other information

Other information

Pour point:	N/D
Bulk Density:	N/D

SECTION 10: Stability and reactivity

10.1. Reactivity — Not chemically reactive.

10.2. Chemical stability — Stable under normal ambient and anticipated conditions of use.

10.3. Possibility of hazardous reactions — Hazardous reactions not anticipated.

10.4. Conditions to avoid — Avoid all possible sources of ignition. Heat will increase pressure in the storage tank.

10.5. Incompatible materials — Avoid contact with acids, aluminium chloride, chlorine, chlorine dioxide, halogens and oxidizing agents.

10.6. Hazardous decomposition products — Not anticipated under normal conditions of use.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Substance / Mixture

Acute Toxicity	Hazard	Additional Information	LC50/LD50 Data
Inhalation	Unlikely to be harmful	Simple asphyxiant. May displace oxygen and cause rapid suffocation.	>12190 ppm (gas); (rat)

		See section 4 for more information.	
Dermal	Skin absorption is not anticipated		Not applicable
Oral	Ingestion is not anticipated		Not applicable

Likely Routes of Exposure: Inhalation, eye contact, skin contact

Aspiration Hazard: Not applicable.

Skin Corrosion/Irritation: Not expected to be irritating. Contact with the liquefied or pressurized gas may cause frostbite ("cold" burn).

Serious Eye Damage/Irritation: Not expected to be irritating. Contact with the liquefied or pressurized gas may cause momentary freezing followed by swelling and eye damage.

Skin Sensitisation: Skin contact is not anticipated.

Respiratory Sensitisation: Not expected to be a respiratory sensitizer.

Specific Target Organ Toxicity (Single Exposure): Not expected to cause organ effects from single exposure.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure. No systemic or neurotoxic effects were noted in rats exposed to concentrations of propane as high as 12,000 ppm for 28 days.
Carcinogenicity: Not expected to cause cancer.

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity. No adverse reproductive or developmental effects were observed in rats exposed to propane; no observed adverse effect level = 12,000 ppm.

Other Comments: High concentrations may reduce the amount of oxygen available for breathing, especially in confined spaces. Hypoxia (inadequate oxygen) during pregnancy may have adverse effects on the developing foetus.

The odorant, ethyl mercaptan, can be irritating to the eyes, skin and respiratory tract. At high concentrations, a person can temporarily lose the ability to smell ethyl mercaptan. In addition, some individuals may have an impaired sense of smell, which inhibits the detection of the odorant.

11.2 Information on Hazardous Components

Butane

Target Organ(s): No systemic or neurotoxic effects were noted in rats exposed to concentrations of butane as high as 9,000 ppm for 28 days.
Reproductive Toxicity: No adverse reproductive or developmental effects were observed in rats exposed to butane; no observed adverse effect level = 12,000 ppm.

SECTION 12: Ecological information

12.1. Toxicity

Petroleum gases will readily evaporate from the surface and would not be expected to have significant adverse effects in the aquatic environment.

12.2. Persistence and degradability

The hydrocarbons in this material are expected to be inherently biodegradable. In practise, hydrocarbon gases are not likely to remain in solution long enough for biodegradation to be a significant loss process.

12.3. Bioaccumulative potential

Log Kow values measured for the hydrocarbon gases range from 2.3 for propane to 2.8 for butane and are not regarded as having the potential to bioaccumulate.

12.4. Mobility in soil

Due to the extreme volatility of petroleum gases, air is the only environmental compartment in which these hydrocarbons will be

found. In air, these hydrocarbons undergo photodegradation by reaction with hydroxyl radicals with half-lives ranging from 3.2 days for n-butane to 7 days for propane.

12.5. Results of PBT and vPvB assessment
Not a PBT or vPvB substance.

12.6. Other adverse effects
None anticipated.

German Water Hazard Information: Not considered hazardous to water

SECTION 13: Disposal considerations

13.1. Waste treatment methods

European Waste Code: 16 05 04* gases in pressure containers (including halons) containing dangerous substances

This material, if discarded as produced, would be considered as hazardous waste pursuant to Directive 2008/98/EC on hazardous waste, and subject to the provisions of that Directive unless Article 1(5) of that Directive applies.
This code has been assigned based upon the most common uses for this material and may not reflect contaminants resulting from actual use. Waste generators/producers are responsible for assessing the actual process used when generating the waste and it's contaminants in order to assign the proper waste disposal code.

Disposal must be in accordance with Directive 2008/98/EC and other applicable national or regional provisions, and based upon material characteristics at time of disposal. For incineration of waste, follow Directive 2000/76/EC. For landfill of waste, follow Directive 1999/31/EC. Product is suitable for burning in an enclosed controlled burner for fuel value if >5000 BTU, or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Follow Directive 2000/76/EC.

Empty Containers: Container contents should be completely used and containers emptied prior to discard. Empty drums should be properly sealed and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with applicable regulations.

SECTION 14: Transport information

14.1. UN number
UN1978

14.2. UN proper shipping name
Propane,

14.3. Transport hazard class(es)
2.1

14.4. Packing group
None

14.5. Environmental hazards
This product does not meet the DOT/UN/IMDG/IMO criteria of a marine pollutant

14.6. Special precautions for user
None

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EC 1272/2008 - Classification, labelling and packaging of substances and mixtures
EN166:2002 Eye Protection
EN 529:2005 Respiratory Protective devices

BS EN 374-1:2016 Protective gloves against chemicals and micro-organisms
Occupational Exposure Limits, Technical Rules for Dangerous Substances
Federal Water Act on the Classification of Substances Hazardous to Waters
Directive 2008/98/EC (Waste Framework Directive)
Directive 2000/76/EC on incineration of waste
Directive 1999/31/EC on landfill of waste

Export Rating: NLR (No Licence Required)

15.2. Chemical safety assessment

A formal chemical safety assessment is not required for this mixture.

SECTION 16: Other information

Issue date	26-May-2021
Status:	FINAL
Previous Issue Date:	25-May-2021
Revised Sections or Basis for Revision:	First Aid (Section 4)
Safety Data Sheet Number:	**815868**
Language:	BE

List of Relevant Hazard Statements:
H280 - Contains gas under pressure; may explode if heated
H220 - Extremely flammable gas

Regulatory Basis of Classification	
Classification	Regulatory Basis
H220 - Flammable gases -- Category 1	Based on component information.
H280 -- Gases under pressure -- Liquefied gas	Based on component information.

Key literature references and sources for data:
Information used includes one or more of the following: results from internal company data, supplier toxicology studies, CONCAWE Product Dossiers and other publicly available resources.

Guide to Abbreviations:
ACGIH = American Conference of Governmental Industrial Hygienists; ADR = Agreement on Dangerous Goods by Road; BMGV = Biological Monitoring Guidance Value; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA = [US] Environmental Protection Agency; Germany-TRGS = Technical Rules for Dangerous Substances; IARC = International Agency for Research on Cancer; ICAO/IATA = International Civil Aviation Organisation / International Air Transport Association; INSHT = National Institute for Health and Safety at Work; IMDG = International Maritime Dangerous Goods; Irland-HSA = Ireland's National Health and Safety Authority; LEL = Lower Explosive Limit; MARPOL = Marine Pollution; N/A = Not Applicable; N/D = Not Determined; NTP = [US] National Toxicology Programme; PBT = Persistent, Bioaccumulative and Toxic; RID = Regulations Concerning the International Transport of Dangerous Goods by Rail; STEL = Short Term Exposure Limit; TLV = Threshold Limit Value; TRGS 903 = Technical rules for hazardous substances; TWA = Time Weighted Average; UEL = Upper Explosive Limit; UK-EH40 = United Kingdom EH40/2005 OEL; vPvB = very Persistent, very Bioaccumulative

Disclaimer of Expressed and implied Warranties:
The information presented in this Safety Data Sheet is based on data believed to be accurate as of the date this Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorisation is given nor implied to practice any patented invention without a licence.

SAFETY DATA SHEET

Creation Date 24-Nov-2010 **Revision Date** 14-Feb-2020 **Revision Number** 2

1. Identification

Product Name **Quinhydrone**

Cat No. : **A16681**

CAS-No 106-34-3
Synonyms p-Benzoquinhydrone.

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 3
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
Toxic if swallowed
Causes skin irritation
Causes serious eye irritation

May cause respiratory irritation

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
2,5-Cyclohexadiene-1,4-dione, compound with 1,4-benzenediol (1:1)	106-34-3	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.

Inhalation Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical attention. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects	No information available.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	Not applicable
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition. Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	1	1	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes or clothing.
Environmental Precautions	Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.
Methods for Containment and Clean Up	Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid dust formation. Do not breathe (dust, vapor, mist, gas). Do not get in eyes, on skin, or on clothing. Do not ingest. If swallowed then seek immediate medical assistance.
Storage	Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed. Protect from direct sunlight. Keep under nitrogen.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Dark green
Odor	No information available
Odor Threshold	No information available
pH	No information available
Melting Point/Range	168 - 172 °C / 334.4 - 341.6 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	1.400 g/cm3
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C12 H10 O4
Molecular Weight	218.21

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability May form explosive peroxides. Air sensitive. Light sensitive.

Conditions to Avoid Avoid dust formation. Incompatible products. Excess heat. Exposure to air. Exposure to light.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
2,5-Cyclohexadiene-1,4-dione, compound with 1,4-benzenediol (1:1)	LD50 = 225 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
2,5-Cyclohexadiene-1, 4-dione, compound with 1,4-benzenediol (1:1)	106-34-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Very toxic to aquatic organisms. The product contains following substances which are hazardous for the environment.

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
2,5-Cyclohexadiene-1,4-dione, compound with 1,4-benzenediol (1:1)	0.16

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN2811
Proper Shipping Name	Toxic solid, organic, n.o.s.
Hazard Class	6.1
Packing Group	III

TDG

UN-No	UN2811
Proper Shipping Name	Toxic solid, organic, n.o.s.
Hazard Class	6.1
Packing Group	III

IATA

UN-No	UN2811
Proper Shipping Name	TOXIC SOLID, ORGANIC, N.O.S.*
Hazard Class	6.1
Packing Group	III

IMDG/IMO

UN-No	UN2811
Proper Shipping Name	Toxic solid, organic, n.o.s.
Hazard Class	6.1
Packing Group	III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
2,5-Cyclohexadiene-1,4-dione, compound with 1,4-benzenediol (1:1)	106-34-3	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
2,5-Cyclohexadiene-1,4-dione, compound with 1,4-benzenediol (1:1)	106-34-3	X	-	203-387-6	X	-	X	X	-

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration	Not applicable
CERCLA	Not applicable
California Proposition 65	This product does not contain any Proposition 65 chemicals.
U.S. State Right-to-Know Regulations	Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security	This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade	No information available

16. Other information

Prepared By	Health, Safety and Environmental Department Email: tech@alfa.com www.alfa.com
Creation Date	24-Nov-2010
Revision Date	14-Feb-2020
Print Date	14-Feb-2020
Revision Summary	SDS authoring systems update, replaces ChemGes SDS No. 106-34-3.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Revision Date 25-Apr-2019 **Revision Number** 2

1. Identification

Product Name **Selenium, AAS standard solution, Specpure®, Se 1000µg/ml**

Cat No. : **88094**

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Skin Corrosion/irritation	Category 1 A
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals
Causes severe skin burns and eye damage
May cause respiratory irritation

Precautionary Statements
Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Keep only in original container
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Spills
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	94.90
Nitric acid	7697-37-2	5.00
Selenium	7782-49-2	0.10

4. First-aid measures

General Advice
Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. Call a physician immediately.

Inhalation	If not breathing, give artificial respiration. Remove from exposure, lie down. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.
Ingestion	Do not induce vomiting. Clean mouth with water. Never give anything by mouth to an unconscious person. Call a physician immediately.
Most important symptoms and effects	Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Not combustible. CO_2, dry chemical, dry sand, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes.

Hazardous Combustion Products
Nitrogen oxides (NOx) Selenium oxide
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	0	-

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional ecological information. Do not allow material to contaminate ground water system. Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling	Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe vapors or spray mist. Do not ingest.
Storage	Corrosives area. Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Nitric acid	TWA: 2 ppm STEL: 4 ppm	(Vacated) TWA: 2 ppm (Vacated) TWA: 5 mg/m³ (Vacated) STEL: 4 ppm (Vacated) STEL: 10 mg/m³ TWA: 2 ppm TWA: 5 mg/m³	IDLH: 25 ppm TWA: 2 ppm TWA: 5 mg/m³ STEL: 4 ppm STEL: 10 mg/m³	TWA: 2 ppm STEL: 4 ppm
Selenium	TWA: 0.2 mg/m³	(Vacated) TWA: 0.2 mg/m³	IDLH: 1 mg/m³ TWA: 0.2 mg/m³	TWA: 0.2 mg/m³

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear
Odor	No information available
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	<=1100 hPa @ 50 °C
Vapor Density	No information available
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

Molecular Formula Se in 5% HN O3

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong bases

Hazardous Decomposition Products Nitrogen oxides (NOx), Selenium oxide

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	Not listed	Not listed
Nitric acid	Not listed	Not listed	LC50 = 2500 ppm. (Rat) 1h
Selenium	LD50 = 6700 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Nitric acid	7697-37-2	Not listed	Not listed	Not listed	Not listed	Not listed
Selenium	7782-49-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and Product is a corrosive material. Use of gastric lavage or emesis is contraindicated.

delayed Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

May cause long-term adverse effects in the environment. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nitric acid	Not listed	LC50: = 72 mg/L, 96h (Gambusia affinis)	Not listed	Not listed

Persistence and Degradability based on information available. May persist

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Nitric acid	-2.3

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3264
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Proper technical name (NITRIC ACID)
Hazard Class 8
Packing Group III

TDG

UN-No UN3264
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Hazard Class 8
Packing Group III

IATA

UN-No UN3264
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Hazard Class 8
Packing Group III

IMDG/IMO

UN-No UN3264
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Hazard Class 8
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags

Water	7732-18-5	X	ACTIVE	-
Nitric acid	7697-37-2	X	ACTIVE	-
Selenium	7782-49-2	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	-	X	X	KE-35400
Nitric acid	7697-37-2	X	-	231-714-2	X	X	X	X	KE-25911
Selenium	7782-49-2	X	-	231-957-4	X	-	X	X	KE-30924

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nitric acid	7697-37-2	5.00	1.0
Selenium	7782-49-2	0.10	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nitric acid	X	1000 lb	-	-
Selenium	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Selenium	X		-

OSHA - Occupational Safety and Health Administration Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Nitric acid	-	TQ: 500 lb

CERCLA Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nitric acid	1000 lb	1000 lb
Selenium	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Nitric acid	X	X	X	X	X
Selenium	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product contains the following DHS chemicals:
Legend - STQs = Screening Threshold Quantities, APA = A placarded amount

Component	DHS Chemical Facility Anti-Terrorism Standard
Nitric acid	Release STQs - 15000lb Theft STQs - 400lb

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By

Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com

Revision Date 25-Apr-2019
Print Date 25-Apr-2019
Revision Summary SDS authoring systems update, replaces ChemGes SDS No. 1,705.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 22-Sep-2009 **Revision Date** 22-Feb-2019 **Revision Number** 2

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identification

Product Description: Silicon atomic absorption standard solution
Cat No. : **196290000; 196291000**

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Based on available data, the classification criteria are not met

Health hazards

Skin Corrosion/irritation	Category 1 B (H314)
Serious Eye Damage/Eye Irritation	Category 1 (H318)

Environmental hazards
Based on available data, the classification criteria are not met

2.2. Label elements

Signal Word **Danger**

Hazard Statements

H314 - Causes severe skin burns and eye damage

Precautionary Statements

P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P310 - Immediately call a POISON CENTER or doctor/ physician

2.3. Other hazards

No information available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Water	7732-18-5	231-791-2	98	-
Sodium hydroxide	1310-73-2	215-185-5	2	Skin Corr. 1A (H314) Eye Dam. 1 (H318)
Silicon (4+)	NA		0.1	-

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Ingestion Do not induce vomiting. Obtain medical attention.

Inhalation Move to fresh air. Obtain medical attention. If not breathing, give artificial respiration.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

4.2. Most important symptoms and effects, both acute and delayed

Causes burns by all exposure routes. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Carbon dioxide (CO_2). Dry chemical. Chemical foam.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
None under normal use conditions.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation.

6.2. Environmental precautions

See Section 12 for additional ecological information.

6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Ensure adequate ventilation. Wear personal protective equipment. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing before re-use. Wash hands before breaks and at the end of workday.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Corrosives area. Keep containers tightly closed in a dry, cool and well-ventilated place.

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **UK** - EH40/2005 Containing the workplace exposure limits (WELs) for use with the Control of Substances Hazardous to Health Regulations (COSHH) 2002 (as amended). Updated by September 2006 official press release and October 2007 Supplement. **IRE -** 2010 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations 2001. Published by the Health and Safety Authority.

Component	The United Kingdom	European Union	Ireland
Sodium hydroxide	2 mg/m³ STEL		STEL: 2 mg/m³ 15 min

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.

Derived No Effect Level (DNEL) No information available

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				
Inhalation				

Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Engineering Measures
Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Natural rubber Nitrile rubber Neoprene PVC	See manufacturers recommendations	-	EN 374	(minimum requirement)

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

Large scale/emergency use Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced
Recommended Filter type: Particulates filter conforming to EN 143

Small scale/Laboratory use Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Recommended half mask:- Particle filtering: EN149:2001
When RPE is used a face piece Fit Test should be conducted

Environmental exposure controls No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance	No information available	
Physical State	Liquid	
Odor	aromatic	
Odor Threshold	No data available	
pH	No information available	
Melting Point/Range	No data available	
Softening Point	No data available	
Boiling Point/Range	No information available	
Flash Point	No information available	**Method -** No information available
Evaporation Rate	No data available	
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	No data available	

Vapor Pressure	No data available	
Vapor Density	No data available	(Air = 1.0)
Specific Gravity / Density	1.020	
Bulk Density	Not applicable	Liquid
Water Solubility	Miscible	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Autoignition Temperature	No data available	
Decomposition Temperature	No data available	
Viscosity	No data available	
Explosive Properties	No information available	
Oxidizing Properties	No information available	

9.2. Other information

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions No information available.

10.4. Conditions to avoid

Incompatible products.

10.5. Incompatible materials

Strong acids.

10.6. Hazardous decomposition products

None under normal use conditions.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Product Information No acute toxicity information is available for this product

(a) acute toxicity;

Oral Based on available data, the classification criteria are not met
Dermal Based on available data, the classification criteria are not met
Inhalation Based on available data, the classification criteria are not met

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-		
Sodium hydroxide	LD50 140 - 340 mg/kg (Rat)	LD50 = 1350 mg/kg (Rabbit)	

(b) skin corrosion/irritation; Category 1 B

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs None known.

(j) aspiration hazard; No data available

Symptoms / effects,both acute and delayed Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity
Ecotoxicity effects Do not empty into drains. .

Component	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
Sodium hydroxide	LC50: = 45.4 mg/L, 96h static (Oncorhynchus mykiss)	-	-	-

12.2. Persistence and degradability
Persistence Miscible with water, Persistence is unlikely, based on information available.

