REDACTED VERSION

Material Safety Data Sheets

9586098

EPAPA005001035

MSDS

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MATERIAL SAFETY DATA SHEET

Hydrogen Peroxide (40 to 60%)

MSDS Ref. No.: 7722-84-1-4
Date Approved: 06/03/2008
Revision No.: 11

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200 and Canada's Workplace Hazardous Materials Information System (WHMIS) requirements.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Hydrogen Peroxide (40 to 60%)

ALTERNATE PRODUCT NAME(S): Durox® Reg. & LR 50%, Oxypure® 50%, Hi Ox-TG, Hi Ox-SG, Semiconductor Reg & Seg 50%, Standard 50%, Technical 50%, Chlorate Grade 50%, Super D® 50%, OHP 50%, UP-HTP 50%, HTP 50%, HTP 59%

GENERAL USE:

Durox® 50% Reg. and LR - meets the Food Chemical Codex requirements for aseptic packaging and other food related applications.

Oxypure® 50%, Hi Ox-TG and Hi Ox-SG - certified by NSF to meet NSF/ANSI Standard 60 requirements for drinking water treatment.

Semiconductor Reg. & Seg. 50% - conforms to ACS and Semi Specs., for wafer etching and cleaning, and applications requiring low residues.

Standard 50% - most suitable for industrial bleaching, processing, pollution abatement and general oxidation reactions.

Technical 50% - essentially free of inorganic metals, suitable for chemical synthesis.

Chlorate Grade 50% - specially formulated for use in chlorate manufacture or processing.

Super D® 50% - meets US Pharmacopoeia specifications for 3% topical solutions when diluted with proper quality water. While manufactured to the USP standards or purity and to FMC's demanding ISO 9002 quality standards, FMC does not claim that its Hydrogen Peroxide is manufactured in accordance with all pharmaceutical cGMP conditions.

OHP 50% - specially formulated for OHP process, advanced oxidation, and activated peroxide applications.

UP-HTP 50% - unstabilized product for semi-conductor applications.

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HTP 50% and HTP 59% - specially formulated for aerospace or other special applications.

SynergOx™ - combination of a proprietary catalyst and 50% hydrogen peroxide, at the point of use, for environmental applications.

MANUFACTURER

FMC CORPORATION
FMC Peroxygens
1735 Market Street
Philadelphia, PA 19103
(215) 299-6000 (General Information)
msdsinfo@fmc.com (Email - General Information)

FMC of Canada Ltd.
FMC Peroxygens
PG Pulp Mill Road
Prince George, BC V2N2S6
(250) 561-4200 (General Information)

EMERGENCY TELEPHONE NUMBERS

(281) 474-8750 (Plant: Pasadena, TX, US - Call Collect)
(250) 561-4221 (Plant: Prince George, BC, Canada - Call Collect)
(303) 595-9048 (Medical - U.S. - Call Collect)

For leak, fire, spill, or accident emergencies, call:
(800) 424-9300 (CHEMTREC - U.S.A.)
(613) 996-6666 (CANUTEC - Canada)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- Clear, colorless, odorless liquid
- Oxidizer.
- Contact with combustibles may cause fire.
- Decomposes yielding oxygen that supports combustion of organic matters and can cause overpressure if confined.
- Corrosive to eyes, nose, throat, lungs and gastrointestinal tract.

POTENTIAL HEALTH EFFECTS: Corrosive to eyes, skin, nose, throat and lungs. May cause irreversible tissue damage to the eyes including blindness.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Hydrogen Peroxide	7722-84-1	40 - 60	231-765-0	O, C, Xn; R5- R8-R35-R20/22
Water	7732-18-5	40 - 60	231-791-2	Not classified

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4. FIRST AID MEASURES

EYES: Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.

SKIN: Immediately flush with plenty of water while removing contaminated clothing and/or shoes, and thoroughly wash with soap and water. See a medical doctor immediately.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, contact a medical doctor.

NOTES TO MEDICAL DOCTOR: Hydrogen peroxide at these concentrations is a strong oxidant. Direct contact with the eye is likely to cause corneal damage especially if not washed immediately. Careful ophthalmologic evaluation is recommended and the possibility of local corticosteroid therapy should be considered. Because of the likelihood of corrosive effects on the gastrointestinal tract after ingestion, and the unlikelihood of systemic effects, attempts at evacuating the stomach via emesis induction or gastric lavage should be avoided. There is a remote possibility, however, that a nasogastric or orogastric tube may be required for the reduction of severe distension due to gas formation.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Flood with water.

FIRE / EXPLOSION HAZARDS: Product is non-combustible. On decomposition releases oxygen which may intensify fire.

FIRE FIGHTING PROCEDURES: Any tank or container surrounded by fire should be flooded with water for cooling. Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Non-combustible

SENSITIVITY TO IMPACT: No data available

SENSITIVITY TO STATIC DISCHARGE: No data available

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6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES: Dilute with a large volume of water and hold in a pond or diked area until hydrogen peroxide decomposes. Hydrogen peroxide may be decomposed by adding sodium metabisulfite or sodium sulfite after diluting to about 5%. Dispose according to methods outlined for waste disposal.

Combustible materials exposed to hydrogen peroxide should be immediately submerged in or rinsed with large amounts of water to ensure that all hydrogen peroxide is removed. Residual hydrogen peroxide that is allowed to dry (upon evaporation hydrogen peroxide can concentrate) on organic materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

7. HANDLING AND STORAGE

HANDLING: Wear chemical splash-type monogoggles and full-face shield, impervious clothing, such as rubber, PVC, etc., and rubber or neoprene gloves and shoes. Avoid cotton, wool and leather. Avoid excessive heat and contamination. Contamination may cause decomposition and generation of oxygen gas which could result in high pressures and possible container rupture. Hydrogen peroxide should be stored only in vented containers and transferred only in a prescribed manner (see FMC Technical Bulletins). Never return unused hydrogen peroxide to original container, empty drums should be triple rinsed with water before discarding. Utensils used for handling hydrogen peroxide should only be made of glass, stainless steel, aluminum or plastic.

STORAGE: Store drums in cool areas out of direct sunlight and away from combustibles. For bulk storage refer to FMC Technical Bulletins.

COMMENTS: VENTILATION: Provide mechanical general and/or local exhaust ventilation to prevent release of vapor or mist into the work environment.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

Chemical Name	ACGIH	OSHA	Supplier
Hydrogen Peroxide	1 ppm (TWA)	1 ppm (PEL) 1.4 mg/m^3 (PEL)	

ENGINEERING CONTROLS: Ventilation should be provided to minimize the release of hydrogen peroxide vapors and mists into the work environment. Spills should be minimized or confined immediately to prevent release into the work area. Remove contaminated clothing immediately and wash before reuse.

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PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Use chemical splash-type monogoggles and a full-face shield made of polycarbonate, acetate, polycarbonate/acetate, PETG or thermoplastic.

RESPIRATORY: If concentrations in excess of 10 ppm are expected, use NIOSH/DHHS approved self-contained breathing apparatus (SCBA), or other approved atmospheric-supplied respirator (ASR) equipment (e.g., a full-face airline respirator (ALR)). DO NOT use any form of air-purifying respirator (APR) or filtering facepiece (AKA dust mask), especially those containing oxidizable sorbants such as activated carbon.

PROTECTIVE CLOTHING: For body protection wear impervious clothing such as an approved splash protective suit made of SBR Rubber, PVC (PVC Outershell w/Polyester Substrate), Gore-Tex (Polyester trilaminate w/Gore-Tex), or a specialized HAZMAT Splash or Protective Suite (Level A, B, or C). For foot protection, wear approved boots made of NBR, PVC, Polyurethane, or neoprene. Overboots made of Latex or PVC, as well as firefighter boots or specialized HAZMAT boots are also permitted. DO NOT wear any form of boot or overboots made of nylon or nylon blends. DO NOT use cotton, wool or leather, as these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Completely submerge hydrogen peroxide contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

GLOVES: For hand protection, wear approved gloves made of nitrile, PVC, or neoprene. DO NOT use cotton, wool or leather for these materials react RAPIDLY with higher concentrations of hydrogen peroxide. Thoroughly rinse the outside of gloves with water prior to removal. Inspect regularly for leaks.