12.3. Bioaccumulative potential Bioaccumulation is unlikely

12.4. Mobility in soil The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility. Highly mobile in soils

12.5. Results of PBT and vPvB assessment No data available for assessment.

12.6. Other adverse effects
Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors
Persistent Organic Pollutant This product does not contain any known or suspected substance

Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues / Unused Products Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Contaminated Packaging Dispose of this container to hazardous or special waste collection point.

European Waste Catalogue (EWC) According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.

Other Information Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Do not dispose of waste into sewer. Large amounts will affect pH and harm aquatic organisms.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

14.1. UN number UN1824
14.2. UN proper shipping name Sodium hydroxide solution
14.3. Transport hazard class(es) 8
14.4. Packing group II

ADR

14.1. UN number UN1824
14.2. UN proper shipping name Sodium hydroxide solution
14.3. Transport hazard class(es) 8
14.4. Packing group II

IATA

14.1. UN number UN1824
14.2. UN proper shipping name Sodium hydroxide solution
14.3. Transport hazard class(es) 8
14.4. Packing group II

14.5. Environmental hazards No hazards identified

14.6. Special precautions for user No special precautions required

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories X = listed.

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Water	231-791-2	-		X	X	-	X	-	X	X	KE-35400
Sodium hydroxide	215-185-5	-		X	X	-	X	X	X	X	KE-3148

											7

National Regulations

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Sodium hydroxide	WGK 1	

Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment.

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3
H314 - Causes severe skin burns and eye damage
H318 - Causes serious eye damage

Legend

CAS - Chemical Abstracts Service
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic
TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
PNEC - Predicted No Effect Concentration
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor
ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC - Volatile Organic Compounds

Key literature references and sources for data
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
First aid for chemical exposure, including the use of eye wash and safety showers.

Creation Date 22-Sep-2009
Revision Date 22-Feb-2019
Revision Summary Not applicable.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

RICCA CHEMICAL COMPANY®

Safety Data Sheet

Classified according to WHMIS 2015

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: Potassium Chloride, 3 Molar, saturated with Silver Chloride, Electrode Filling Solution

Product Number: 5918

Other Identifying Product Numbers: 5918-16, 5918-32, 5918-4

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Ricca Chemical Company
Address: 448 West Fork Drive

Arlington, TX 76012 USA

Telephone: 888-467-4222

1.4. Emergency Telephone Number (24 hours)

CHEMTREC (USA)	800-424-9300
CHEMTREC (International)	1+ 703-527-3887

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

This product is not categorized as hazardous in any GHS hazard class.

2.2. GHS Label Elements

Pictograms: None Required.

Signal Word: None Required.

Safety Data Sheet

Hazard Statements: None Required.

Precautionary Statements: None Required.

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Water	H_2O	18.01 g/mol	7732-18-5	80.26
Potassium Chloride	KCl	74.55 g/mol	7447-40-7	19.74
Silver Nitrate	$AgNO_3$	169.87 g/mol	7761-88-8	0.00

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: May cause slight irritation.

Inhalation: Not expected to require first aid. If necessary, remove to fresh air.

Skin Contact: May cause slight irritation.

Ingestion: Dilute with water or milk. Call a physician if necessary.

4.2. Most Important Symptoms and Effects, Acute and Delayed

Non-flammable, non-toxic, non-corrosive. Does not present any significant health hazards. Wash areas of contact with water. EYE CONTACT: May cause slight irritation. SKIN CONTACT: May cause slight irritation.

4.3. Medical Attention or Special Treatment Needed

Not expected to require special treatment.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Use any means suitable for extinguishing surrounding fire.

5.2. Specific Hazards Arising from the Substance or Mixture

Not considered to be a fire or explosion hazard.

5.3. Special Protective Equipment for Firefighters

Use protective clothing and breathing equipment appropriate for the surrounding fire.

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear appropriate PPE for the size and nature of the spill. As a general rule, wear safety glasses and gloves.

6.2. Cleanup and Containment Methods and Materials

Absorb with suitable inert material (vermiculite, dry sand, etc) and place in a chemical waste container for proper disposal. Do not flush to sewer. Dispose of in accordance with local regulations.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage. Store above 20oC to prevent crystallization. If crystallization does occur, warm gently in a hot water bath and agitate occasionally to redissolve.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Silver Nitrate (7761-88-8)	TWA	USA	0.01 mg/m³ TWA (as Ag)	U.S. - OSHA - Final PELs - Time Weighted Averages (TWAs)
Silver Nitrate (7761-88-8)	TLV-TWA	USA	0.01 mg/m³ TWA (as Ag)	ACGIH - Threshold Limit Values - Time Weighted Averages (TLV-TWA)

8.2. Exposure Controls

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Chemical resistant gloves.

Eye Protection: Safety glasses or goggles.

8.3. Personal Protective Equipment

Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

Safety Data Sheet

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance: Colorless liquid
Physical State: Liquid
Odor: Data not available.
Odor Threshold: Data not available.
pH: app 7
Melting/Freezing Point: Approximately 0°C
Initial Boiling Point/Range: Approximately 100°C - Approximately 100°C
Flash Point: Data not available.
Evaporation Rate: Data not available.
Flammability: Data not available.
Flammability/Explosive Limits: Data not available.
Vapor Pressure: Data not available.
Vapor Density: Data not available.
Relative Density: 1.13
Solubility: Miscible
Partition Coefficient: Data not available.
Auto-Ignition Temperature: Data not available.
Decomposition Temperature: Data not available.
Viscosity: Data not available.
Explosive Properties: Data not available.
Oxidizing Properties: Data not available.

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Stable under normal conditions of use and storage.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Bromine Trifluoride, Potassium Permanganate plus Sulfuric Acid.

10.4. Hazardous Decomposition Products

Will not occur.

Safety Data Sheet

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:

Not applicable.

Acute Toxicity - Dermal Exposure:

Not applicable.

Acute Toxicity - Inhalation Exposure:

Not applicable.

Acute Toxicity - Other Information:

LD50, Oral, Rat: (Potassium Chloride) 2600 mg/kg, details of toxic effects not reported other than lethal dose value; Irritation (Potassium Chloride): eye, rabbit (500mg/24 hr mild); LD50, Oral, Rat: (Silver Nitrate) 1173 mg/kg, behavioral, respiratory and gastrointestinal effects noted. Silver Nitrate is investigated as a tumorigen.

Skin Corrosion and Irritation:

Not applicable.

Serious Eye Damage and Irritation:

Not applicable.

Respiratory Sensitization:

Not applicable.

Skin Sensitization:

Not applicable.

Germ Cell Mutagenicity:

Not applicable.

Carcinogenicity:

Not applicable.

Reproductive Toxicity:

Not applicable.

Specific Target Organ Toxicity from Single Exposure:

Not applicable.

Specific Target Organ Toxicity from Repeated Exposure:

Not applicable.

Aspiration Hazard:

Not applicable.

Additional Toxicology Information:

Data not available.

Safety Data Sheet

SECTION 12: Ecological Information

12.1. Ecotoxicity

Not applicable.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Data not available.

SECTION 14: Transportation Information

14.1. Transportation by Land-Department of Transportation (DOT, United States of America)

Not regulated according to DOT Regulations.

14.2. Transportation by Air - International Air Transport Association (IATA)

Not regulated according to IATA Dangerous Goods Regulations.

14.3 Transportation of Dangerous Goods (TDG, Canada)

Not regulated according to TDG Regulations.

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Not listed.

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Not listed.

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Silver Nitrate (CAS # 7761-88-8): 1 lb final RQ; 0.454 kg final RQ

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Silver Nitrate (CAS # 7761-88-8): 1.0 % de minimis concentration (listed under Chemical Category N740)

Silver Nitrate (CAS # 7761-88-8): 1.0 % de minimis concentration (reportable only when in aqueous solution, Chemical Category N511)

15.5. Massachusetts Right-to-Know Substance List

Silver Nitrate (CAS # 7761-88-8): Present

15.6. Pennsylvania Right-to-Know Hazardous Substances

Water (CAS # 7732-18-5): Present

Silver Nitrate (CAS # 7761-88-8): Environmental hazard

Silver Nitrate (CAS # 7761-88-8): Present

15.7. New Jersey Worker and Community Right-to-Know Components

Silver Nitrate (CAS # 7761-88-8): corrosive

Silver Nitrate (CAS # 7761-88-8): sn 1672

Silver Nitrate (CAS # 7761-88-8): sn 3008

Silver Nitrate (CAS # 7761-88-8): SN 3008 500 lb TPQ (Category Code N740. Includes any unique chemical substance that contains the named metal as part of that chemical structure)

Silver Nitrate (CAS # 7761-88-8): sn 3722

Silver Nitrate (CAS # 7761-88-8): SN 3722 500 lb TPQ (water dissociable, Category Code N511)

15.8. California Proposition 65

Not listed.

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Potassium Chloride (CAS # 7447-40-7): Present (DSL)

Water (CAS # 7732-18-5): Present (DSL)

Silver Nitrate (CAS # 7761-88-8): Present (DSL)

15.10. United States of America Toxic Substances Control Act (TSCA) List

Potassium Chloride (CAS # 7447-40-7): Present

Water (CAS # 7732-18-5): Present

Silver Nitrate (CAS # 7761-88-8): Present

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Potassium Chloride (CAS # 7447-40-7): 231-211-8

Water (CAS # 7732-18-5): 231-791-2

Water (CAS # 7732-18-5): 232-148-9

Silver Nitrate (CAS # 7761-88-8): 231-853-9

SECTION 16: Other Information

16.1. Full Text of Hazard Statements and Precautionary Statements

Safety Data Sheet

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.

Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.

Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.

Biohazardous Infectious Materials Hazard Class: Not Applicable.

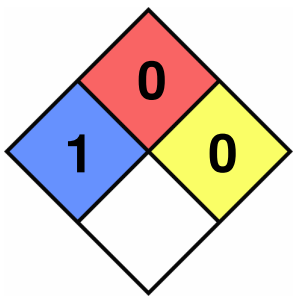
16.3. National Fire Protection Association (NFPA) Rating

Health: 1

Flammability: 0

Reactivity: 0

Special Hazard:



16.4. Document Revision

Last Revision Date: 2020-06-20

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty , expressed or implied, is made and RICCA CHEMICAL COMPANY assumes no legal responsibility or liability whatsoever resulting from its use .

SAFETY DATA SHEET

Version 6.3
Revision Date 02/06/2020
Print Date 02/08/2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Silver

Product Number : 576832
Brand : Aldrich
CAS-No. : 7440-22-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P273 Avoid release to the environment.
P391 Collect spillage.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Ag
Molecular weight	:	107.87 g/mol
CAS-No.	:	7440-22-4
EC-No.	:	231-131-3

Component	Classification	Concentration
Silver		
	Aquatic Acute 1; Aquatic Chronic 1; H400, H410 M-Factor - Aquatic Acute: 100 - Aquatic Chronic: 100	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Silver/silver oxides
Not combustible.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.
Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Air sensitive. Handle and store under inert gas. Keep in a dry place.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Silver	7440-22-4	TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Argyria		
		PEL	0.01 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		TWA	0.01 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 960 °C (1760 °F) - lit.
f)	Initial boiling point and boiling range	2,212 °C 4,014 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	10.49 g/mL
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Silver/silver oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

No data available
Inhalation: No data available

Inhalation: No data available
Dermal: No data available

Dermal: No data available
No data available
No data available

Skin corrosion/irritation
No data available

Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
No data available
Eyes - Rabbit
Result: No eye irritation

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available
No data available

Germ cell mutagenicity
No data available
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.
Further data:
Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity
No data available

Toxicity to fish	semi-static test LC50 - Pimephales promelas (fathead minnow) - 0.0021 mg/l - 96 h Remarks: (ECOTOX Database)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Silver)
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Marine pollutant : yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s.
Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Silver	7440-22-4	2007-07-01

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Silver	7440-22-4	2007-07-01

SECTION 16: Other information

Further information
Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.3 Revision Date: 02/06/2020 Print Date: 02/08/2020

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SDS

SAFETY DATA SHEET

Oakwood Products, Inc
730 Columbia HWY N
Estill, SC 29918
www.oakwoodchemical.com

Phone Numbers:

Product Information	803-739-8800
Transportation Emergency	800-451-8346
Outside the USA	760-602-8700

MATERIAL IDENTIFICATION

NAME: Sodium carbonate
CAS#: [497-19-8]
CAT#: 044706
For R&D use only.

HAZARDS IDENTIFICATION

GHS Classification
Acute toxicity, oral (Category 4)
Skin corrosion/irritation (Category 2)
Serious eye damage/eye irritation (Category 2A)
Respiratory tract irritation (Category 3)

GHS Label elements, including precautionary statements

Pictograms

Signal Word Warning

Hazard Statement(s)

H302	Harmful if swallowed
H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation

Precautionary Statement(s)

P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P264	Wash hands thoroughly after handling.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337 + P313 IF eye irritation persists: Get medical advice/attention.

COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Soda ash, Carbonic acid disodium salt, Calcined soda
Formula : Na2CO3
Molecular Weight : 105.99 g/mol

CAS	Description	Concentration
497-19-8	Sodium carbonate	99%

FIRST AID MEASURES

In case of eye contact
Immediately flush eyes with running water for at least 15 minutes while keeping eyes open. Seek medical attention.

In case of skin contact
Wash thoroughly with soap and plenty of water. Seek medical attention.

If inhaled
Remove victim from source of exposure to fresh air. If breathing is difficult, administer oxygen. Seek medical attention.

If swallowed
Do not induce vomiting. Give water to victim to drink. Seek medical attention.

FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use carbon dioxide, dry chemical powder, alcohol-resistant or polymer foam.

Special protective equipment for fire-fighters
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Unusual fire and explosion hazards/decomposition of product
emits toxic fumes under fire conditions.

ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing fumes, vapors, mists or gas. Ventilate area. Remove all sources of ignition. Evacuate personnel.

Environmental precautions
Prevent further leakage if safe to do so.

Methods and materials for containment and clean up
Absorb spills on sand or vermiculite and place in closed container for disposal.

HANDLING AND STORAGE

Precautions for safe handling
Avoid prolonged use. Avoid all direct contact with material. Do not breathe dust or vapor. Wash thoroughly after handling.

Precautions for safe storage
Keep container tightly closed. Store in a cool, dry, well-ventilated area.
Moisture sensitive.

EXPOSURE CONTROL/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Eye/face protection
Wear protective safety goggles or face shields tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Hand/skin protection
Avoid all direct contact with product.
Wear chemical-resistant gloves.
Wear protective clothing and boots.
After contact with skin, wash immediately.

Respiratory protection
Ensure adequate ventilation during use. Approved respiratory equipment must be used when airborne concentrations are unknown or exceed the exposure limits.

PHYSICAL AND CHEMICAL PROPERTIES

Appearance	solid
Odour	no data available
Odour Threshold	no data available
Melting point/Freezing Point	851°C
Boiling Point	no data available
Flash Point	no data available
Evaporation Rate	no data available
Flammability (solid, gas)	no data available
Upper/Lower Flammability or Explosive limits	no data available
Vapour pressure	no data available
Relative Density	2.532
Solubility(ies)	no data available
Partition coefficient: n-octanol/water	no data available
Auto-ignition temperature	no data available
Decomposition temperature	no data available
Viscosity	no data available
Refractive Index	no data available

STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
Moisture.

Incompatible materials
Strong acids and water.

Hazardous decomposition products
May evolve carbon monoxide, carbon dioxide, and nitrogen oxides.

TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
Rat - 4,090 mg/kg

Inhalation LC50
Rat - 2 h - 5,750 mg/l

Skin corrosion/irritation
Rabbit - Mild irritation - 24 h

Serious eye damage/eye irritation
Rabbit - Irritation - 24 h

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity
no data available

Reproductive toxicity
no data available

STOT-single exposure
May cause respiratory irritation

STOT-repeated exposure
no data available

Aspiration hazard
no data available

Exposure Routes

Irritating to skin, eyes, and respiratory system.
May have harmful effects if inhaled or swallowed.

Signs and Symptoms of Exposure
Burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

Additional Information
RTECS: VZ4050000

To the best of our knowledge, the health hazards of this material have not been fully investigated.

ECOLOGICAL INFORMATION

Toxicity
Toxicity to fish:
LC50 - Lepomis macrochirus (Bluegill) - 300 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates:
EC50 - Daphnia magna (Water flea) - 265 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects
no data available

DISPOSAL CONSIDERATIONS

Dissolve in or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all Federal, State and local laws.

TRANSPORT INFORMATION

DOT
Classed non-hazardous for shipping.

IMDG
Classed non-hazardous for shipping.

IATA
Classed non-hazardous for shipping.

REGULATORY INFORMATION

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 313.

New Jersey Right to Know Components

This product may contain a chemical on the New Jersey Right to Know Components List.

	CAS
Sodium carbonate	497-19-8

California Prop. 65 Components

This product does not contain a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

OTHER INFORMATION

Version : 1.3

Revision Date : 1/14/2021

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. Oakwood shall not be held liable for any damage resulting from handling or from contact with the above product.