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9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Odorless
APPEARANCE:	Clear, colorless liquid
AUTOIGNITION TEMPERATURE:	Non-combustible
BOILING POINT:	110°C (229°F) (40%); 114°C (237°F) (50%)
COEFFICIENT OF OIL / WATER:	Not available
DENSITY / WEIGHT PER VOLUME:	Not available
EVAPORATION RATE:	> 1 (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
FREEZING POINT:	-41.4°C (-42.5°F) (40%); -52°C (-62°F) (50%)
ODOR THRESHOLD:	Not available
OXIDIZING PROPERTIES:	Strong oxidizer
PERCENT VOLATILE:	100
pH:	<= 3.0
SOLUBILITY IN WATER:	100 %

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SPECIFIC GRAVITY:	(H_20 = 1) 1.15 @ 20°C/4°C (40%); 1.19 @ 20°C/4°C (50%)
VAPOR DENSITY:	Not available (Air = 1)
VAPOR PRESSURE:	22 mmHg @ 30°C (40%); 18.3 mmHg @ 30°C (50%)

COMMENTS:
pH (1% solution) : 5.0 - 6.0

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Excessive heat or contamination could cause product to become unstable.
STABILITY:	Stable (heat and contamination could cause decomposition)
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Reducing agents, wood, paper and other combustibles, iron and other heavy metals, copper alloys and caustic.
HAZARDOUS DECOMPOSITION PRODUCTS:	Oxygen which supports combustion.

COMMENTS: Materials to Avoid : Dirt, organics, cyanides and combustibles such as wood, paper, oils, etc.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: 70% hydrogen peroxide: Severe irritant (corrosive) (rabbit) [FMC Study Number: ICG/T-79.027]

SKIN EFFECTS: 50% hydrogen peroxide: Severe irritant (corrosive) (rabbit) [FMC Study Number: I89-1079]

DERMAL LD_{50}: 70% hydrogen peroxide: > 6.5 g/kg (rabbit) [FMC Study Number: ICG/T-79.027]

ORAL LD_{50}: 50% hydrogen peroxide: > 225 mg/kg (rat) [FMC Study Number: I86-914]

INHALATION LC_{50}: 50% hydrogen peroxide: > 0.17 mg/l (rat) [FMC Study Number: I89-1080]

TARGET ORGANS: Eye, skin, nose, throat, lungs

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ACUTE EFFECTS FROM OVEREXPOSURE: Severe irritant/corrosive to eyes, skin and gastrointestinal tract. May cause irreversible tissue damage to the eyes including blindness. Inhalation of mist or vapors may be severely irritating to nose, throat and lungs.

CHRONIC EFFECTS FROM OVEREXPOSURE: The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for carcinogenicity of hydrogen peroxide in humans, but limited evidence in experimental animals (Group 3 - not classifiable as to its carcinogenicity to humans). The American Conference of Governmental Industrial Hygienists (ACGIH) has concluded that hydrogen peroxide is a 'Confirmed Animal Carcinogen with Unknown Relevance to Humans' (A3).

CARCINOGENICITY:

Chemical Name	IARC	NTP	OSHA	Other
Hydrogen Peroxide	Not listed	Not listed	Not listed	(ACGIH) Listed (A3, Animal Carcinogen)

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: Channel catfish 96-hour LC_{50} = 37.4 mg/L
Fathead minnow 96-hour LC_{50} = 16.4 mg/L
Daphnia magna 24-hour EC_{50} = 7.7 mg/L
Daphnia pulex 48-hour LC_{50} = 2.4 mg/L
Freshwater snail 96-hour LC_{50} = 17.7 mg/L
For more information refer to ECETOC "Joint Assessment of Commodity Chemicals No. 22, Hydrogen Peroxide." ISSN-0773-6339, January 1993

CHEMICAL FATE INFORMATION: Hydrogen peroxide in the aquatic environment is subject to various reduction or oxidation processes and decomposes into water and oxygen. Hydrogen peroxide half-life in freshwater ranged from 8 hours to 20 days, in air from 10-20 hrs. and in soils from minutes to hours depending upon microbiological activity and metal contaminants.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: An acceptable method of disposal is to dilute with a large amount of water and allow the hydrogen peroxide to decompose followed by discharge into a suitable treatment system in accordance with all regulatory agencies. The appropriate regulatory agencies should be contacted prior to disposal.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

EPAPA005001044

PROPER SHIPPING NAME:	Hydrogen peroxide, aqueous solutions with more than 40% but not more than 60% hydrogen peroxide.
PRIMARY HAZARD CLASS / DIVISION:	5.1 (Oxidizer)
UN/NA NUMBER:	UN 2014
PACKING GROUP:	II
LABEL(S):	Oxidizer, Corrosive
PLACARD(S):	5.1 (Oxidizer)
ADDITIONAL INFORMATION:	DOT Marking: Hydrogen Peroxide, aqueous solution with more than 40%, but not more than 60% Hydrogen Peroxide, UN 2014 Hazardous Substance/RQ: Not applicable 49 STCC Number: 4918775 DOT Spec: stainless steel/high purity aluminum cargo tanks and rail cars. UN Spec: HDPE drums. Contact FMC for specific details.