SAFETY DATA SHEET

Version 6.4
Revision Date 02/11/2020
Print Date 04/04/2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sodium cyanide

Product Number : 380970
Brand : SIGALD
Index-No. : 006-007-00-5
CAS-No. : 143-33-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Corrosive to metals (Category 1), H290
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Inhalation (Category 1), H330
Acute toxicity, Dermal (Category 1), H310
Specific target organ toxicity - repeated exposure (Category 1), Thyroid, H372
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Hazard statement(s)

H290	May be corrosive to metals.
H300 + H310 + H330	Fatal if swallowed, in contact with skin or if inhaled.
H372	Causes damage to organs (Thyroid) through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P234	Keep only in original container.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P262	Do not get in eyes, on skin, or on clothing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P350 + P310	IF ON SKIN: Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/ physician.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P314	Get medical advice/ attention if you feel unwell.
P362	Take off contaminated clothing and wash before reuse.
P390	Absorb spillage to prevent material damage.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Contact with acids liberates very toxic gas.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	CNNa
Molecular weight	:	49.01 g/mol
CAS-No.	:	143-33-9
EC-No.	:	205-599-4
Index-No.	:	006-007-00-5

Component	Classification	Concentration
Sodium cyanide		
	Met. Corr. 1; Acute Tox. 2; Acute Tox. 1; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H290, H300, H330, H310, H372, H400,	<= 100 %

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

	H410	

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Dry powder Dry sand

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sodium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage. Do not store near acids.
Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Sodium cyanide	143-33-9	C	4.7 ppm 5 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	10 minute ceiling value		
		TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		CAS number varies with compound Skin designation		
		C	5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Headache Nausea Thyroid effects Danger of cutaneous absorption		

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

		varies		
		PEL	5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: white
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	11.0 - 12.0 at 49.0 g/l at 25 °C (77 °F)
e)	Melting point/freezing point	Melting point/range: 563.7 °C (1046.7 °F) - lit.
f)	Initial boiling point and boiling range	1,500 °C 2,732 °F at 1.013 hPa
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1 hPa at 817 °C (1503 °F)
l)	Vapour density	No data available
m)	Relative density	1.59 kg/m3 at 20 °C (68 °F)
n)	Water solubility	370 g/l at 20 °C (68 °F) - completely soluble
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Dissociation constant ca.9.36 at 20 °C (68 °F) - OECD Test Guideline 112

SECTION 10: Stability and reactivity

10.1 Reactivity

Contact with acids liberates very toxic gas.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Do not store near acids., Strong oxidizing agents, Carbon dioxide (CO2)

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sodium oxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - 5.09 mg/kg
Remarks: (ECHA)
LC50 Inhalation - Rat - male - 1 h - 63 ppm
(OECD Test Guideline 403)
Remarks: (in analogy to similar products)
LD50 Dermal - Rabbit - female - 7.35 mg/kg
Remarks: (ECHA)
LD50 Dermal - Rabbit - 10.4 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Tremor. Lungs, Thorax, or Respiration:Dyspnea.
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Ames test
Salmonella typhimurium
Result: negative
US-EPA
Rat
Result: negative

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure. - Thyroid

Aspiration hazard
No data available

Additional Information
RTECS: VZ7525000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Gasterosteus aculeatus - 0.0988 mg/l - 96 h Remarks: (referred to cyanide ions)(ECHA)
Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - Chironomus riparius (harlequin fly) - 0.012 mg/l - 48 h (OECD Test Guideline 202)
	semi-static test NOEC - Chironomus riparius (harlequin fly) - 0.006 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	EC50 - Nitzschia closterium - 0.051 mg/l - 72 h
Toxicity to bacteria	EC50 - Bacteria - 4.9 mg/l - 6 h Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 42 d Result: ca.99 % - Inherently biodegradable. Remarks: (ECHA)
Chemical Oxygen Demand (COD)	816 mg/g Remarks: (IUCLID)
Ratio BOD/ThBOD	6 %

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 1689 Class: 6.1 Packing group: I
Proper shipping name: Sodium cyanide, solid
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1689 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: SODIUM CYANIDE, SOLID
Marine pollutant : yes

IATA
UN number: 1689 Class: 6.1 Packing group: I
Proper shipping name: Sodium cyanide, solid

SECTION 15: Regulatory information

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Sodium cyanide	143-33-9	1993-02-16

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Sodium cyanide	143-33-9	1993-02-16

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sodium cyanide	143-33-9	1993-02-16

SECTION 16: Other information

Further information
Copyright 2020 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.4 Revision Date: 02/11/2020 Print Date: 04/04/2020

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: January 27, 2021

1 Identification

· **Product identifier**

· **Trade name: Sodium Hydroxide, 0.1N (N/10)**
· **Product code:** SH6200-B

· **Recommended use and restriction on use**
· **Recommended use:** Laboratory chemicals
· **Restrictions on use:** No relevant information available.

· **Details of the supplier of the Safety Data Sheet**
· **Manufacturer/Supplier:**
AquaPhoenix Scientific, Inc.
860 Gitts Run Road
Hanover, PA 17331 USA
Tel +1 (717)632-1291
Toll-Free: (866)632-1291
info@aquaphoenixsci.com
· **Distributor:**
AquaPhoenix Scientific
860 Gitts Run Road,
Hanover, PA 17331
(717) 632-1291

· **Emergency telephone number:**
ChemTel Inc.
(800)255-3924 (North America)
+1 (813)248-0585 (International)

2 Hazard(s) identification

· **Classification of the substance or mixture**
The substance is not classified as hazardous according to the Globally Harmonized System (GHS).

· **Label elements**
· **GHS label elements** Not regulated.
· **Hazard pictograms:** Not regulated.
· **Signal word:** Not regulated.
· **Hazard statements:** Not regulated.

· **Other hazards** There are no other hazards not otherwise classified that have been identified.

3 Composition/information on ingredients

· **Chemical characterization: Substances**

· **Components:**		
7732-18-5	Water	99.6%
1310-73-2	Sodium hydroxide Met. Corr.1, H290; Skin Corr. 1A, H314; Eye Dam. 1, H318	0.4%

· **Additional information:**
For the listed ingredient(s), the identity and/or exact percentage(s) are being withheld as a trade secret.
For the wording of the listed Hazard Statements, refer to section 16.

(Cont'd. on page 2)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: January 27, 2021

Trade name: Sodium Hydroxide, 0.1N (N/10)

(Cont'd. of page 1)

4 First-aid measures

· **Description of first aid measures**
· **General information:** No special measures required.
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:** If skin irritation continues, consult a doctor.
· **After eye contact:**
Protect unharmed eye.
Remove contact lenses if worn.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· **After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; immediately call for medical help.
· **Most important symptoms and effects, both acute and delayed:**
Gastric or intestinal disorders when ingested.
Nausea in case of ingestion.
· **Danger:** Causes skin and eye irritation.
· **Indication of any immediate medical attention and special treatment needed:**
Medical supervision for at least 48 hours.
If medical advice is needed, have product container or label at hand.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
· **For safety reasons unsuitable extinguishing agents:** No relevant information available.
· **Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.
· **Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
For large spills, use respiratory protective device against the effects of fumes/dust/aerosol.
· **Environmental precautions**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Methods and material for containment and cleaning up**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Place in properly marked container for disposal.
· **Reference to other sections**
See Section 7 for information on safe handling.

(Cont'd. on page 3)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: January 27, 2021

Trade name: Sodium Hydroxide, 0.1N (N/10)

(Cont'd. of page 2)

See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling**
· **Precautions for safe handling:**
Prevent formation of aerosols.
Avoid splashes or spray in enclosed areas.
Use only in well ventilated areas.
· **Information about protection against explosions and fires:** No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Requirements to be met by storerooms and receptacles:**
Unsuitable material for receptacle: aluminium.
Unsuitable material for receptacle: steel.
Unsuitable material for receptacle: glass or ceramic.
Store only in the original receptacle.
· **Information about storage in one common storage facility:**
Store away from foodstuffs.
Do not store together with acids.
Store away from oxidizing agents.
Store away from metals.
· **Further information about storage conditions:**
Store in cool, dry conditions in well sealed receptacles.
Keep containers tightly sealed.
· **Specific end use(s)** No relevant information available.

8 Exposure controls/personal protection

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:**
The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit.

1310-73-2 Sodium hydroxide	
PEL (USA)	Long-term value: 2 mg/m³
REL (USA)	Ceiling limit value: 2 mg/m³
TLV (USA)	Ceiling limit value: 2 mg/m³
EL (Canada)	Ceiling limit value: 2 mg/m³
EV (Canada)	Ceiling limit value: 2 mg/m³
LMPE (Mexico)	Ceiling limit value: 2 mg/m³

· **Exposure controls**
· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.

(Cont'd. on page 4)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: January 27, 2021

Trade name: Sodium Hydroxide, 0.1N (N/10)

(Cont'd. of page 3)

Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
· **Engineering controls:** Provide adequate ventilation.
· **Breathing equipment:** For spills, respiratory protection may be advisable.
· **Protection of hands:**

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
· **Eye protection:**

Safety glasses

Follow relevant national guidelines concerning the use of protective eyewear.
· **Body protection:** Protective work clothing
· **Limitation and supervision of exposure into the environment**
No relevant information available.

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **Appearance:**	
Form:	Liquid
Color:	Colorless
· **Odor:**	Odorless
· **Odor threshold:**	Not determined.
· **pH-value:**	13
· **Melting point/Melting range:**	Not determined.
· **Boiling point/Boiling range:**	110-120 °C (230-184 °F)
· **Flash point:**	The product is not flammable.
· **Flammability (solid, gaseous):**	Not applicable.
· **Auto-ignition temperature:**	Not determined.
· **Decomposition temperature:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits**	
Lower:	Not determined.
Upper:	Not determined.
· **Oxidizing properties:**	Not determined.
· **Vapor pressure:**	Not determined.
· **Density:**	
Relative density:	1.0-1.2
Vapor density:	Not determined.

(Cont'd. on page 5)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: January 27, 2021

Trade name: Sodium Hydroxide, 0.1N (N/10)

(Cont'd. of page 4)

Evaporation rate:	Not determined.
· **Solubility in / Miscibility with Water:**	Fully miscible.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Other information**	No relevant information available.

10 Stability and reactivity

· **Reactivity:** No relevant information available.
· **Chemical stability:** Stable under normal temperatures and pressures.
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **Possibility of hazardous reactions**
Strong exothermic reaction with acids.
Attacks materials containing glass and silicate.
Reacts with various metals.
Toxic fumes may be released if heated above the decomposition point.
· **Conditions to avoid** Excessive heat.
· **Incompatible materials**
Metals.
Strong acids
· **Hazardous decomposition products**
Under fire conditions only:
Toxic metal oxide smoke

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**
· **LD/LC50 values that are relevant for classification:** None.
· **Primary irritant effect:**
· **On the skin:** Irritant to skin and mucous membranes.
· **On the eye:** Causes serious eye irritation.
· **Sensitization:** Based on available data, the classification criteria are not met.

· **IARC (International Agency for Research on Cancer):**
None of the ingredients are listed.

· **NTP (National Toxicology Program):**
None of the ingredients are listed.

· **OSHA-Ca (Occupational Safety & Health Administration):**
None of the ingredients are listed.

(Cont'd. on page 6)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: January 27, 2021

Trade name: Sodium Hydroxide, 0.1N (N/10)

(Cont'd. of page 5)

· **Probable route(s) of exposure:**
Ingestion.
Inhalation.
Eye contact.
Skin contact.
· **Acute effects (acute toxicity, irritation and corrosivity):** Irritating to eyes and skin.
· **Repeated dose toxicity:** No relevant information available.
· **Germ cell mutagenicity:** Based on available data, the classification criteria are not met.
· **Carcinogenicity:** Based on available data, the classification criteria are not met.
· **Reproductive toxicity:** Based on available data, the classification criteria are not met.
· **STOT-single exposure:** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure:** Based on available data, the classification criteria are not met.
· **Aspiration hazard:** Based on available data, the classification criteria are not met.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity** No relevant information available.
· **Persistence and degradability** No relevant information available.
· **Bioaccumulative potential:** No relevant information available.
· **Mobility in soil:** No relevant information available.
· **Ecotoxical effects:**
· **Remark:** After neutralization a reduction of the harming action may be recognized
· **Additional ecological information**
· **General notes:**
Must not reach bodies of water or drainage ditch undiluted or unneutralized.
Rinse off of bigger amounts into drains or the aquatic environment may lead to increased pH-values. A high pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably reduced, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
· **Other adverse effects** No relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.

· **Uncleaned packagings**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agent:** Water, if necessary with cleansing agents.

14 Transport information

(Cont'd. on page 7)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: January 27, 2021

Trade name: Sodium Hydroxide, 0.1N (N/10)

(Cont'd. of page 6)

· **UN-Number**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.
· **UN proper shipping name**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.
· **Transport hazard class(es)**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	
· **Class**	Not regulated.
· **Packing group**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.
· **Environmental hazards**	
· **Marine pollutant:**	No
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **United States (USA)**

· **SARA**

· **Section 302 (extremely hazardous substances):**

None of the ingredients are listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act)**

1310-73-2	Sodium hydroxide
7732-18-5	Water

· **Proposition 65 (California)**

· **Chemicals known to cause cancer:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity for females:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity for males:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

· **EPA (Environmental Protection Agency):**

(Cont'd. on page 8)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: January 27, 2021

Trade name: Sodium Hydroxide, 0.1N (N/10)

(Cont'd. of page 7)

None of the ingredients are listed.

· **IARC (International Agency for Research on Cancer):**

None of the ingredients are listed.

· **Canadian Domestic Substances List (DSL):**

None of the ingredients are listed.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Abbreviations and acronyms:**
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
OSHA: Occupational Safety & Health Administration
Met. Corr.1: Corrosive to metals – Category 1
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

· **Sources**
Website, European Chemicals Agency (echa.europa.eu)
Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/overview/home.do)
Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)
Patty's Industrial Hygiene, 6th ed., Rose, Vernon, ed. ISBN: 978-0-470-07488-6
Casarett and Doull's Toxicology: The Basic Science of Poisons, 8th Ed., Klaasen, Curtis D., ed., ISBN: 978-0-07-176923-5.
Safety Data Sheets, Individual Manufacturers

SAFETY DATA SHEET

Creation Date 25-Oct-2010 **Revision Date** 01-Apr-2021 **Revision Number** 8

1. Identification

Product Name **Sodium hypochlorite, 5% active chlorine**

Cat No. : **AC419550000; AC419550010; AC419550025; AC419550100; AC419550250; AC419552500**

Synonyms Sodium Oxychloride.; Antiformin; Sodium Chloride Oxide

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Skin Corrosion/Irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals

Causes severe skin burns and eye damage
May cause respiratory irritation

Precautionary Statements
Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Keep only in original container
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Spills
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life
Toxic to aquatic life with long lasting effects
Contact with acids liberates toxic gas

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	88-90
Sodium hypochlorite	7681-52-9	10-12

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Call a physician immediately.
Inhalation	If not breathing, give artificial respiration. Remove from exposure, lie down. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.
Ingestion	Do NOT induce vomiting. Clean mouth with water. Never give anything by mouth to an unconscious person. Call a physician immediately.
Most important symptoms and effects	Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. CO_2, dry chemical, dry sand, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2). Sodium oxides. Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	1	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
Environmental Precautions	Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from direct sunlight. Corrosives area. Keep refrigerated.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Yellow
Odor	pungent
Odor Threshold	No information available
pH	12.52 @ 19 - 22°C (5%)
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	17.5 mmHg @ 20 °C
Vapor Density	2.57
Specific Gravity	1.083
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard Yes

Stability Light sensitive.

Conditions to Avoid Incompatible products. Excess heat. Protect from light.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Sodium oxides, Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Sodium hypochlorite	LD50 = 8.91 g/kg (Rat)	LD50 > 20000 mg/kg (Rabbit)	> 10500 mg/l (Rat) 1h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes skin burns; Causes eye burns; Irritating to respiratory system

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Sodium hypochlorite	7681-52-9	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium hypochlorite	EC50: = 0.05 mg/L, 72h (Pseudokirchnerella subcapitata)	Clupea pallasi: LC50=0.065 mg/L 96h	-	0.032 mg/L LC50 = 48 h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN1791
Proper Shipping Name HYPOCHLORITE SOLUTIONS
Hazard Class 8
Packing Group III

TDG

UN-No UN1791
Proper Shipping Name HYPOCHLORITE SOLUTION
Hazard Class 8
Packing Group III

IATA

UN-No UN1791
Proper Shipping Name HYPOCHLORITE SOLUTION
Hazard Class 8
Packing Group III

IMDG/IMO

UN-No UN1791
Proper Shipping Name HYPOCHLORITE SOLUTION
Hazard Class 8
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Sodium hypochlorite	7681-52-9	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X	X	X	KE-35400
Sodium hypochlorite	7681-52-9	X	-	231-668-3	X	X	X	X	KE-31506

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Sodium hypochlorite	X	100 lb	-	-

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Sodium hypochlorite	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Sodium hypochlorite	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 25-Oct-2010
Revision Date 01-Apr-2021
Print Date 01-Apr-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard

replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Section 1 Identification

Aldon Corporation
221 Rochester Street
Avon, NY 14414
(585) 226-6177

CHEMTREC 24 Hour Emergency
Phone Number (800) 424-9300
For laboratory and industrial use only.
Not for drug, food or household use.

Product	**SODIUM OXALATE**
Synonyms	Ethanedioic Acid Disodium Salt

Section 2 Hazards identification

Signal word: DANGER
Pictograms: GHS05 / GHS07
Target organs: Cardiovascular system, Central nervous system, Liver, Kidneys

GHS Classification:
Acute toxicity, oral (Category 4)
Acute toxicity, dermal (Category 4)
Skin irritation (Category 1B)
Eye irritation (Category 1)

GHS Label information: **Hazard statement:**
H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H314: Causes severe skin burns and eye damage.

Precautionary statement:
P260: Do not breathe dust.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310+P331: IF SWALLOWED: Immediately call a POISON CENTER or doctor. Do NOT induce vomiting.
P302+P352: IF ON SKIN: Wash with plenty of water and soap.
P312: Call a POISON CENTER or doctor if you feel unwell.
P362+P364: Take off contaminated clothing and wash it before reuse.
P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P310: Immediately call a POISON CENTER or doctor.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405: Store locked up.
P501: Dispose of contents/container to a licensed chemical disposal agency in accordance with local/regional/national regulations.

Hazards not otherwise classified:
Health hazards not otherwise classified (HHNOC) - Not Known
Physical hazards not otherwise classified (PHNOC) - Not Known

Section 3 Composition / information on ingredients

Chemical Name	CAS #	%	EINECS
Sodium oxalate	62-76-0	100%	200-550-3

Section 4 First aid measures

INGESTION: MAY BE FATAL IF SWALLOWED. Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: EXTREMELY DESTRUCTIVE TO THE TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT. Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: CAUSES EYE DAMAGE. Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: CAUSES SEVERE SKIN BURNS. Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire fighting measures

Suitable Extinguishing Media: Dry chemical, CO_2 or water spray.

Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

Specific Hazards: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Section 6 Accidental release measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Recover for reuse if not contaminated. Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and storage

Precautions for Safe Handling: Read label on container before using. Do not wear contact lenses when working with chemicals. Keep out of reach of children. Avoid contact with eyes, skin and clothing. Do not inhale dusts. Use with adequate ventilation. Avoid ingestion. Wash thoroughly after handling. Remove and wash clothing before reuse.

Conditions for Safe Storage: Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 Exposure controls / personal protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Sodium oxalate	Not established	Not established	Not established

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None should be needed in normal laboratory handling at room temperatures. If dusty conditions prevail, work in fume hood or wear a NIOSH/MSHA-approved respirator.

Section 9 Physical and chemical properties

Appearance: Solid. White powder
Odor: No odor
Odor threshold: Data not available
pH: Data not available
Melting / Freezing point: 250-270°C (482-518°F)
Boiling point: Data not available
Flash point: Data not available

Evaporation rate (= 1): Data not available
Flammability (solid/gas): Data not available
Explosion limits: Lower / Upper: Data not available
Vapor pressure (mm Hg): Data not available
Vapor density (Air = 1): Data not available
Relative density (Specific gravity): 2.34
Solubility(ies): 37 g/L water @ 20°C (68°F)

Partition coefficient: Data not available
Auto-ignition temperature: Data not available
Decomposition temperature: Data not available
Viscosity: Data not available
Molecular formula: $(COONa)_2$
Molecular weight: 134.00

Section 10 Stability and reactivity

Chemical stability: Stable
Conditions to avoid: Excessive temperatures and heat.
Hazardous polymerization: Will not occur.
Incompatible materials: Strong oxidizers and acids.
Hazardous decomposition products: Carbon oxides.

Section 11 Toxicological information

Acute toxicity: Data not available
Skin corrosion/irritation: Data not available
Serious eye damage/irritation: Data not available
Respiratory or skin sensitization: Data not available
Germ cell mutagenicity: Data not available
Carcinogenity: Data not available
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Ca Prop 65: This product does not contain any chemicals known to the State of California to cause cancer or reproductive toxicity.
Reproductive toxicity: Data not available
STOT-single exposure: Data not available
STOT-repeated exposure: Data not available
Aspiration hazard: Data not available
Potential health effects:
Inhalation: Harmful if inhaled. Corrosive to mucous membranes. Oxalates can be absorbed through the lungs. Symptoms inlcude nervousness, cramps, central nervous system depression.
Ingestion: May be fatal if swallowed. Corrosive action on the mucosa and sever gastrointestitis can occur with pain and vomiting.
Skin: Corrosive. Symptoms of redness, pain, and sever burns can occur.
Eyes: Corrosive. Contact can cause blurred vision, redness, pain, and severe tissue burns.
Signs and symptoms of exposure: This substance may cause effects on the kidneys and calcium balance after ingestion. This may result in impaired functions. Exposure to high concentrations could cause death. The substance may have effects on the kidneys. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: KI1750000

Section 12 Ecological information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
Toxicity to algae: No data available
Persistence and degradability: No data available
Bioaccumulative potential: No data available
Mobility in soil: No data available
PBT and vPvB assessment: No data available
Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport information

UN/NA number: UN2928 **Shipping name:** Toxic solids, corrosive, organic, n.o.s., (Sodium oxalate)
Hazard class: 6.1, (8) **Packing group:** II **Reportable Quantity:** No **Marine pollutant:** No
Exceptions: Limited quantity equal to or less than 0.5 Kg **2020 ERG Guide #** 154

Section 15 Regulatory information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	CA Prop 65
Sodium oxalate	Listed	Not listed	Not listed	Listed	Not listed	This product does not contain any chemicals known to the State of California to cause cancer or reproductive toxicity.

Section 16 Other information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

Section 1 Identification

ProlabScientific
2213 le Chatelier, Laval, Quebec, H7L 5B3
www.prolabscientific.com ✆ 1-800-556-5226
info@prolabscientific.com

CHEMTREC 24 Hour Emergency
Phone Number (800) 424-9300
For laboratory and industrial use only.
Not for drug, food or household use.

Product	**SODIUM SULFATE, DECAHYDRATE**
Synonyms	Glauber's Salt

Section 2 Hazards identification

Signal word: WARNING
Pictograms: GHS07
Target organs: None known

GHS Classification:
Skin irrit. (Category 2)
Eye irrit. (Category 2A)

GHS Label information: **Hazard statement:**
H315: Causes skin irritation.
H319: Causes serious eye irritation.

Precautionary statement:
P264: Wash hands thoroughly after handling.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P337+P313: If eye irritation persists: Get medical advice/attention.
P362+P364: Take off contaminated clothing and wash before reuse.

Hazards not otherwise classified:
Health hazards not otherwise classified (HHNOC) - Not Known
Physical hazards not otherwise classified (PHNOC) - Not Known

Section 3 Composition / information on ingredients

Chemical Name	CAS #	%	EINECS
Sodium sulfate, decahydrate	7727-73-3	100%	231-820-9 [anhydrous]

Section 4 First aid measures

INGESTION: Call physician or Poison Control Center immediately. Induce vomiting only if advised by appropriate medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: CAUSES SERIOUS EYE IRRITATION. Check for and remove contact lenses. Flush thoroughly with water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get immediate medical attention.

SKIN ABSORPTION: CAUSES SKIN IRRITATION. Remove contaminated clothing. Flush thoroughly with mild soap and water. If irritation occurs, get medical attention.

Section 5 Fire fighting measures

Suitable Extinguishing Media: Use extinguishing agent suitable for type of surrounding fire.

Protective Actions for Fire-fighters: In fire conditions, wear a NIOSH/MSHA-approved self-contained breathing apparatus and full protective gear. Use water spray to keep fire-exposed containers cool.

Specific Hazards: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Section 6 Accidental release measures

Personal Precautions: Evacuate personnel to safe area. Use proper personal protective equipment as indicated in Section 8. Provide adequate ventilation.

Environmental Precautions: Avoid runoff into storm sewers and ditches which lead to waterways.

Containment and Cleanup: Recover for reuse if not contaminated. Sweep or vacuum up and place in a suitable container for proper disposal. Wash spill area with soap and water.

Section 7 Handling and storage

Read label on container before using. Do not wear contact lenses when working with chemicals. Keep container tightly closed. Keep out of reach of children. Use with adequate ventilation. Wash thoroughly after handling.

Handling: Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Avoid ingestion. Do not inhale dusts. Wash thoroughly after handling. Remove and wash clothing before reuse.

Storage: Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 Exposure controls / personal protection

Exposure Limits:

Chemical Name	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Sodium sulfate	None established.	None established.	None established.

Engineering controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower and fire extinguishing material. Personnel should wear safety glasses, goggles, or faceshield, lab coat or apron, appropriate protective gloves. Use adequate ventilation to keep airborne concentrations low.

Respiratory protection: None should be needed in normal laboratory handling at room temperatures. If dusty conditions prevail, work in fume hood or wear a NIOSH/MSHA-approved respirator.

Section 9 Physical and chemical properties

Appearance: Solid. White, crystalline powder.
Odor: No odor.
Odor threshold: Data not available.
pH: Data not available.
Melting / Freezing point: 32.4°C (89.6°F)
Boiling point: Data not available
Flash point: Not applicable

Evaporation rate (= 1): Not applicable
Flammability (solid/gas): Not applicable
Explosion limits: Lower / Upper: Not applicable
Vapor pressure (mm Hg): Negligible
Vapor density (Air = 1): Data not available
Relative density (Specific gravity): 1.46
Solubility(ies): 11 g/100 ml water @ 0°C

Partition coefficient: Data not available
Auto-ignition temperature: Not applicable
Decomposition temperature: Data not available.
Viscosity: Data not available.
Molecular formula: $Na_2SO_4 \cdot 10H_2O$
Molecular weight: 322.19

Section 10 Stability and reactivity

Chemical stability: Stable
Hazardous polymerization: Will not occur.
Conditions to avoid: Hygroscopic material. Protect from moisture.

Incompatibilities with other materials: Molten active metals, including aluminum and magnesium, acids.

Hazardous decomposition products: Sulfur oxides.

Section 11 Toxicological information

Acute toxicity: Oral-rat LD50: 5,989 mg/kg [anhydrous]
Skin corrosion/irritation: Data not available
Serious eye damage/irritation: Data not available
Respiratory or skin sensitization: Data not available
Germ cell mutagenicity: Data not available
Carcinogenity: Data not available
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Ca Prop 65: This product does not contain any chemicals known to the State of California to cause cancer or reproductive toxicity.
Reproductive toxicity: Data not available
STOT-single exposure: Data not available
STOT-repeated exposure: Data not available
Aspiration hazard: Data not available
Potential health effects:
Inhalation: Inhalation may irritate nose, throat and lungs.
Ingestion: Not generally considered toxic. However, if swallowed, irritation may develop in the mouth, esophagus and stomach. May cause purging.
Skin: Prolonged skin contact may cause irritation.
Eyes: Contact with eyes may cause irritation.
Signs and symptoms of exposure: See Potential health effects above. Exercise appropriate procedures to minimize potential hazards.
Additional information: RTECS #: WE1650000 [anhydrous]

Section 12 Ecological information

Toxicity to fish: No data available
Toxicity to daphnia and other aquatic invertebrates: No data available
Toxicity to algae: No data available
Persistence and degradability: No data available
Bioaccumulative potential: No data available
Mobility in soil: No data available
PBT and vPvB assessment: No data available
Other adverse effects: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Section 13 Disposal considerations

These disposal guidelines are intended for the disposal of catalog-size quantities only. Federal regulations may apply to empty container. State and/or local regulations may be different. Dispose of in accordance with all local, state and federal regulations or contract with a licensed chemical disposal agency.

Section 14 Transport information

UN/NA number: Not applicable
Shipping name: Not Regulated
Hazard class: Not applicable
Packing group: Not applicable
Reportable Quantity: No
Marine pollutant: No
Exceptions: Not applicable
2016 ERG Guide # Not applicable

Section 15 Regulatory information

A chemical is considered to be listed if the CAS number for the anhydrous form is on the Inventory list.

Component	TSCA	CERLCA (RQ)	RCRA code	DSL	NDSL	CA Prop 65
Sodium sulfate	Listed	Not listed	Not listed	Listed	Not listed	This product does not contain any chemicals known to the State of California to cause cancer or reproductive toxicity.

Section 16 Other information

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. NTP: National Toxicology Program, IARC: International Agency for Research on Cancer, OSHA: Occupational Safety and Health Administration, STOT: Specific Target Organ Toxicity, SE: Single Exposure, RE: Repeated Exposure, ERG: Emergency Response Guidebook.

SAFETY DATA SHEET

Creation Date 24-Nov-2010 **Revision Date** 13-Dec-2020 **Revision Number** 5

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description: Sodium thiosulfate, 0.1 N standard solution
Cat No. : **124270000; 124270010; 124270025; 124270250**

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Based on available data, the classification criteria are not met

Health hazards
Based on available data, the classification criteria are not met

Environmental hazards
Based on available data, the classification criteria are not met

Full text of Hazard Statements: see section 16

2.2. Label elements

Hazard Statements

Precautionary Statements

2.3. Other hazards

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Water	7732-18-5	231-791-2	97.5	-
Sodium thiosulfate	7772-98-7	231-867-5	2.5	-

Components	Reach Registration Number	
Sodium thiosulfate	01-2119531537-38	

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Ingestion Do NOT induce vomiting. Get medical attention.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur.

Self-Protection of the First Aider No special precautions required.

4.2. Most important symptoms and effects, both acute and delayed

No information available.

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

Non-combustible.

Hazardous Combustion Products
Sulfur oxides, Sodium oxides.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Ensure adequate ventilation.

6.2. Environmental precautions

See Section 12 for additional Ecological Information.

6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid contact with skin and eyes. Wash hands before breaks and immediately after handling the product.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 12

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s):

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.

Derived No Effect Level (DNEL) No information available

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				
Inhalation				

Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Engineering Measures
None under normal use conditions.

Personal protective equipment

Eye Protection Wear safety glasses with side shields (or goggles) (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Natural rubber Nitrile rubber Neoprene PVC	See manufacturers recommendations	-	EN 374	(minimum requirement)

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection	No protective equipment is needed under normal use conditions.
Large scale/emergency use	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced **Recommended Filter type:** Particle filter 2
Small scale/Laboratory use	Maintain adequate ventilation
Environmental exposure controls	No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Liquid	
Appearance	Colorless	
Odor	Odorless	
Odor Threshold	No data available	
Melting Point/Range	0 °C / 32 °F	
Softening Point	No data available	
Boiling Point/Range	No information available	
Flammability (liquid)	No data available	
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	No data available	
Flash Point	No information available	**Method -** No information available
Autoignition Temperature	No data available	
Decomposition Temperature	No data available	
pH	No information available	
Viscosity	No data available	
Water Solubility	Miscible	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Component	**log Pow**	
Sodium thiosulfate	-4.35	
Vapor Pressure	14 mmHg	
Density / Specific Gravity	1.0 - 1.1	
Bulk Density	Not applicable	Liquid
Vapor Density	No information available	(Air = 1.0)
Particle characteristics	Not applicable (liquid)	

9.2. Other information

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions No information available.

10.4. Conditions to avoid

Excess heat. Incompatible products. Exposure to light. Exposure to moist air or water.

10.5. Incompatible materials

Acids.

10.6. Hazardous decomposition products

Sulfur oxides. Sodium oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information

(a) acute toxicity;
Oral Based on available data, the classification criteria are not met
Dermal No data available
Inhalation No data available

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; No data available

Symptoms / effects,both acute and delayed No information available.

11.2. Information on other hazards

Endocrine Disrupting Properties Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity
Ecotoxicity effects Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants.

12.2. Persistence and degradability
Persistence Miscible with water, Persistence is unlikely, based on information available.

12.3. Bioaccumulative potential Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Sodium thiosulfate	-4.35	No data available

12.4. Mobility in soil The product is water soluble, and may spread in water systems . Will likely be mobile in the environment due to its water solubility. Highly mobile in soils

12.5. Results of PBT and vPvB assessment No data available for assessment.

12.6. Endocrine disrupting properties
Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects
Persistent Organic Pollutant This product does not contain any known or suspected substance
Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Contaminated Packaging	Empty remaining contents. Dispose of in accordance with local regulations. Do not re-use empty containers.
European Waste Catalogue (EWC)	According to the European Waste Catalog, Waste Codes are not product specific, but application specific.
Other Information	Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

ADR Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

IATA Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

14.5. Environmental hazards No hazards identified

14.6. Special precautions for user No special precautions required

14.7. Maritime transport in bulk according to IMO instruments Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories
X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Australia (AICS), Korea (ECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Water	231-791-2	-		X	X	-	X	X	X	X	KE-35400
Sodium thiosulfate	231-867-5	-		X	X	-	X	X	X	X	KE-31633

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals
Not applicable

National Regulations

WGK Classification Water endangering class = non-hazardous to waters (self classification)

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Sodium thiosulfate	WGK1	

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

15.2. Chemical safety assessment

Chemical Safety Assessment/Reports (CSA/CSR) are not required for mixtures

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3

Legend

CAS - Chemical Abstracts Service
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic
TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor
ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC (volatile organic compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:

Physical hazards	On basis of test data
Health Hazards	Calculation method
Environmental hazards	Calculation method

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Creation Date	24-Nov-2010
Revision Date	13-Dec-2020
Revision Summary	Update to CLP Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

SAFETY DATA SHEET

1. Identification

Product identifier **STANNOUS CHLORIDE, DIHYDRATE, REAGENT (ACS)**

Other means of identification

Product code 562

CAS number 10025-69-1

Synonyms TIN(II) CHLORIDE

Recommended use professional, scientific and technical activities: other professional, scientific and technical activities

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name GFS Chemicals, Inc.

Address 800 Kaderly Drive
Columbus, OH 43228
United States

Telephone Phone 740-881-5501
Toll Free 800-858-9682
Fax 740-881-5989

Website www.gfschemicals.com

E-mail service@gfschemicals.com

Emergency phone number Emergency Assistance Chemtrec 800-424-9300

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 1
	Serious eye damage/eye irritation	Category 1
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 3
	Hazardous to the aquatic environment, long-term hazard	Category 3

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Harmful if swallowed. Causes severe skin burns and eye damage. Causes serious eye damage. Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

Precautionary statement

Prevention Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.

Response If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician. Wash contaminated clothing before reuse.

Storage Store locked up. Store in corrosive resistant container with a resistant inner liner.

Disposal Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC) None known.

RCC-CW001737

Supplemental information None.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	%
STANNOUS CHLORIDE, DIHYDRATE	TIN(II) CHLORIDE	10025-69-1	100

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Give small amounts of water to drink.

Most important symptoms/effects, acute and delayed Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media Use extinguishing agent suitable for type of surrounding fire.

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical None known.

Special protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Fire fighting equipment/instructions Move containers from fire area if you can do it without risk. Use water spray to cool unopened containers.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up Sweep up or gather material and place in appropriate container for disposal. This product is miscible in water. This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways. Should not be released into the environment.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid release to the environment. Inform appropriate managerial or supervisory personnel of all environmental releases. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Avoid prolonged exposure. When using, do not eat, drink or smoke. Provide adequate ventilation. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities Store locked up. Store in tightly closed container. Store away from incompatible materials (see Section 10 of the SDS). Store in a cool dry place.

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

U.S. - OSHA

Material	Type	Value	Form
STANNOUS CHLORIDE, DIHYDRATE (CAS 10025-69-1)	TWA	2 mg/m3	as tin

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Material	Type	Value
STANNOUS CHLORIDE, DIHYDRATE (CAS 10025-69-1)	PEL	2 mg/m3

ACGIH

Material	Type	Value	Form
STANNOUS CHLORIDE, DIHYDRATE (CAS 10025-69-1)	TWA	2 mg/m3	as tin

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
STANNOUS CHLORIDE, DIHYDRATE (CAS 10025-69-1)	TWA	2 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product. Local exhaust ventilation may be necessary to control any air contaminants to within their TLVs during the use of this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield. Eye wash fountains are required.

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Solid.

Form Crystalline.

Color White.

Odor Slight.

Odor threshold Not available.

pH	2 (10% aqueous)
Melting point/freezing point	100.4 °F (38 °C) on rapid heating
Initial boiling point and boiling range	1153.4 °F (623 °C)
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Soluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Molecular formula	$SnCl_2.2H_2O$
Molecular weight	225.63 g/mol
Oxidizing properties	Not oxidizing.
Specific gravity	2.71

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Exposure to moisture. Avoid high temperatures. This product may react with oxidizing agents. Contact with incompatible materials.
Incompatible materials	This product may react with strong alkalies. This product may react with oxidizing agents.
Hazardous decomposition products	Chlorine. Hydrogen chloride. May include oxides of tin.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns. Harmful if swallowed.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity	Harmful if swallowed.

Product	Species	Test Results
STANNOUS CHLORIDE, DIHYDRATE (CAS 10025-69-1)		
Acute		
Oral		
LD50	Mouse	1200 mg/kg
	Rabbit	10000 mg/kg
	Rat	700 mg/kg (anhydrous)
Other		
LD50	Dog	22 mg/kg
	Mouse	17.8 mg/kg

Skin corrosion/irritation Causes severe skin burns and eye damage.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Due to partial or complete lack of data the classification is not possible.

Skin sensitization Due to partial or complete lack of data the classification is not possible.

Germ cell mutagenicity Due to partial or complete lack of data the classification is not possible.

Carcinogenicity Due to partial or complete lack of data the classification is not possible.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity Due to partial or complete lack of data the classification is not possible.

Specific target organ toxicity - single exposure Due to partial or complete lack of data the classification is not possible.

Specific target organ toxicity - repeated exposure Due to partial or complete lack of data the classification is not possible.

Aspiration hazard Due to partial or complete lack of data the classification is not possible.

Chronic effects Hazardous by WHMIS criteria. Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

Product		Species	Test Results
STANNOUS CHLORIDE, DIHYDRATE (CAS 10025-69-1)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	55 mg/l, 48 hours

Persistence and degradability No data is available on the degradability of this substance.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]
The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

RCC-CW001741

Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number	UN3260
UN proper shipping name	Corrosive solid, acidic, inorganic, n.o.s. (STANNOUS CHLORIDE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Label(s)	8
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	IB8, IP3, T1, TP33
Packaging exceptions	154
Packaging non bulk	213
Packaging bulk	240

IATA

UN number	UN3260
UN proper shipping name	Corrosive solid, acidic, inorganic, n.o.s. (STANNOUS CHLORIDE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	8L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed with restrictions.
Cargo aircraft only	Allowed with restrictions.

IMDG

UN number	UN3260
UN proper shipping name	CORROSIVE SOLID, ACIDIC, INORGANIC, N.O.S. (STANNOUS CHLORIDE)
Transport hazard class(es)	
Class	8
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable.

DOT

IATA; IMDG

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Toxic Substances Control Act (TSCA) This substance is on the TSCA 8(b) inventory and is designated "active".

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

Food and Drug Administration (FDA)
Total food additive
Direct food additive
GRAS food additive

US state regulations

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date August-13-2013

Revision date September-02-2020

Version # 03

Disclaimer GFS Chemicals, Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision information This document has undergone significant changes and should be reviewed in its entirety.