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

PROPER SHIPPING NAME:	Hydrogen peroxide, aqueous solutions with not less than 20%, but not more than 60% hydrogen peroxide.

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

PROPER SHIPPING NAME:	Hydrogen peroxide (40 - 60%) is forbidden on Passenger and Cargo Aircraft, as well as Cargo Only Aircraft.

OTHER INFORMATION:

Protect from physical damage. Keep drums in upright position. Drums should not be stacked in transit. Do not store drum on wooden pallets.

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):

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Hydrogen Peroxide > 52%, RQ: 1000 lbs. Planning Threshold: 10,000 lbs.

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Fire Hazard, Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.: None, (conc. <52%) (hydrogen peroxide, 1000 lbs. when conc is >52%)

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not listed

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Unlisted (Hydrogen Peroxide); RQ = 100 lbs.; Ignitability, Corrosivity

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):
Listed

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):
Waste Number: D001, D002

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

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.

Hazard Classification / Division:	C E D2B
Product Identification Number:	2014
Ingredient Disclosure List:	Listed
Domestic Substance List:	All components listed

INTERNATIONAL LISTINGS

Hydrogen peroxide:
China: Listed
Japan (ENCS): (1)-419
Korea: KE-20204
Philippines (PICCS): Listed

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HAZARD AND RISK PHRASE DESCRIPTIONS:

EC Symbols:	O	(Oxidizer)
	C	(Corrosive)
	Xn	(Harmful)
EC Risk Phrases:	R5	(Heating may cause an explosion.)
	R8	(Contact with combustible material may cause fire)
	R20/22	(Harmful by inhalation and if swallowed.)
	R35	(Causes severe burns.)

16. OTHER INFORMATION

HMIS

Health	3
Flammability	0
Physical Hazard	1
Personal Protection (PPE)	H

Protection = H (Safety goggles, gloves, apron, the use of a supplied air or SCBA respirator is required in lieu of a vapor cartridge respirator)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	3
Flammability	0
Reactivity	1
Special	OX

SPECIAL = OX (Oxidizer)

NFPA (National Fire Protection Association)

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate

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1 = Slight
0 = Insignificant

REVISION SUMMARY:
This MSDS replaces Revision #10, dated April 27, 2006.
Changes in information are as follows:
Section 1 (Product and Company Identification)
Section 3 (Composition / Information on Ingredients)
Section 15 (Regulatory Information)
Section 16 (Other Information)

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NOTE: NFPA Reactivity is 3 - when greater than 52%

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SIGMA-ALDRICH

Material Safety Data Sheet

Version 3.0
Revision Date 07/15/2007
Print Date 08/04/2007

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : **Heptane**

Product Number : 494526
Brand : Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C7H16
Molecular Weight : 100.21 g/mol

CAS-No.	EC-No.	Index-No.	Concentration [%]
Heptane			
142-82-5	205-563-8	601-008-00-2	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable Liquid

Target Organs
Central nervous system, Heart, Lungs, ears

HMIS Classification
Health Hazard: 1
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0

NFPA Rating
Health Hazard: 2
Fire : 3
Reactivity Hazard: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Skin May be harmful if absorbed through skin. May cause skin irritation.

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Eyes	May cause eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

4. 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
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	-4.0 °C (24.8 °F) - closed cup
Ignition temperature	223 °C (433 °F)

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Specific hazards
Flash back possible over considerable distance.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.In case of fire: Evacuate area and fight fire remotely due to the risk of explosion.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

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.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

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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.Store in cool place.Store under inert gas.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Heptane	142-82-5	TWA	400 ppm 1,640 mg/m3	1994-09-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
		STEL	500 ppm 2,050 mg/m3	1994-09-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
		TWA	400 ppm 1,600 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		STEL	500 ppm 2,000 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
		TWA	500 ppm 2,000 mg/m3	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PEL) 29 CFR 1910.1000 Air Contaminants.