RCC-CW001744

SAFETY DATA SHEET

Creation Date 09-Dec-2010 **Revision Date** 21-Dec-2020 **Revision Number** 7

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description: Starch
Cat No. : **419690000; 419695000**
Synonyms Potato starch: iodine indicator.; Corn starch
CAS-No 9005-25-8
EC-No. 232-679-6
Molecular Formula (C6 H10 O5)n

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals.
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Based on available data, the classification criteria are not met

Health hazards
Based on available data, the classification criteria are not met

Environmental hazards
Based on available data, the classification criteria are not met

Full text of Hazard Statements: see section 16

2.2. Label elements

Hazard Statements

Precautionary Statements

2.3. Other hazards

No information available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Starch	9005-25-8	EEC No. 232-679-6	100	-

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water. Get medical attention if symptoms occur.

Ingestion Do NOT induce vomiting. Get medical attention if symptoms occur.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention if symptoms occur.

Self-Protection of the First Aider No special precautions required.

4.2. Most important symptoms and effects, both acute and delayed

No information available.

4.3. Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Water spray. Carbon dioxide (CO_2). Dry chemical. Chemical foam.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Carbon monoxide (CO), Carbon dioxide (CO_2).

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Ensure adequate ventilation. Avoid dust formation.

6.2. Environmental precautions

See Section 12 for additional Ecological Information.

6.3. Methods and material for containment and cleaning up

Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid dust formation. Do not breathe dust. Avoid contact with skin and eyes.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2. Conditions for safe storage, including any incompatibilities

Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 11

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **UK** - EH40/2005 Work Exposure Limits, Third edition. Published 2018. **IRE -** 2018 Code of Practice for the Chemical Agents Regulations, Schedule 1. Published by the Health and Safety Authority

Component	The United Kingdom	European Union	Ireland
Starch	STEL: 30 mg/m³ 15 min STEL: 12 mg/m³ 15 min TWA: 10 mg/m³ 8 hr TWA: 4 mg/m³ 8 hr		TWA: 10 mg/m³ 8 hr. total inhalable dust TWA: 4 mg/m³ 8 hr. respirable dust STEL: 30 mg/m³ 15 min STEL: 12 mg/m³ 15 min

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

Derived No Effect Level (DNEL) No information available

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				
Inhalation				

Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Engineering Measures
Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment

Eye Protection Wear safety glasses with side shields (or goggles) (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Nitrile rubber Neoprene Natural rubber PVC	See manufacturers recommendations	-	EN 374	(minimum requirement)

Skin and body protection Long sleeved clothing

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

Large scale/emergency use Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced
Recommended Filter type: Particle filter 2

Small scale/Laboratory use Maintain adequate ventilation

Environmental exposure controls No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Powder Solid	
Appearance	Off-white	
Odor	Odorless	
Odor Threshold	No data available	
Melting Point/Range	No data available	
Softening Point	No data available	
Boiling Point/Range	No information available	
Flammability (liquid)	Not applicable	Solid
Flammability (solid,gas)	No information available	
Explosion Limits	No data available	
Flash Point	No information available	**Method -** No information available
Autoignition Temperature	400 °C / 752 °F	
Decomposition Temperature	200 °C	
pH	5 - 7	(2 %)
Viscosity	Not applicable	Solid
Water Solubility	Insoluble	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Vapor Pressure	negligible	
Density / Specific Gravity	1.5	
Bulk Density	No data available	
Vapor Density	Not applicable	Solid
Particle characteristics	No data available	

9.2. Other information

Molecular Formula	(C6 H10 O5)n
Evaporation Rate	Not applicable - Solid

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	No information available.

10.4. Conditions to avoid

Avoid dust formation. Incompatible products. Excess heat.

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

Carbon monoxide (CO). Carbon dioxide (CO_2).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Product Information No acute toxicity information is available for this product

(a) acute toxicity;

Oral	No data available
Dermal	No data available
Inhalation	No data available

(b) skin corrosion/irritation; No data available

(c) serious eye damage/irritation; No data available

(d) respiratory or skin sensitization;

Respiratory	No data available
Skin	No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity;	No data available
(h) STOT-single exposure;	No data available
(i) STOT-repeated exposure;	No data available
Target Organs	No information available.
(j) aspiration hazard;	Not applicable Solid
Symptoms / effects,both acute and delayed	No information available.

11.2. Information on other hazards

Endocrine Disrupting Properties	Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecotoxicity effects	Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants.

12.2. Persistence and degradability

Persistence	Persistence is unlikely, based on information available.

12.3. Bioaccumulative potential MATERIAL DOES NOT BIOACCUMULATE

12.4. Mobility in soil The product is water soluble, and may spread in water systems. Will likely be mobile in the environment due to its water solubility. Highly mobile in soils

12.5. Results of PBT and vPvB assessment No data available for assessment.

12.6. Endocrine disrupting properties

Endocrine Disruptor Information	This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects

Persistent Organic Pollutant	This product does not contain any known or suspected substance
Ozone Depletion Potential	This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products	Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.
Contaminated Packaging	Empty remaining contents. Dispose of in accordance with local regulations. Do not re-use empty containers.
European Waste Catalogue (EWC)	According to the European Waste Catalog, Waste Codes are not product specific, but application specific.
Other Information	Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

ADR Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

IATA Not regulated

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

14.5. Environmental hazards No hazards identified

14.6. Special precautions for user No special precautions required

14.7. Maritime transport in bulk according to IMO instruments Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories
X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Australia (AICS), Korea (ECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL
Starch	232-679-6	-		X	X	-	X	X	X	X	KE-32128

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals
Not applicable

National Regulations

WGK Classification See table for values

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Starch	WGK1	

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

15.2. Chemical safety assessment

A Chemical Safety Assessment/Report (CSA/CSR) has not been conducted

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration
PBT - Persistent, Bioaccumulative, Toxic

TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC (volatile organic compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Creation Date 09-Dec-2010
Revision Date 21-Dec-2020
Revision Summary Update to CLP Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006 COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: June 04, 2020

1 Identification

· **Product identifier**

· **Trade name: Sulfuric Acid, 1.0N**
· **Product code:** SA1625-B

· **Recommended use and restriction on use**
· **Recommended use:** Laboratory chemicals
· **Restrictions on use:** No relevant information available.

· **Details of the supplier of the Safety Data Sheet**
· **Manufacturer/Supplier:**
AquaPhoenix Scientific, Inc.
860 Gitts Run Road
Hanover, PA 17331 USA
Tel +1 (717)632-1291
Toll-Free: (866)632-1291
info@aquaphoenixsci.com
· **Distributor:**
AquaPhoenix Scientific
860 Gitts Run Road,
Hanover, PA 17331
(717) 632-1291

· **Emergency telephone number:**
ChemTel Inc.
(800)255-3924 (North America)
+1 (813)248-0585 (International)

2 Hazard(s) identification

· **Classification of the substance or mixture**
The substance is not classified as hazardous according to the Globally Harmonized System (GHS).

· **Label elements**
· **GHS label elements** Not regulated.
· **Hazard pictograms:** Not regulated.
· **Signal word:** None.
· **Hazard statements:** Not regulated.

· **Other hazards** There are no other hazards not otherwise classified that have been identified.

3 Composition/information on ingredients

· **Chemical characterization: Substances**

· **Components:**		
7732-18-5	Water	>95%
7664-93-9	Sulfuric acid Met. Corr.1, H290; Skin Corr. 1A, H314; Eye Dam. 1, H318	<5%

· **Additional information:**
For the wording of the listed Hazard Statements, refer to section 16.
For the listed ingredient(s), the identity and/or exact percentage(s) are being withheld as a trade secret.

(Cont'd. on page 2)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: June 04, 2020

Trade name: Sulfuric Acid, 1.0N

(Cont'd. of page 1)

4 First-aid measures

· **Description of first aid measures**
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Rinse with warm water.
If skin irritation is experienced, consult a doctor.
· **After eye contact:**
Remove contact lenses if worn, if possible.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· **After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; immediately call for medical help.
· **Most important symptoms and effects, both acute and delayed:**
Nausea in case of ingestion.
Gastric or intestinal disorders when ingested.
· **Indication of any immediate medical attention and special treatment needed:**
No relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:**
The product is not flammable.
Use fire fighting measures that suit the environment.
· **For safety reasons unsuitable extinguishing agents:** None.
· **Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.
· **Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Use personal protective equipment as required.
Ensure adequate ventilation.
For large spills, use respiratory protective device against the effects of fumes/dust/aerosol.
· **Environmental precautions**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Methods and material for containment and cleaning up**
Use limestone to neutralize and/or absorb spill.
Clean the affected area carefully; suitable cleaners are:
Warm water
Send for recovery or disposal in suitable receptacles.
· **Reference to other sections**

(Cont'd. on page 3)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: June 04, 2020

Trade name: Sulfuric Acid, 1.0N

(Cont'd. of page 2)

See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **Handling**
· **Precautions for safe handling:**
Avoid splashes or spray in enclosed areas.
Use only in well ventilated areas.
Avoid breathing mist, vapors, or spray.
Avoid contact with the eyes and skin.

· **Conditions for safe storage, including any incompatibilities**
· **Requirements to be met by storerooms and receptacles:**
Use only receptacles specifically permitted for this substance/product.
Unsuitable material for receptacle: aluminium.
Store in cool, dry conditions in well sealed receptacles.
· **Information about storage in one common storage facility:**
Store away from foodstuffs.
Do not store together with alkalis (caustic solutions).
· **Specific end use(s)** No relevant information available.

8 Exposure controls/personal protection

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:**
The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit.

7664-93-9 Sulfuric acid	
PEL (USA)	Long-term value: 1 mg/m³
REL (USA)	Long-term value: 1 mg/m³
TLV (USA)	Long-term value: 0.2* mg/m³ *as thoracic fraction
EL (Canada)	Long-term value: 0.2 mg/m³ ACGIH A2; IARC 1
EV (Canada)	Long-term value: 0.2 mg/m³
LMPE (Mexico)	Long-term value: 0.2* mg/m³ A2;*fracción torácica

· **Exposure controls**
· **General protective and hygienic measures:**
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Do not inhale gases / fumes / aerosols.
Avoid contact with the eyes and skin.

(Cont'd. on page 4)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: June 04, 2020

Trade name: Sulfuric Acid, 1.0N

(Cont'd. of page 3)

· **Engineering controls:** Provide adequate ventilation.
· **Breathing equipment:**
Not required under normal conditions of use.
For spills, respiratory protection may be advisable.
· **Protection of hands:**

Protective gloves

· **Eye protection:**

Safety glasses

Follow relevant national guidelines concerning the use of protective eyewear.
· **Body protection:** Protection may be required for spills.
· **Limitation and supervision of exposure into the environment**
No relevant information available.
· **Risk management measures** No relevant information available.

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **Appearance:**	
Form:	Liquid
Color:	Colorless
· **Odor:**	Sulphurous
· **Odor threshold:**	Not determined.
· **pH-value:**	Slightly acidic
· **Melting point/Melting range:**	Not determined.
· **Boiling point/Boiling range:**	Not determined.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Not applicable.
· **Auto-ignition temperature:**	Not determined.
· **Decomposition temperature:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits**	
Lower:	Not determined.
Upper:	Not determined.
· **Oxidizing properties:**	Non-oxidizing.
· **Vapor pressure at 20 °C (68 °F):**	23 hPa (17.3 mm Hg)
· **Density:**	
Relative density:	Not determined.
Vapor density:	Not determined.

(Cont'd. on page 5)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: June 04, 2020

Trade name: Sulfuric Acid, 1.0N

(Cont'd. of page 4)

Evaporation rate:	Not determined.
· **Solubility in / Miscibility with Water:**	Soluble.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Other information**	No relevant information available.

10 Stability and reactivity

· **Reactivity:** No relevant information available.
· **Chemical stability:**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
· **Possibility of hazardous reactions**
Toxic fumes may be released if heated above the decomposition point.
Reacts with certain metals.
Reacts with alkali (lyes).
· **Conditions to avoid** Store away from oxidizing agents.
· **Incompatible materials** Alkalis.
· **Hazardous decomposition products** Sulfur oxides (SOx)

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:** Based on available data, the classification criteria are not met.
· **LD/LC50 values that are relevant for classification:** None.
· **Primary irritant effect:**
· **On the skin:** Based on available data, the classification criteria are not met.
· **On the eye:** Based on available data, the classification criteria are not met.
· **Sensitization:** No sensitizing effects known.

· **IARC (International Agency for Research on Cancer):**

None of the ingredients are listed.

· **NTP (National Toxicology Program):**

7664-93-9	Sulfuric acid	K

· **OSHA-Ca (Occupational Safety & Health Administration):**

None of the ingredients are listed.

· **Probable route(s) of exposure:**
Ingestion.
Inhalation.
Eye contact.
Skin contact.

(Cont'd. on page 6)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: June 04, 2020

Trade name: Sulfuric Acid, 1.0N

(Cont'd. of page 5)

· **Germ cell mutagenicity:** Based on available data, the classification criteria are not met.
· **Carcinogenicity:** Based on available data, the classification criteria are not met.
· **Reproductive toxicity:** Based on available data, the classification criteria are not met.
· **STOT-single exposure:** Based on available data, the classification criteria are not met.
· **STOT-repeated exposure:** Based on available data, the classification criteria are not met.
· **Aspiration hazard:** Based on available data, the classification criteria are not met.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity** No relevant information available.
· **Persistence and degradability** No relevant information available.
· **Bioaccumulative potential:** No relevant information available.
· **Mobility in soil:** No relevant information available.
· **Additional ecological information**
· **General notes:**
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Other adverse effects** No relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Small amounts may be diluted with plenty of water and washed away. Dispose of bigger amounts in accordance with Local Authority requirements.
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.

· **Uncleaned packagings**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.
· **UN proper shipping name**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.
· **Transport hazard class(es)**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	
· **Class**	Not regulated.
· **Packing group**	
· **DOT, ADR/RID/ADN, IMDG, IATA**	Not regulated.

(Cont'd. on page 7)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: June 04, 2020

Trade name: Sulfuric Acid, 1.0N

(Cont'd. of page 6)

· **Environmental hazards**	
· **Marine pollutant:**	No
· **Special precautions for user**	Not applicable.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **United States (USA)**

· **SARA**

· **Section 302 (extremely hazardous substances):**

None of the ingredients are listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act)**

7664-93-9	Sulfuric acid
7732-18-5	Water

· **Proposition 65 (California)**

· **Chemicals known to cause cancer:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity for females:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity for males:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

· **EPA (Environmental Protection Agency):**

None of the ingredients are listed.

· **IARC (International Agency for Research on Cancer):**

7664-93-9	Sulfuric acid	1

· **Canadian Domestic Substances List (DSL):**

None of the ingredients are listed.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

(Cont'd. on page 8)

Safety Data Sheet

according to OSHA HCS (29CFR 1910.1200) and WHMIS 2015 Regulations

Revision: June 04, 2020

Trade name: Sulfuric Acid, 1.0N

(Cont'd. of page 7)

· **Abbreviations and acronyms:**
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
CAS: Chemical Abstracts Service (division of the American Chemical Society)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
OSHA: Occupational Safety & Health Administration
Met. Corr.1: Corrosive to metals – Category 1
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1

· **Sources**
Website, European Chemicals Agency (echa.europa.eu)
Website, US EPA Substance Registry Services (ofmpub.epa.gov/sor internet/registry/substreg/home/overview/home.do)
Website, Chemical Abstracts Registry, American Chemical Society (www.cas.org)
Patty's Industrial Hygiene, 6th ed., Rose, Vernon, ed. ISBN: 978-0-470-07488-6
Casarett and Doull's Toxicology: The Basic Science of Poisons, 8th Ed., Klaasen, Curtis D., ed., ISBN: 978-0-07-176923-5.
Safety Data Sheets, Individual Manufacturers

SDS Prepared by:
ChemTel
1305 North Florida Avenue
Tampa, Florida USA 33602-2902
Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573
Website: www.chemtel.com

SAFETY DATA SHEET

Revision Date 19-Jan-2018 **Revision Number** 3

1. Identification

Product Name **Tellurium atomic absorption standard solution**

Cat No. : **AC196340000; AC196341000; AC196345000**

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2

Label Elements

Signal Word
Warning

Hazard Statements
Causes skin irritation
Causes serious eye irritation

Precautionary Statements
Prevention

Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection

Skin

IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention

Hazards not otherwise classified (HNOC)

None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	98
Potassium hydroxide	1310-58-3	2
Tellurium	13494-80-9	0.1

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

Inhalation Remove from exposure, lie down. Move to fresh air.

Ingestion Do not induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. If possible drink milk afterwards.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

None known

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.

Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Ensure adequate ventilation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Potassium hydroxide	Ceiling: 2 mg/m³	(Vacated) Ceiling: 2 mg/m³	Ceiling: 2 mg/m³	
Tellurium	TWA: 0.1 mg/m³	(Vacated) TWA: 0.1 mg/m³ TWA: 0.1 mg/m³	IDLH: 25 mg/m³ TWA: 0.1 mg/m³	TWA: 0.1 mg/m³

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable

Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	Not listed	Not listed
Potassium hydroxide	LD50 = 284 mg/kg (Rat)	Not listed	Not listed
Tellurium	>5000 mg/kg (Rat)	Not listed	>2420 mg/m^3 (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Potassium hydroxide	1310-58-3	Not listed	Not listed	Not listed	Not listed	Not listed
Tellurium	13494-80-9	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Potassium hydroxide	Not listed	LC50: = 80 mg/L, 96h static (Gambusia affinis)	Not listed	Not listed
Tellurium	Not listed	LC50>37.1 mg/L 96h	Not listed	EC50 = 5.7 mg/L 48h

Persistence and Degradability Miscible with water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Potassium hydroxide	0.83

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
- **UN-No** UN1814
- **Hazard Class** 8
- **Packing Group** II

TDG
- **UN-No** UN1814
- **Hazard Class** 8
- **Packing Group** II

IATA
- **UN-No** 1814
- **Proper Shipping Name** POTASSIUM HYDROXIDE SOLUTION
- **Hazard Class** 8
- **Packing Group** II

IMDG/IMO
- **UN-No** 1814
- **Proper Shipping Name** POTASSIUM HYDROXIDE SOLUTION
- **Hazard Class** 8
- **Packing Group** II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Water	X	X	-	231-791-2	-		X	-	X	X	X
Potassium hydroxide	X	X	-	215-181-3	-		X	X	X	X	X
Tellurium	X	X	-	236-813-4	-		X	-	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Potassium hydroxide	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Potassium hydroxide	1000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Potassium hydroxide	X	X	X	-	X
Tellurium	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade	No information available

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Revision Date	19-Jan-2018
Print Date	19-Jan-2018
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

Revision Date 06.03.2020 Version 17.5

SECTION 1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Catalogue No.	107979
Product name	Thiourea GR for analysis ACS,Reag. Ph Eur
REACH Registration Number	01-2119977062-37-xxxx
CAS-No.	62-56-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Reagent for analysis In compliance with the conditions described in the annex to this safety data sheet.

1.3 Details of the supplier of the safety data sheet

Company	Merck KGaA * 64271 Darmstadt * Germany * Phone:+49 6151 72-0
Responsible Department	LS-QHC * e-mail: prodsafe@merckgroup.com

1.4 Emergency telephone number

Please contact the regional company representation in your country.

SECTION 2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 4, Oral, H302
Carcinogenicity, Category 2, H351
Reproductive toxicity, Category 2, H361d
Long-term (chronic) aquatic hazard, Category 2, H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

The life science business of Merck operates as MilliporeSigma in the US and Canada

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms

Signal word
Warning

Hazard statements
H302 Harmful if swallowed.
H351 Suspected of causing cancer.
H361d Suspected of damaging the unborn child.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements
Prevention
P273 Avoid release to the environment.
Response
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Reduced labelling (≤125 ml)

Hazard pictograms

Signal word
Warning

Hazard statements
H351 Suspected of causing cancer.
H361d Suspected of damaging the unborn child.

Precautionary statements
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Index-No. 612-082-00-0

2.3 Other hazards

None known.

SECTION 3. Composition/information on ingredients

3.1 Substance

Formula	H_2NCSNH_2	CH_4N_2S (Hill)
Index-No.	612-082-00-0	
EC-No.	200-543-5	

The life science business of Merck operates as MilliporeSigma in the US and Canada

Molar mass 76,12 g/mol

Hazardous components (REGULATION (EC) No 1272/2008)

Chemical name (Concentration)

CAS-No.	Registration number	Classification
Thiourea (<= 100 %)		

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

62-56-6	01-2119977062-37-xxxx	Acute toxicity, Category 4, H302 Carcinogenicity, Category 2, H351 Reproductive toxicity, Category 2, H361d Long-term (chronic) aquatic hazard, Category 2, H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

3.2 Mixture
Not applicable

SECTION 4. First aid measures

4.1 Description of first aid measures
After inhalation: fresh air. Call in physician.

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
irritant effects, Diarrhoea, Nausea, Vomiting, Stomach/intestinal disorders

4.3 Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Firefighting measures

5.1 Extinguishing media
Suitable extinguishing media
Water, Foam, Carbon dioxide (CO2), Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

The life science business of Merck operates as MilliporeSigma in the US and Canada

Fire may cause evolution of:
Sulphur oxides, nitrogen oxides, nitrous gases

5.3 Advice for firefighters

Special protective equipment for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Suppress (knock down) gases/vapours/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

Indications about waste treatment see section 13.

SECTION 7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Observe label precautions.

Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Recommended storage temperature see product label.

7.3 Specific end use(s)

See exposure scenario in the Annex to this MSDS.

The life science business of Merck operates as MilliporeSigma in the US and Canada

SECTION 8. Exposure controls/personal protection

8.1 Control parameters

Derived No Effect Level (DNEL)

Worker DNEL, longterm	Long-term systemic effects	dermal	1 mg/m³
Worker DNEL, longterm	Long-term systemic effects	inhalation	3,4 mg/kg Body weight
Consumer DNEL, longterm	Long-term systemic effects	dermal	1,7 mg/kg Body weight
Consumer DNEL, longterm	Long-term systemic effects	inhalation	0,2 mg/m³
Consumer DNEL, longterm	Long-term systemic effects	oral	0,1 mg/kg Body weight

Predicted No Effect Concentration (PNEC)

PNEC Fresh water	0,01 mg/l
PNEC Fresh water sediment	0,072 mg/kg
PNEC Marine water	0,001 mg/l
PNEC Marine sediment	0,007 mg/kg
PNEC Sewage treatment plant	0,38 mg/l
PNEC Soil	2,725 mg/kg

8.2 Exposure controls

Engineering measures
Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

See section 7.1.

Individual protection measures
Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

Eye/face protection
Safety glasses

Hand protection

full contact:

Glove material:	Nitrile rubber
Glove thickness:	0,11 mm
Break through time:	480 min

splash contact:

Glove material:	Nitrile rubber
Glove thickness:	0,11 mm
Break through time:	480 min

The life science business of Merck operates as MilliporeSigma in the US and Canada

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 741 Dermatril® L (full contact), KCL 741 Dermatril® L (splash contact).
The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment
protective clothing

Respiratory protection
required when dusts are generated.
Recommended Filter type: Filter B-(P3)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.
These measures have to be properly documented.

Environmental exposure controls
Do not let product enter drains.

SECTION 9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Form	solid
Colour	colourless
Odour	odourless
Odour Threshold	Not applicable
pH	6 - 8 at 50 g/l 20 °C
Melting point/range	169 - 178 °C
Boiling point/boiling range	Not applicable, (decomposition)
Flash point	No information available.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	Not applicable

The life science business of Merck operates as MilliporeSigma in the US and Canada

Upper explosion limit	Not applicable
Vapour pressure	at 20 °C Not applicable
Relative vapour density	No information available.
Density	1,405 g/cm3 at 20 °C
Relative density	No information available.
Water solubility	137 g/l at 20 °C
Partition coefficient: n-octanol/water	log Pow: -0,92 (20 °C) OECD Test Guideline 107 Bioaccumulation is not expected.
Auto-ignition temperature	No information available.
Decomposition temperature	No information available.
Viscosity, dynamic	No information available.
Explosive properties	Not classified as explosive.
Oxidizing properties	none

9.2 Other data

Ignition temperature	440 °C Dust
Bulk density	640 kg/m3

SECTION 10. Stability and reactivity

10.1 Reactivity

The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Risk of explosion with:

chlorates

Violent reactions possible with:

The life science business of Merck operates as MilliporeSigma in the US and Canada

acryl aldehyde

Exothermic reaction with:

Acrolein, Strong oxidizing agents, Strong acids and strong bases

hydrogen peroxide, with, Nitric acid

10.4 Conditions to avoid

Strong heating (decomposition).

10.5 Incompatible materials

no information available

10.6 Hazardous decomposition products

in the event of fire: See section 5.

SECTION 11. Toxicological information

11.1 Information on toxicological effects

Acute oral toxicity
LD50 Rat: 1.750 mg/kg

(External MSDS)

Symptoms: Nausea, Vomiting, Diarrhoea, Stomach/intestinal disorders

Acute inhalation toxicity

Symptoms: Possible damages:, May cause irritation of respiratory tract.

Acute dermal toxicity
LD50 Rabbit: > 2.800 mg/kg
(External MSDS)

Skin irritation
Rabbit
Result: No irritation
OECD Test Guideline 404

Eye irritation
Rabbit
Result: slight irritation
OECD Test Guideline 405

Sensitisation

Sensitisation possible in predisposed persons.

Germ cell mutagenicity
Genotoxicity in vitro
Ames test
Result: negative

(External MSDS)

Carcinogenicity
This information is not available.

The life science business of Merck operates as MilliporeSigma in the US and Canada

Reproductive toxicity
This information is not available.

Teratogenicity
This information is not available.

CMR effects
Carcinogenicity:
Suspected of causing cancer.
Teratogenicity:
Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure
This information is not available.

Specific target organ toxicity - repeated exposure
This information is not available.

Aspiration hazard
This information is not available.

11.2 Further information
After absorption:
Changes in the blood count
Damage to:
thyroid, Bone marrow
Other dangerous properties can not be excluded.
This substance should be handled with particular care.

SECTION 12. Ecological information

12.1 Toxicity
Toxicity to fish
LC50 Danio rerio (zebra fish): 10.000 mg/l; 96 h
(External MSDS)

Toxicity to daphnia and other aquatic invertebrates
EC50 Daphnia magna (Water flea): 35 mg/l; 48 h
(IUCLID)

Toxicity to algae
IC50 Desmodesmus subspicatus (green algae): 3,8 - 10 mg/l; 72 h
(IUCLID)

Toxicity to bacteria
EC10 Pseudomonas putida: 1.265 mg/l; 18 h
(IUCLID)

12.2 Persistence and degradability
Biodegradability
0 %; 34 d
OECD Test Guideline 301C
Not readily biodegradable.

Biochemical Oxygen Demand (BOD)
13 mg/g (5 d)

(IUCLID)

The life science business of Merck operates as MilliporeSigma in the US and Canada

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water
log Pow: -0,92 (20 °C)
OECD Test Guideline 107

Bioaccumulation is not expected.

12.4 Mobility in soil

No information available.

12.5 Results of PBT and vPvB assessment

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

12.6 Other adverse effects

Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

Waste treatment methods
See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14. Transport information

Land transport (ADR/RID)

14.1 UN number	UN 3077
14.2 Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (THIOUREA)
14.3 Class	9
14.4 Packing group	III
14.5 Environmentally hazardous	yes
14.6 Special precautions for user	yes
Tunnel restriction code	-

Packages smaller than or equal to 5 kg / L , not dangerous goods of Class 9

Inland waterway transport (ADN)

Not relevant

Air transport (IATA)

14.1 UN number	UN 3077
14.2 Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (THIOUREA)
14.3 Class	9
14.4 Packing group	III
14.5 Environmentally hazardous	yes

The life science business of Merck operates as MilliporeSigma in the US and Canada

14.6 Special precautions for user no

Packages smaller than or equal to 5 kg / L , not dangerous goods of Class 9

Sea transport (IMDG)

14.1 UN number	UN 3077
14.2 Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (THIOUREA)
14.3 Class	9
14.4 Packing group	III
14.5 Environmentally hazardous	yes
14.6 Special precautions for user	yes
EmS	F-A S-F

Packages smaller than or equal to 5 kg / L , not dangerous goods of Class 9

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not relevant

SECTION 15. Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Major Accident Hazard Legislation	SEVESO III ENVIRONMENTAL HAZARDS E2 Quantity 1: 200 t Quantity 2: 500 t
Occupational restrictions	Take note of Dir 94/33/EC on the protection of young people at work. Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer	not regulated
Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	not regulated

The life science business of Merck operates as MilliporeSigma in the US and Canada

Substances of very high concern (SVHC)	This product does not contain substances of very high concern according to Regulation (EC) No 1907/2006 (REACH), Article 57 above the respective regulatory concentration limit of ≥ 0.1 % (w/w).

National legislation
Storage class 10 - 13

15.2 Chemical safety assessment

For this product a chemical safety assessment was not carried out.

SECTION 16. Other information

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H361d	Suspected of damaging the unborn child.
H411	Toxic to aquatic life with long lasting effects.

Training advice
Provide adequate information, instruction and training for operators.

Labelling
Hazard pictograms

Signal word
Warning

Hazard statements
H302 Harmful if swallowed.
H351 Suspected of causing cancer.
H361 Suspected of damaging fertility or the unborn child.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements
Prevention
P273 Avoid release to the environment.
Response
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

The life science business of Merck operates as MilliporeSigma in the US and Canada

Key or legend to abbreviations and acronyms used in the safety data sheet

Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Regional representation

This information is given on the authorised Safety Data Sheet for your country.

The information contained herein is based on the present state of our knowledge. It characterises the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.

The life science business of Merck operates as MilliporeSigma in the US and Canada

EXPOSURE SCENARIO 1 (Industrial use)

1. Industrial use Reagent for analysis)

Sectors of end-use

SU 3	Industrial uses: Uses of substances as such or in preparations at industrial sites
SU9	Manufacture of fine chemicals
SU 10	Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

Chemical product category

PC21	Laboratory chemicals

Process categories

PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)
PROC8a	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities
PROC8b	Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing
PROC15	Use as laboratory reagent

Environmental Release Categories

ERC2	Formulation of preparations
ERC6a	Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b	Industrial use of reactive processing aids

2. Contributing scenarios: Operational conditions and risk management measures
2.1 Contributing scenario controlling environmental exposure for: ERC2

Amount used

Daily amount per site (Msafe)	3.380 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	300
Emission or Release Factor: Air	0,002 %

The life science business of Merck operates as MilliporeSigma in the US and Canada

Emission or Release Factor: Water	0,001 %
Emission or Release Factor: Soil	0,01 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d
Sludge Treatment	Can be landfilled, when in compliance with local regulations.

2.2 Contributing scenario controlling environmental exposure for: ERC6a

Amount used

Daily amount per site (Msafe)	806.000 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	300
Emission or Release Factor: Air	0,005 %
Emission or Release Factor: Water	0 %
Emission or Release Factor: Soil	0,1 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d
Sludge Treatment	Can be landfilled, when in compliance with local regulations.

2.3 Contributing scenario controlling environmental exposure for: ERC6b

Amount used

Daily amount per site (Msafe)	676 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

The life science business of Merck operates as MilliporeSigma in the US and Canada

Other given operational conditions affecting environmental exposure

Number of emission days per year	20
Emission or Release Factor: Air	0,1 %
Emission or Release Factor: Water	0,05 %
Emission or Release Factor: Soil	0,025 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d
Sludge Treatment	Can be landfilled, when in compliance with local regulations.

2.4 Contributing scenario controlling worker exposure for: PROC3, PROC4, PROC8b, PROC9, PROC15

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	Solid, low dustiness

Frequency and duration of use

Frequency of use	< 8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor activities

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

2.5 Contributing scenario controlling worker exposure for: PROC5, PROC8a

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	Solid, low dustiness

Frequency and duration of use

Frequency of use	< 8 hours/day
Frequency of use	5 days/week

The life science business of Merck operates as MilliporeSigma in the US and Canada

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

2.6 Contributing scenario controlling worker exposure for: PROC10

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	Solid, low dustiness

Frequency and duration of use

Frequency of use	< 8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor with local exhaust ventilation (LEV)

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

3. Exposure estimation and reference to its source

Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC2		Marine water	1	ECETOC TRA 3
2.2	ERC6a		Marine water	1	ECETOC TRA 3
2.3	ERC6b		Marine water	1	ECETOC TRA 3

The life science business of Merck operates as MilliporeSigma in the US and Canada

Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.4	PROC3	longterm, inhalative, systemic	0,1	ECETOC TRA 3
		longterm, dermal, systemic	0,04	ECETOC TRA 3
		longterm, combined, systemic	0,14	
2.4	PROC4	longterm, inhalative, systemic	0,5	ECETOC TRA 3
		longterm, dermal, systemic	0,4	ECETOC TRA 3
		longterm, combined, systemic	0,9	
2.4	PROC8b	longterm, inhalative, systemic	0,1	ECETOC TRA 3
		longterm, dermal, systemic	0,8	ECETOC TRA 3
		longterm, combined, systemic	0,9	
2.4	PROC9	longterm, inhalative, systemic	0,1	ECETOC TRA 3
		longterm, dermal, systemic	0,4	ECETOC TRA 3
		longterm, combined, systemic	0,5	
2.4	PROC15	longterm, inhalative, systemic	0,1	ECETOC TRA 3
		longterm, dermal, systemic	0,02	ECETOC TRA 3
		longterm, combined, systemic	0,12	
2.5	PROC5	longterm, inhalative, systemic	0,5	ECETOC TRA 3
		longterm, dermal, systemic	0,4	ECETOC TRA 3
		longterm, combined, systemic	0,9	
2.5	PROC8a	longterm, inhalative, systemic	0,5	ECETOC TRA 3
		longterm, dermal, systemic	0,4	ECETOC TRA 3
		longterm, combined, systemic	0,9	
2.6	PROC10	longterm, inhalative, systemic	0,05	ECETOC TRA 3
		longterm, combined, systemic	0,85	ECETOC TRA 3
		longterm, dermal, systemic	0,8	

The default parameters and -efficiencies of the applied exposure assessment model were used for the calculation (unless stated differently).
For (other) acute and local effects risk management measures are based on qualitative risk characterisation.

The life science business of Merck operates as MilliporeSigma in the US and Canada

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

For scaling of worker exposure assessments performed with ECETOC TRA, please consult the Merck tool ScIDeEx® at www.merckmillipore.com/scideex.

The life science business of Merck operates as MilliporeSigma in the US and Canada

EXPOSURE SCENARIO 2 (Professional use)

1. Professional use Reagent for analysis)

Sectors of end-use
SU 22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Chemical product category
PC21 Laboratory chemicals

Process categories
PROC15 Use as laboratory reagent

Environmental Release Categories
ERC2 Formulation of preparations
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids

2. Contributing scenarios: Operational conditions and risk management measures
2.1 Contributing scenario controlling environmental exposure for: ERC2

Amount used

Daily amount per site (Msafe)	3.380 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	300
Emission or Release Factor: Air	0,002 %
Emission or Release Factor: Water	0,001 %
Emission or Release Factor: Soil	0,01 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d
Sludge Treatment	Can be landfilled, when in compliance with local regulations.

2.2 Contributing scenario controlling environmental exposure for: ERC6a

The life science business of Merck operates as MilliporeSigma in the US and Canada

Amount used

Daily amount per site (Msafe)	806.000 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	300
Emission or Release Factor: Air	0,005 %
Emission or Release Factor: Water	0 %
Emission or Release Factor: Soil	0,1 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d
Sludge Treatment	Can be landfilled, when in compliance with local regulations.

2.3 Contributing scenario controlling environmental exposure for: ERC6b

Amount used

Daily amount per site (Msafe)	676 kg

Environment factors not influenced by risk management

Dilution Factor (River)	10
Dilution Factor (Coastal Areas)	100

Other given operational conditions affecting environmental exposure

Number of emission days per year	20
Emission or Release Factor: Air	0,1 %
Emission or Release Factor: Water	0,05 %
Emission or Release Factor: Soil	0,025 %

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant	Municipal sewage treatment plant
Flow rate of sewage treatment plant effluent	2.000 m3/d

The life science business of Merck operates as MilliporeSigma in the US and Canada

Sludge Treatment	Can be landfilled, when in compliance with local regulations.

2.4 Contributing scenario controlling worker exposure for: PROC15

Product characteristics

Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	Solid, low dustiness

Frequency and duration of use

Frequency of use	< 8 hours/day
Frequency of use	5 days/week

Other operational conditions affecting workers exposure

Outdoor / Indoor	Indoor

Organisational measures to prevent /limit releases, dispersion and exposure

Covers daily exposures up to 8 hours.

Conditions and measures related to personal protection, hygiene and health evaluation

Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

CS	Use descriptor	Msafe	Compartment	RCR	Exposure Assessment Method
2.1	ERC2		Marine water	1	ECETOC TRA 3
2.2	ERC6a		Marine water	1	ECETOC TRA 3
2.3	ERC6b		Marine water	1	ECETOC TRA 3

Workers

CS	Use descriptor	Exposure duration, route, effect	RCR	Exposure Assessment Method
2.4	PROC15	longterm, inhalative, systemic	0,1	ECETOC TRA 3
		longterm, dermal, systemic	0,02	ECETOC TRA 3
		longterm, combined, systemic	0,12	

The default parameters and -efficiencies of the applied exposure assessment model were used for the calculation (unless stated differently).
For (other) acute and local effects risk management measures are based on qualitative risk characterisation.