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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
For prolonged or repeated contact use protective gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	no data available

Safety data

pH	no data available
Melting point	-91.0 °C (-131.8 °F)
Boiling point	98.0 - 99.0 °C (208.4 - 210.2 °F)
Flash point	-4.0 °C (24.8 °F) - closed cup
Ignition temperature	223 °C (433 °F)
Lower explosion limit	1.1 %(V)
Upper explosion limit	7 %(V)
Vapour pressure	110.7 hPa (83.0 mmHg) at 37.7 °C (99.9 °F) 53.3 hPa (40.0 mmHg) at 20.0 °C (68.0 °F)
Density	0.68 g/cm3
Water solubility	insoluble
Partition coefficient: n-octanol/water	log Pow: > 3.00

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

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Hazardous decomposition products

Hazardous decomposition products formed under fire conditions.
Carbon oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LC50 Inhalation - rat - 4 h - 103,000 mg/m3

Irritation and corrosion

no data available

Sensitisation

no data available

Chronic exposure

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Signs and Symptoms of Exposure

Prolonged or repeated exposure to skin causes defatting and dermatitis., Central nervous system depression, narcosis, Damage to the lungs.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.
Target Organs	Central nervous system, Heart, Lungs, ears,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Ecotoxicity effects

Toxicity to fish	LC50 - Carassius auratus (goldfish) - 4.00 mg/l - 24 h
	LC50 - other fish - 375 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 1.50 mg/l - 48 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do not empty into drains. Avoid release to the environment.

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13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1206 Class: 3 Packing group: II
Proper shipping name: Heptanes

IMDG
UN-Number: 1206 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: HEPTANES
Marine pollutant: No

IATA
UN-Number: 1206 Class: 3 Packing group: II
Proper shipping name: Heptanes

15. REGULATORY INFORMATION

OSHA Hazards
Flammable Liquid

TSCA Status
On TSCA Inventory

DSL Status
All components of this product are on the Canadian DSL list.

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: 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

	CAS-No.	Revision Date
Heptane	142-82-5	1989-12-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Heptane	142-82-5	1989-12-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Heptane	142-82-5	1989-12-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

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16. OTHER INFORMATION

Further information

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SIGMA-ALDRICH

Material Safety Data Sheet

Version 3.0
Revision Date 06/25/2007
Print Date 09/21/2007

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : **Hexane**

Product Number : 296090
Brand : Aldrich

Company : Sigma-Aldrich Canada, Ltd
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA
Telephone : +1 9058299500
Fax : +1 9058299292
Emergency Phone # : 800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : n-Hexane

Formula : C6H14
Molecular Weight : 86.18 g/mol

CAS-No.	EC-No.	Index-No.	Concentration [%]
n-Hexane			
110-54-3	203-777-6	601-037-00-0	-

3. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Peripheral nervous system., Kidney, Testes.

WHMIS Classification

B2	Flammable Liquid	Flammable Liquid
D2A		Reproductive hazard
D2B		Mild eye irritant

HMIS Classification

Health Hazard: 2
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Skin May be harmful if absorbed through skin. May cause skin irritation.

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Eyes	May cause eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

4. 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
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	-26.0 °C (-14.8 °F) - closed cup
Ignition temperature	234 °C (453 °F)

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

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.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.Flash back possible over considerable distance. Container explosion may occur under fire conditions.

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.Store in cool place.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
n-Hexane	110-54-3	TWA	20 ppm	2004-08-01	Canada. Worker's Compensation Act, Occupational Health and Safety Regulations (BC Reg 296/97 as amended), 7.2 [B.C. Reg. 382/2004, s.1]
		TWA	50 ppm 176 mg/m3	2005-02-03	Canada. Occupational Health and Safety Act [R.S.O. 1990, c.1], Industrial Establishments (R.R.O. 1990, Reg 851),139
		TWA	50 ppm 176 mg/m3	2004-04-30	Canada. Occupational Health and Safety Code 218
		TWA	50 ppm 176 mg/m3	2000-01-12	Canada. Act Respecting Occupational Health and Safety [R.S.Q., c.2.1], Regulation respecting Occupational Health and Safety (O.C.885-2001), Division XV, Sections 130-14

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.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form liquid

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Colour	colourless

Safety data

pH	7.0
Melting point	-95.0 °C (-139.0 °F)
Boiling point	68.0 - 70.0 °C (154.4 - 158.0 °F)
Flash point	-26.0 °C (-14.8 °F) - closed cup
Ignition temperature	234 °C (453 °F)
Lower explosion limit	1.2 %(V)
Upper explosion limit	7.7 %(V)
Vapour pressure	341.3 hPa (256.0 mmHg) at 37.7 °C (99.9 °F) 176.0 hPa (132.0 mmHg) at 20.0 °C (68.0 °F)
Density	0.66 g/cm3
Water solubility	insoluble
Partition coefficient: n-octanol/water	log Pow: 3.90 - 4.11
Evaporation rate	15.8

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.
Exposure to moisture may affect product quality.