The life science business of Merck operates as MilliporeSigma in the US and Canada

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Chapter R.12: Use descriptor system; ECHA Guidance for downstream users; ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

For scaling of worker exposure assessments performed with ECETOC TRA, please consult the Merck tool ScIDeEx® at www.merckmillipore.com/scideex.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

The life science business of Merck operates as MilliporeSigma in the US and Canada

MATERIAL SAFETY DATA SHEET

Date Printed: 23.09.2014
Date Updated: 11.04.2006
Version 1.4

Section 1 - Product and Company Information

Product Name	TIN ATOMIC ABSORPTION STANDARD SOLUTION (HCL)
Product Number	207594
Brand	ALDRICH
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
TIN ATOMIC ABSORPTION STANDARD SOLUTION(HCL)	None	No

Ingredient Name	CAS #	Percent	SARA 313
WATER	7732-18-5	>= 90 < 95	No
HYDROCHLORIC ACID	7647-01-0	>= 5 < 10	

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Irritant.
Irritating to eyes and skin.

HMIS RATING

HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

RCC-CW001793

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing.

STORAGE
Suitable: Keep tightly closed.

SPECIAL REQUIREMENTS
May develop pressure. Open carefully.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

RCC-CW001794

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Discard contaminated shoes. Wash contaminated clothing before reuse.

Section 9 - Physical/Chemical Properties

Appearance — Physical State: Liquid

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	1,0320 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.
Materials to Avoid: Bases, Amines, Alkali metals Copper, Copper alloys, Aluminum.

HAZARDOUS DECOMPOSITION PRODUCTS

RCC-CW001795

Hazardous Decomposition Products: Hydrogen chloride gas.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Hydrochloric acid
UN#: 1789
Class: 8
Packing Group: Packing Group III
Hazard Label: Corrosive
PIH: Not PIH

IATA
Proper Shipping Name: Hydrochloric acid
IATA UN Number: 1789
Hazard Class: 8
Packing Group: III

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xi
Indication of Danger: Irritant.
R: 36/38
Risk Statements: Irritating to eyes and skin.
S: 26-36/37
Safety Statements: In case of contact with eyes, rinse

RCC-CW001796

immediately with plenty of water and seek medical advice. Wear suitable protective clothing and gloves.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Irritant.
Risk Statements: Irritating to eyes and skin.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing and gloves.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.
Copyright 2010 Sigma-Aldrich Co. License granted to make unlimitedpaper copies for internal use only.

RCC-CW001797

SAFETY DATA SHEET

Urea, Dry

Section 1. Identification

Product identifier : Urea, Dry

SDS # : **301**

Other means of identification

Synonyms : Urea Granular; Urea Microprills; Urea Pastille; Urea Prills

This safety data sheet applies to the following:

URGRAN – Urea Granular 46-0-0, Agricultural Grade
URGRANFR – Urea Granular 46-0-0, Forest Grade
URGRANTF – Urea Granular 46-0-0, Turf Grade
URPRL – Urea Prilled Industrial Grade
URPRLAG – Urea Prilled 46-0-0, Agricultural Grade
URPRLAGF – Urea Prilled 46-0-0, Agricultural Grade Forestry
URPRLC – Urea Prilled Commercial Grade
URPRLCH – Urea Prilled Chemical Grade
URPRLENV – Urea Prilled Environmental Grade
URPRLMIA – Urea Microprilled 46-0-0, Agricultural Grade
URPRLMII – Urea Microprilled Industrial Grade
URPRLR – Urea Prilled Reagent Grade
URPAS – Pastille Urea Chemical Grade

Product code(s) : **URGRAN, URGRANFR, URGRANOS, URGRANTF, URTURFOS, URPRILOS, URPRL, URPRLAG, URPRLAGF, URPRLC, URPRLCH, URPRLENV, URPRLMIA, URPRLMII, URPRLR, URPAS, URPASOS**

Product type : Granular solid.

Relevant identified uses of the substance or mixture and uses advised against

Identified uses

Fertilizer. Manufacture of chemical products. Manufacture of intermediates. Manufacture of personal care products. Manufacture of pharmaceutical products. Manufacture of resins. Manufacture of specialty fertilizers. Pollution control products.

Uses advised against	Reason
None identified.	Non-hazardous substance.

Supplier's details : PCS Sales (USA), Inc. (A Subsidiary of Nutrien Ltd.)
Suite 150
500 Lake Cook Road
Deerfield, IL 60015
United States

PCS Sales (Canada), Inc. (A Subsidiary of Nutrien Ltd.)
Suite 500
122 1st Avenue South
Saskatoon, Saskatchewan S7K 7G3
Canada

Company phone number (North America):
1-800-524-0132 (Customer Service)

sds@nutrien.com - www.nutrien.com

Section 1. Identification

Emergency telephone number (with hours of operation) : Nutrien North American
24 HOUR EMERGENCY TELEPHONE NUMBERS:

English:
Transportation Emergencies: 1-800-792-8311
Medical Emergencies: 1-303-389-1653

French or Spanish:
Tranportation or Medical Emergencies: 1-303-389-1654

Section 2. Hazard identification

Classification of the substance or mixture : Not classified.

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

GHS label elements

Hazard pictograms :

Not Applicable.

No Aplicable.

Non applicable.

Signal word : No signal word.

Hazard statements : No known significant effects or critical hazards.

Precautionary statements

General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Prevention : Not applicable.

Response : Not applicable.

Storage : Not applicable.

Disposal : Not applicable.

Supplemental label elements : None known.

Other hazards which do not result in classification : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Multi-constituent substance

Ingredient name	% (w/w)	CAS number
Urea	97.5 - 99.7	57-13-6
Urea, reaction products with formaldehyde	0 - < 1.5	68611-64-3
Imidodicarbonic diamide	<1.5	108-19-0

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First-aid measures

Description of necessary first aid measures

Eye contact : May cause irritation due to mechanical action. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. If possible, remove contact lenses being careful not to cause additional eye damage. Get medical attention if irritation occurs.

Inhalation : Remove person to fresh air. No known significant effects. Seek medical attention for any signs of wheezing and/or breathing difficulties. For additional advice call the medical emergency number on this SDS or your poison center or medical provider.

Skin contact : No known significant effects. Rinse the affected areas with water. Remove contaminated clothing, jewelry, and shoes. Wash/clean items before reuse. Seek medical attention for persistent skin pain or irritation. For additional advice call the medical emergency number on this SDS or your poison center or doctor.

Ingestion : Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards. May cause slight transient irritation.

Inhalation : No known significant effects or critical hazards. May cause slight transient irritation.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data. May cause irritation due to mechanical action.

Inhalation : No specific data. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.

Skin contact : No specific data. Inorganic salt. Prolonged or repeated exposure may dry the skin, causing irritation.

Ingestion : No specific data. May cause irritation of the digestive tract with accompanying nausea, vomiting and diarrhea.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. 24 Hr Medical Emergency telephone number for professional support - From Canada or the U.S., English: 1-303-389-1653; French or Spanish: 1-303-389-1654.

Specific treatments : No specific treatment. If necessary, veterinary advice may be obtained by calling the Medical Emergency number in Section 1.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. Mouth-to-mouth resuscitation of oral exposure patients is not recommended. First-aiders with contaminated clothing should be properly decontaminated.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Non-flammable. Material will not burn. Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Incompatible with halogens. If mixed with chlorine or hypochlorites, it may form nitrogen trichloride which may explode spontaneously in air.

Hazardous thermal decomposition products : Material will not burn. Undergoes thermal decomposition at elevated temperatures to produce solid cyanuric acid and release toxic and combustible gases (ammonia, carbon dioxide, and oxides of nitrogen).

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Remark : Contain and collect the water used to fight the fire for later treatment and disposal.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused adverse impacts (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Move containers from spill area. Recover the material and use it for the intended purpose.
or
Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Large spill : Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Collect spillage. Use appropriate equipment to put the spilled substance in a container for reuse or disposal. Recycle to process, if possible.
or
Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. If user operations generate dust, fumes or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Section 7. Handling and storage

Advice on general occupational hygiene : Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. May form steep piles that can collapse without warning when transported or stored in bulk. This may damage equipment and endanger workers. The risk of cliffing and sudden collapse increases if product is loaded or stored when hot or in high humidity conditions. Avoid forming steep slopes when removing product. If product has caked, cliffed, or has adhered to the storage or transport container, stay out of the potential engulfment zone in case the material collapses. Do not enter bins, railcars or trucks without conducting a risk assessment and following all confined space entry requirements. Ensure that consideration is given to fall protection and mobile equipment securement if applicable. Carefully loosen the set product from outside the container using mechanical vibration, sledge hammers, or other devices.

Ensure that bulk bags or smaller packaged products stored in tiers are stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, rolling, or collapse. Use caution when opening truck or railcar doors as product may have shifted during transport.

Must be stored in a dry location. Absorbs moisture on long-term storage under high humidity conditions. Store away from incompatible materials (see Section 10). When product is stored in sealable containers, keep container tightly closed and sealed until ready for use. Sealable containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Canadian Regulations Urea, including: Urea, reaction products with formaldehyde Biuret	**AIHA WEEL (United States, 10/2011).** TWA: 10 mg/m³ 8 hours. **CA Alberta Provincial:** Particulates not otherwise regulated (PNOR) TWA (8 hours), Total dust: 10 mg/m³; Respirable fraction: 3 mg/m³.
U.S. Federal Regulations Urea including: Urea, reaction products with formaldehyde Biuret	**AIHA WEEL (United States, 10/2011).** TWA: 10 mg/m³ 8 hours. **OSHA (United States):** Particulates not otherwise regulated (PNOR) TWA (8 hours), Total dust: 15 mg/m³; Respirable fraction: 5 mg/m³.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Wash contaminated clothing before reusing.

Section 8. Exposure controls/personal protection

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: sealed eyewear

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Cotton or cotton/synthetic overalls or coveralls are normally suitable.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Hazard of slipping on spilled product. Use slip resistant footwear.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state : Solid. [Granular solid. Crystals. Powder. Solid beads.]

Color : White.

Odor : Slight Ammoniacal.

Odor threshold : Not available.

pH : 7 to 8 [Conc. (% w/w): 10%]

Melting point : 134°C (273.2°F)

Boiling point : Not available.

Flash point : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Non-flammable substance. Non-combustible.

Lower and upper explosive (flammable) limits : Not applicable.

Vapor pressure : 0 kPa (0 mm Hg) [room temperature]

Vapor density : Not available.

Relative density : 2.31

Solubility : Easily soluble in the following materials: cold water and hot water: 1193 g/l @ 25 °C

Solubility in water : 620 g/l

Partition coefficient: n-octanol/water : <-1.73

Auto-ignition temperature : Not applicable.

Decomposition temperature : 135°C (275°F)

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : Incompatible with halogens, hydrogen peroxide, chlorinated hydrocarbons, fluorine, nitric acid, oxidizing agents and sulfuric acid.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Absorbs moisture on long-term storage under high humidity conditions. Decomposes on heating. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10).

Incompatible materials : See above. May be incompatible with some materials of construction. Contact your sales representative or a metallurgical specialist to ensure compatability with your equipment.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Urea	LD50 Oral TDLo Oral	Rat Cattle - Male, Female	8471 mg/kg 200 mg(N)/kg	- -

Conclusion/Summary : Very low toxicity to humans or animals. Effects are not sufficient for classification as hazardous.

Irritation/Corrosion

Not available.

Conclusion/Summary

Skin : May cause slight transient irritation. Inorganic salt. Prolonged or repeated exposure may dry the skin, causing irritation. Effects are not sufficient for classification as hazardous.

Eyes : No known significant effects or critical hazards. May cause irritation due to mechanical action.

Respiratory : Non-irritating to the respiratory system.

Sensitization

Not available.

Conclusion/Summary

Skin : Non-sensitizer to skin.

Respiratory : Non-sensitizer to lungs.

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Urea, Dry	OECD 471 Bacterial Reverse Mutation Test	Experiment: In vitro Subject: Bacteria Cell: Somatic Metabolic activation: With and without	Negative

Conclusion/Summary : No mutagenic effect.

Section 11. Toxicological information

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Urea, Dry	Negative - Oral - TC	Rat - Male, Female	2250 mg/kg Continuous	-

Conclusion/Summary : No known significant effects or critical hazards.

Reproductive toxicity

Not available.

Conclusion/Summary : No known significant effects or critical hazards.

Teratogenicity

Not available.

Conclusion/Summary : No known significant effects or critical hazards.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Skin contact
Inhalation (dusts and mists)

Potential acute health effects

Eye contact : No known significant effects or critical hazards. May cause slight transient irritation.

Inhalation : No known significant effects or critical hazards. May cause slight transient irritation.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data. May cause irritation due to mechanical action.

Inhalation : No specific data. Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.

Skin contact : No specific data. Inorganic salt. Prolonged or repeated exposure may dry the skin, causing irritation.

Ingestion : No specific data. May cause irritation of the digestive tract with accompanying nausea, vomiting and diarrhea.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : See above.

Potential delayed effects : See above.

Long term exposure

Potential immediate effects : See above.

Potential delayed effects : See below.

Potential chronic health effects

Conclusion/Summary : No known significant effects or critical hazards.

General : No known significant effects or critical hazards.

Section 11. Toxicological information

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Urea	Acute EC50 3910000 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 1000 mg/l Marine water	Crustaceans - Chaetogammarus marinus - Young	48 hours
	Acute LC50 5000 µg/l Fresh water	Fish - Colisa fasciata - Fingerling	96 hours
	Chronic NOEC 2 g/L Fresh water	Fish - Heteropneustes fossilis	30 days

Conclusion/Summary : Excessive nutrient runoff to a body of water may result in eutrophication.

Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
Urea, Dry	OECD 302B Inherent Biodegradability: Zahn-Wellens/ EMPA Test	96 % - Readily - 16 days	-	-

Conclusion/Summary : Readily biodegradable

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Urea, Dry	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Urea, Dry	<-1.73	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : 0.037

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may

Section 13. Disposal considerations

retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	TDG Classification	DOT Classification	Mexico Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-	-	-
Transport hazard class(es)	-	-	-	-	-
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.
Additional information	-	-	-	-	Marine Pollutant (MARPOL): No.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

Canadian lists

Canadian NPRI : None of the components are listed.

CEPA Toxic substances : None of the components are listed.

Canada inventory : This material is listed or exempted.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

China : This material is listed or exempted.

Section 15. Regulatory information

Europe : All components are listed or exempted.

Japan : This material is listed or exempted.

Malaysia : Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Turkey : Not determined.

U.S. Federal Regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

TSCA 8(b) Active inventory: **TSCA 8(b) Active inventory:** This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304 Composition/information on ingredients

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Not applicable.

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

Pennsylvania : None of the components are listed.

California Prop. 65 : This product, as manufactured, does NOT contain any substance in concentrations known to the state of California to cause cancer, birth defects or other reproductive harm. Nutrien cannot guarantee the downstream compliance of any product once out of Nutrien custody.

Section 16. Other information

History

Date of issue/Date of revision : 7/14/2021

Date of previous issue : 3/29/2021

Version : 2.6

Indicates information that has changed from previously issued version.

Section 16. Other information

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations
HPR = Hazardous Products Regulations

Procedure used to derive the classification

Classification	Justification
Not classified.	Weight of evidence

References : Transportation of Dangerous Goods Act and Clear Language Regulations, current edition at time of SDS preparation, Transport Canada;
Hazardous Products Act and Regulations, current revision at time of SDS preparation, Health Canada;
Domestic Substances List, current revision at time of SDS preparation, Environment Canada;
29 CFR Part 1910, current revision at time of SDS preparation, U.S. Occupational Safety and Health Administration;
40 CFR Parts 1-799, current revision at time of SDS preparation, U.S. Environmental Protection Agency;
49 CFR Parts 1-199, current revision at time of SDS preparation, U.S. Department of Transport;
Mexican Official Standard NOM-018-STPS-2015, Harmonised System for the Identification and Communication of Hazards and Risks by Hazardous Chemicals in the Workplace;
NORMA Oficial Mexicana NOM-010-STPS-2014, Agentes químicos contaminantes del ambiente laboral-Reconocimiento, evaluación y control.
Mexican Official Standard NOM-002-SCT / 2011, List of the most commonly transported hazardous substances and materials;
Threshold Limit Values for Chemical Substances, current edition at time of SDS preparation, American Conference of Governmental Industrial Hygienists;
NFPA 400, National Fire Codes, National Fire Protection Association, current edition at time of SDS preparation;
NFPA 704, National Fire Codes, National Fire Protection Association, current edition at time of SDS preparation;
Corrosion Data Survey, Sixth Edition, 1985, National Association of Corrosion Engineers;
ERG 2016, Emergency Response Guidebook, U.S. Department of Transport, Transport Canada, and the Secretariat of Transportation and Communications of Mexico
Hazardous Substances Data Bank, current revision at time of SDS preparation, National Library of Medicine, Bethesda, Maryland
Integrated Risk Information System, current revision at time of SDS preparation, U. S. Environmental Protection Agency, Washington, D.C.
Pocket Guide to Chemical Hazards, current revision at time of SDS preparation, National Institute for Occupational Safety and Health, Cincinnati, Ohio ;
Agency for Toxic Substances and Disease Registry Databank, current revision at time of SDS preparation, U.S. Department of Health and Human Services, Atlanta, Georgia
National Toxicology Program, Report on Carcinogens, Division of the National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina.
Registry of Toxic Effects of Chemical Substances. National Institute for Occupational Safety and Health, Cincinnati, Ohio
California Code of Regulations, Title 27, Div 4, Chapter 1, Proposition 65 Aug 30, 2018 rev and current updates
The Fertilizer Institute, Product Toxicology Testing Program Results, TFI,

Section 16. Other information

Washington , D.C., 2003

Notice to reader

Supply chain partners must ensure they pass this SDS, and all other relevant safety information to their customers.

DISCLAIMER AND LIMITATION OF LIABILITY

The information and recommendations contained in this Safety Data Sheet ("SDS") relate only to the specific material referred to herein (the "Material") and do not relate to the use of such Material in combination with any other material or process. The information and recommendations contained herein are believed to be current and correct as of the date of this SDS. HOWEVER, THE INFORMATION AND RECOMMENDATIONS ARE PRESENTED WITHOUT WARRANTY, REPRESENTATION OR LICENSE OF ANY KIND, EXPRESS OR IMPLIED, WITH RESPECT TO THEIR ACCURACY, CORRECTNESS OR COMPLETENESS, AND THE SELLER, SUPPLIER AND MANUFACTURER OF THE MATERIAL AND THEIR RESPECTIVE AFFILIATES (COLLECTIVELY, THE "SUPPLIER") DISCLAIM ALL LIABILITY FOR RELIANCE ON SUCH INFORMATION AND RECOMMENDATIONS. This SDS is not a guarantee of safety. A buyer or user of the Material (a "Recipient") is responsible for ensuring that it has all current information necessary to safely use the Material for its specific purpose.

FURTHERMORE, THE RECIPIENT ASSUMES ALL RISK IN CONNECTION WITH THE USE OF THE MATERIAL. THE RECIPIENT ASSUMES ALL RESPONSIBILITY FOR ENSURING THE MATERIAL IS USED IN A SAFE MANNER IN COMPLIANCE WITH APPLICABLE ENVIRONMENTAL, HEALTH, SAFETY AND SECURITY LAWS, POLICIES AND GUIDELINES. THE SUPPLIER DOES NOT WARRANT THE MERCHANTABILITY OF THE MATERIAL OR THE FITNESS OF THE MATERIAL FOR ANY PARTICULAR USE AND ASSUMES NO RESPONSIBILITY FOR INJURY OR DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY OR RELATED TO THE USE OF THE MATERIAL.

SAFETY DATA SHEET

Creation Date 09-Mar-2011 **Revision Date** 19-Jan-2018 **Revision Number** 4

1. Identification

Product Name **Yttrium atomic absorption standard solution**

Cat No. : **AC196450000; AC196455000**

Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Skin Corrosion/irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals
Causes severe skin burns and eye damage
May cause respiratory irritation

Precautionary Statements
Prevention
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Keep only in original container
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
Spills
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	95-98
Nitric acid	7697-37-2	2-5
Yttrium (3+)	NA	0.1

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. Call a physician immediately.

Inhalation Move to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the

	substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.
Ingestion	Do not induce vomiting. Clean mouth with water. Never give anything by mouth to an unconscious person. Call a physician immediately.
Most important symptoms and effects	None reasonably foreseeable. Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	CO_2, dry chemical, dry sand, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes.

Hazardous Combustion Products
Nitrogen oxides (NOx)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
Environmental Precautions	Should not be released into the environment.
Methods for Containment and Clean Up	Keep in suitable, closed containers for disposal. Soak up with inert absorbent material.

7. Handling and storage

Handling	Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe vapors or spray mist. Do not ingest.
Storage	Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Corrosives area. Do not store in metal containers. Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Nitric acid	TWA: 2 ppm STEL: 4 ppm	(Vacated) TWA: 2 ppm (Vacated) TWA: 5 mg/m³ (Vacated) STEL: 4 ppm (Vacated) STEL: 10 mg/m³ TWA: 2 ppm TWA: 5 mg/m³	IDLH: 25 ppm TWA: 2 ppm TWA: 5 mg/m³ STEL: 4 ppm STEL: 10 mg/m³	TWA: 2 ppm TWA: 5 mg/m³ STEL: 4 ppm STEL: 10 mg/m³

Legend

ACGIH *- American Conference of Governmental Industrial Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Long sleeved clothing.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Odorless
Odor Threshold	No information available
pH	No information available < 1
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong bases, Strong reducing agents

Hazardous Decomposition Products Nitrogen oxides (NOx)

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product
Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.
Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	Not listed	Not listed
Nitric acid	Not listed	Not listed	LC50 = 2500 ppm. (Rat) 1h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Nitric acid	7697-37-2	Not listed	Not listed	Not listed	Not listed	Not listed
Yttrium (3+)	NA	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nitric acid	Not listed	LC50: = 72 mg/L, 96h (Gambusia affinis)	Not listed	Not listed

Persistence and Degradability Miscible with water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Nitric acid	-2.3

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3264
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Proper technical name Nitric acid
Hazard Class 8
Packing Group II

TDG

UN-No UN3264
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Hazard Class 8
Packing Group II

IATA

UN-No UN3264
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Hazard Class 8
Packing Group II

IMDG/IMO

UN-No UN3264
Proper Shipping Name CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S.
Hazard Class 8
Packing Group II

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Water	X	X	-	231-791-2	-		X	-	X	X	X
Nitric acid	X	X	-	231-714-2	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nitric acid	7697-37-2	2-5	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nitric acid	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Nitric acid	-	TQ: 500 lb

CERCLA Not applicable

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nitric acid	1000 lb	1000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Nitric acid	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Component	DHS Chemical Facility Anti-Terrorism Standard
Nitric acid	2000 lb STQ

Other International Regulations

Mexico - Grade No information available

16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	09-Mar-2011
Revision Date	19-Jan-2018
Print Date	19-Jan-2018
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 5.3
Revision Date 09/25/2015
Print Date 05/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Zinc atomic absorption standard solution

Product Number : 207667
Brand : Aldrich
Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich Canada Co.
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 9058299500
Fax : +1 9058299292
Emergency Phone # (For both supplier and manufacturer) : 1-800-424-9300
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

WHMIS Classification

E Corrosive Material Corrosive to skin

GHS Classification

Corrosive to metals (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H290 May be corrosive to metals.

Precautionary statement(s)
P234 Keep only in original packaging.
P390 Absorb spillage to prevent material damage.

HMIS Classification

Health hazard: 3
Flammability: 0
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS-No.	EC-No.	Index-No.	Concentration
Hydrochloric acid			
7647-01-0	231-595-7	017-002-01-X	1 %
Water			
7732-18-5	231-791-2	-	98.9 %
Zinc			
7440-66-6	231-175-3	-	0.1 %

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Hydrogen chloride gas

Explosion data - sensitivity to mechanical impact
No data available

Explosion data - sensitivity to static discharge
No data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid breathing vapours, mist or gas.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid inhalation of vapour or mist.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle and open container with care.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Hydrochloric acid	7647-01-0	(c)	2.000000 ppm 3.000000 mg/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
Remarks	Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required			
		C	2.000000 ppm	Canada. British Columbia OEL
		C	5.000000 ppm 7.500000 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
	A substance which may not be recirculated in accordance with section 108			
		(c)	2 ppm 3 mg/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
	Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required			
		C	2 ppm	Canada. British Columbia OEL
		C	5 ppm 7.5 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
	A substance which may not be recirculated in accordance with section 108			
		C	2.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		C	2 ppm	USA. ACGIH Threshold Limit Values (TLV)

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of

workday.

Specific engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	No data available

Safety data

pH	No data available
Melting point/freezing point	No data available
Boiling point	No data available
Flash point	No data available
Ignition temperature	No data available
Auto-ignition temperature	No data available
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapour pressure	No data available
Density	1.010 g/cm3
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Relative vapour density	No data available
Odour	No data available
Odour Threshold	No data available
Evaporation rate	No data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
No data available

Conditions to avoid
No data available

Materials to avoid
Strong bases, Acids, Bases, Alkali metals, Metals, Amines, permanganates, e.g. potassium permanganate, Fluorine, chlorides, hexalithium disilicide, Nitrates, Carbon disulfide

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Hydrogen chloride gas
Other decomposition products - No data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
No data available

Inhalation LC50
No data available

Dermal LD50
No data available

Other information on acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Eyes: No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Hydrochloric acid)

Reproductive toxicity

No data available

Teratogenicity

No data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
No data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
No data available

Aspiration hazard
No data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
No data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity

No data available

Persistence and degradability
No data available

Bioaccumulative potential
No data available

Mobility in soil
No data available

PBT and vPvB assessment
No data available

Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1789 Class: 8 Packing group: III
Proper shipping name: Hydrochloric acid
Reportable Quantity (RQ):
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1789 Class: 8 Packing group: III EMS-No: F-A, S-B
Proper shipping name: HYDROCHLORIC ACID
Marine pollutant: No

IATA
UN number: 1789 Class: 8 Packing group: III
Proper shipping name: Hydrochloric acid

15. REGULATORY INFORMATION

WHMIS Classification

E Corrosive Material Corrosive to skin

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information
Copyright 2015 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

RICCA CHEMICAL COMPANY®

Safety Data Sheet

Classified According to OSHA Hazard Communication Standard (HCS)

SECTION 1: Identification

1.1. Product Identifier

Trade Name or Designation: ZoBell's Solution, Oxidation-Reduction Potential (ORP) Standard

Product Number: 9880

Other Identifying Product Numbers: 9880-1, 9880-16, 9880-32, 9880-5

1.2. Recommended Use and Restrictions on Use

General Laboratory Reagent

1.3. Details of the Supplier of the Safety Data Sheet

Company: Ricca Chemical Company
Address: 448 West Fork Drive

Arlington, TX 76012 USA
Telephone: 888-467-4222

1.4. Emergency Telephone Number (24 hours)

CHEMTREC (USA)	800-424-9300
CHEMTREC (International)	1+ 703-527-3887

SECTION 2: Hazard(s) Identification

2.1. Classification of the Substance or Mixture

For the full text of the Hazard and Precautionary Statements listed below, see Section 16.

This product is not categorized as hazardous in any GHS hazard class.

2.2. GHS Label Elements

Pictograms: None Required.

Signal Word: None Required.

Hazard Statements: None Required.

Safety Data Sheet

Precautionary Statements: None Required.

2.4. Hazards not Otherwise Classified or Covered by GHS

Data not available.

SECTION 3: Composition / Information on Ingredients

3.1. Components of Substance or Mixture

Chemical Name	Formula	Molecular Weight	CAS Number	Weight%
Water	H_2O	18.01 g/mol	7732-18-5	98.90
Potassium Chloride	KCl	74.55 g/mol	7447-40-7	0.75
Potassium Ferrocyanide Trihydrate	$K_4Fe(CN)_6 \cdot 3H_2O$	422.39 g/mol	14459-95-1	0.24
Potassium Ferricyanide	$K_3Fe(CN)_6$	329.24 g/mol	13746-66-2	0.11

SECTION 4: First-Aid Measures

4.1. General First Aid Information

Eye Contact: May cause slight irritation.

Inhalation: Not expected to require first aid. If necessary, remove to fresh air.

Skin Contact: May cause slight irritation.

Ingestion: Dilute with water or milk. Do not induce vomiting. Call a physician if necessary.

4.2. Most Important Symptoms and Effects, Acute and Delayed

Does not present any significant health hazards. Wash areas of contact with water. EYE CONTACT: May cause slight irritation. SKIN CONTACT: May cause slight irritation.

4.3. Medical Attention or Special Treatment Needed

Not expected to require special treatment.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing Media

Use any means suitable for extinguishing surrounding fire.

5.2. Specific Hazards Arising from the Substance or Mixture

Not considered to be a fire or explosion hazard.

5.3. Special Protective Equipment for Firefighters

Use protective clothing and breathing equipment appropriate for the surrounding fire.

Safety Data Sheet

SECTION 6: Accidental Release Measures

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

Wear appropriate PPE for the size and nature of the spill. As a general rule, wear safety glasses and gloves.

6.2. Cleanup and Containment Methods and Materials

Absorb with suitable material and treat as normal refuse. Small amounts of the liquid may be flushed to the drain with excess water. Always dispose of in accordance with local regulations.

SECTION 7: Handling and Storage

7.1. Precautions for Safe Handling and Storage Conditions

As with all chemicals, wash hands thoroughly after handling. Avoid contact with eyes and skin. Protect from freezing and physical damage. Store in the refrigerator.

SECTION 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Chemical Name	Limit Type	Country	Exposure Limit	Information Source
Potassium Ferricyanide (13746-66-2)	TLV-TWA	USA	1 mg/m³ TWA (as Fe)	ACGIH - Threshold Limit Values - Time Weighted Averages (TLV-TWA)
Potassium Ferricyanide (13746-66-2)	TWA	USA	5 mg/m³ TWA (as CN)	U.S. - OSHA - Final PELs - Time Weighted Averages (TWAs)
Potassium Ferrocyanide Trihydrate (14	TLV-TWA	USA	1 mg/m³ TWA (as Fe)	ACGIH - Threshold Limit Values - Time Weighted Averages (TLV-TWA)
Potassium Ferrocyanide Trihydrate (14	TWA	USA	5 mg/m³ TWA (as CN)	U.S. - OSHA - Final PELs - Time Weighted Averages (TWAs)

8.2. Exposure Controls

Engineering Controls: No specific controls are needed. Normal room ventilation is adequate.

Respiratory Protection: Normal room ventilation is adequate.

Skin Protection: Chemical resistant gloves.

Eye Protection: Safety glasses or goggles.

8.3. Personal Protective Equipment

Normal room ventilation is adequate. Chemical resistant gloves. Safety glasses or goggles.

Safety Data Sheet

SECTION 9: Physical and Chemical Properties

9.1. Basic Physical and Chemical Properties

Appearance: Yellow-green liquid
Physical State: Liquid
Odor: Data not available.
Odor Threshold: Data not available.
pH: Data not available.
Melting/Freezing Point: 0.0°C
Initial Boiling Point/Range: 100°C - 100°C
Flash Point: Data not available.
Evaporation Rate: Data not available.
Flammability: Data not available.
Flammability/Explosive Limits: Data not available.
Vapor Pressure: Data not available.
Vapor Density: Data not available.
Relative Density: 1.0
Solubility: Miscible
Partition Coefficient: Data not available.
Auto-Ignition Temperature: Data not available.
Decomposition Temperature: Data not available.
Viscosity: Data not available.
Explosive Properties: Data not available.
Oxidizing Properties: Data not available.

SECTION 10: Stability and Reactivity

10.1. Reactivity and Chemical Stability

Data not available.

10.2. Possibility of Hazardous Reactions

Data not available.

10.3. Conditions to Avoid and Incompatible Materials

Acids, Bromine Trifluoride, Sodium Nitrate, ammonia, Chromium Trioxide, Chromic Anhydride, Cupric Nitrate.

10.4. Hazardous Decomposition Products

Will not occur.

Safety Data Sheet

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity - Oral Exposure:

Not applicable.

Acute Toxicity - Dermal Exposure:

Not applicable.

Acute Toxicity - Inhalation Exposure:

Not applicable.

Acute Toxicity - Other Information:

LD50, Oral Rat: (anhydrous Potassium Ferrocyanide) 6400 mg/kg, (Potassium Chloride) 2600 mg/kg; LD50, Oral, Mouse: (Potassium Ferricyanide) 2970 mg/kg, details of toxic effects not reported other than lethal dose value.

Skin Corrosion and Irritation:

Not applicable.

Serious Eye Damage and Irritation:

Not applicable.

Respiratory Sensitization:

Not applicable.

Skin Sensitization:

Not applicable.

Germ Cell Mutagenicity:

Not applicable.

Carcinogenicity:

Not applicable.

Reproductive Toxicity:

Not applicable.

Specific Target Organ Toxicity from Single Exposure:

Not applicable.

Specific Target Organ Toxicity from Repeated Exposure:

Not applicable.

Aspiration Hazard:

Not applicable.

Additional Toxicology Information:

Data not available.

SECTION 12: Ecological Information

12.1. Ecotoxicity

Not applicable.

12.2. Persistence and Degradability

Data not available.

12.3. Bioaccumulative Potential

Data not available.

12.4. Mobility in Soil

Data not available.

12.5. Other Adverse Ecological Effects

Data not available.

SECTION 13: Disposal Considerations

13.1. Waste Treatment Methods

Dilute with water, then flush to sewer if local regulations allow. If not allowed, save for recovery or recycling in an approved waste disposal facility. Always dispose of in accordance with local, state and federal regulations.

SECTION 14: Transportation Information

14.1. Transportation by Land-Department of Transportation (DOT, United States of America)

Not regulated according to DOT Regulations.

14.2. Transportation by Air - International Air Transport Association (IATA)

Not regulated according to IATA Dangerous Goods Regulations.

14.3 Transportation of Dangerous Goods (TDG, Canada)

Not regulated according to TDG Regulations.

SECTION 15: Regulatory Information

15.1. Occupational Safety and Health Administration (OSHA) Hazards

Not listed.

15.2. Superfund Amendments and Reauthorization Act (SARA) 302 Extremely Hazardous Substances

Not listed.

15.3. Superfund Amendments and Reauthorization Act (SARA) 311/312 Hazardous Chemicals

Not listed.

15.4. Superfund Amendments and Reauthorization Act (SARA) 313 Toxic Release Inventory (TRI)

Potassium Ferricyanide (CAS # 13746-66-2): 1.0 % de minimis concentration (X+CN- where X = H+ or any other group where a formal dissociation can be made. For example KCN or Ca(CN)2. Chemical Category N106)

Potassium Ferrocyanide Trihydrate (CAS # 14459-95-1): 1.0 % de minimis concentration (X+CN- where X = H+ or any other group where a formal dissociation can be made. For example KCN or Ca(CN)2. Chemical Category N106)

15.5. Massachusetts Right-to-Know Substance List

Not listed.

15.6. Pennsylvania Right-to-Know Hazardous Substances

Potassium Ferricyanide (CAS # 13746-66-2): Environmental hazard

Potassium Ferricyanide (CAS # 13746-66-2): Present

Potassium Ferrocyanide Trihydrate (CAS # 14459-95-1): Environmental hazard

Potassium Ferrocyanide Trihydrate (CAS # 14459-95-1): Present

Water (CAS # 7732-18-5): Present

15.7. New Jersey Worker and Community Right-to-Know Components

Potassium Ferricyanide (CAS # 13746-66-2): sn 2308

Potassium Ferricyanide (CAS # 13746-66-2): SN 2308 500 lb TPQ (Category Code N106)

Potassium Ferrocyanide Trihydrate (CAS # 14459-95-1): sn 2308

Potassium Ferrocyanide Trihydrate (CAS # 14459-95-1): SN 2308 500 lb TPQ (Category Code N106)

15.8. California Proposition 65

Not listed.

15.9. Canada Domestic Substances List / Non-Domestic Substances List (DSL/NDSL)

Potassium Ferricyanide (CAS # 13746-66-2): Present (DSL)
Potassium Ferrocyanide Trihydrate (CAS # 14459-95-1): Present (DSL)
Potassium Chloride (CAS # 7447-40-7): Present (DSL)
Water (CAS # 7732-18-5): Present (DSL)

15.10. United States of America Toxic Substances Control Act (TSCA) List

Potassium Ferricyanide (CAS # 13746-66-2): Present
Potassium Ferrocyanide Trihydrate (CAS # 14459-95-1): Present
Potassium Chloride (CAS # 7447-40-7): Present
Water (CAS # 7732-18-5): Present

15.11. European Inventory of Existing Commercial Chemical Substances (EINECS), European List of Notified Chemical Substances (ELINCS), and No Longer Polymers (NLP)

Potassium Ferricyanide (CAS # 13746-66-2): 237-323-3
Potassium Ferrocyanide Trihydrate (CAS # 14459-95-1): 237-722-2
Potassium Chloride (CAS # 7447-40-7): 231-211-8
Water (CAS # 7732-18-5): 231-791-2
Water (CAS # 7732-18-5): 232-148-9

SECTION 16: Other Information

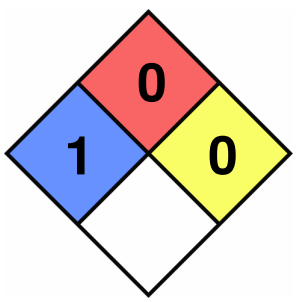
16.1. Full Text of Hazard Statements and Precautionary Statements

16.2. Miscellaneous Hazard Classes

Canadian Carcinogenicity Hazard Class: Not Applicable.
Physical Hazards Not Otherwise Classified (PHNOC): Not Applicable.
Health Hazards Not Otherwise Classified (HHNOC): Not Applicable.
Biohazardous Infectious Materials Hazard Class: Not Applicable.

16.3. National Fire Protection Association (NFPA) Rating

Health: 1
Flammability: 0
Reactivity: 0
Special Hazard:



16.4. Document Revision

Last Revision Date: 2020-06-03

DISCLAIMER

When handled properly by qualified personnel, the product described herein does not present a significant health or safety hazard. Alteration of its characteristics by concentration, evaporation, addition of other substances, or other means may present hazards not specifically addressed herein and which must be evaluated by the user. The information furnished herein is believed to be accurate and represents the best data currently available to us. No warranty , expressed or implied, is made and RICCA CHEMICAL COMPANY assumes no legal responsibility or liability whatsoever resulting from its use .