Materials to avoid
Oxidizing agents

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions.
Carbon oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 25,000 mg/kg

LC50 Inhalation - rat - 4 h - 48000 ppm

Irritation and corrosion

Eyes - rabbit - Mild eye irritation

Sensitisation

no data available

Chronic exposure

Carcinogenicity - rat - Inhalation
Tumorigenic:Carcinogenic by RTECS criteria. Tumorigenic Effects: Testicular tumors.

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

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Signs and Symptoms of Exposure

Prolonged or repeated contact with skin may cause:, defatting, Dermatitis, Contact with eyes can cause:, Redness, Blurred vision, Provokes tears., Effects due to ingestion may include:, Gastrointestinal discomfort, Central nervous system depression, Lung irritation, chest pain, pulmonary edema, giddiness, slowed reaction time, slurred speech, Headache, Dizziness, Drowsiness, Unconsciousness

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.
Target Organs	Peripheral nervous system., Kidney, Testes.,

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available
no data available

Ecotoxicity effects

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 2.5 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 3,878.00 mg/l - 48 h
Toxicity to algae	EC50 - Chlorella vulgaris (Fresh water algae) - 12,840.00 mg/l - 3 h
	EC50 - SKELETOMA - 0.30 mg/l - 8 h

Further information on ecology

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1208 Class: 3 Packing group: II
Proper shipping name: Hexanes

IMDG
UN-Number: 1208 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: HEXANES

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Marine pollutant: No

IATA
UN-Number: 1208 Class: 3 Packing group: II
Proper shipping name: Hexanes

15. REGULATORY INFORMATION

TSCA Status
On TSCA Inventory

DSL Status
All components of this product are on the Canadian DSL list.

WHMIS Classification

B2	Flammable Liquid	Flammable Liquid
D2A		Reproductive hazard
D2B		Mild eye irritant

16. OTHER INFORMATION

Further information
Copyright 2007 Sigma-Aldrich Co. 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 Co., 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.

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: 1-Hexene (MSDS No. P-6237-A)	**Trade Names:** Hexene
Chemical Name: 1-Hexene	**Synonyms:** n-Hexene, hexane, normal-hexene, hexylene; n-hexylene; alpha-hexylene, butyl ethene, butyl ethylene,
Chemical Family: Alkene	**Product Grades:** Not available.

Telephone: **Emergencies:** 1-800-645-4633*
CHEMTREC: 1-800-424-9300*
Routine: 1-800-PRAXAIR

Company Name: Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).*

2. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Flammable liquid and vapor.
May form explosive mixtures with air.
May irritate the eyes, skin, and respiratory tract.
Has anesthetic effects in high concentrations.
May cause dizziness and drowsiness.
Self-contained breathing apparatus and protective clothing may be required by rescue workers.
Under ambient conditions, this is a colorless liquid with a sweet odor.

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communications Standard (29 CFR 1910.1200).

POTENTIAL HEALTH EFFECTS:

Effects of a Single (Acute) Overexposure

Inhalation. Vapors irritate the respiratory tract. High concentrations may act as an anesthetic, first stimulating the central nervous system (CNS), then depressing it to varying degrees. CNS depression is marked by dizziness, drowsiness, and possibly unconsciousness.

Skin Contact. Liquid or vapor may irritate the skin.

Swallowing. Unavailable for 1-Hexene. When children ingest petroleum distillates such as hexene, the effects are similar to those of inhalation: CNS depression and tissue irritation. Lung damage due primarily to inhalation of vomited material has lead to coma and death from pulmonary edema (fluid in the lungs).

Eye Contact. Liquid or vapor may irritate the eyes.

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A vertical line in the left margin indicates revised or new material.

Effects of Repeated (Chronic) Overexposure. Repeated or prolonged exposure of the skin may cause cracking and drying due to defatting of tissues.

Other Effects of Overexposure. None known.

Medical Conditions Aggravated by Overexposure. The skin-irritating properties of 1-Hexene may aggravate an existing dermatitis. Respiratory irritation may aggravate an existing asthma or other upper respiratory or pulmonary disease.

CARCINOGENICITY: 1-Hexene is not listed by NTP, OSHA, or IARC.

POTENTIAL ENVIRONMENTAL EFFECTS: None known. For further information, see section 12, Ecological Information

3. Composition/Information on Ingredients

See section 16 for important information about mixtures.

COMPONENT	CAS NUMBER	CONCENTRATION
1-Hexene	592-41-6	>99%*

**The symbol > means "greater than."*

4. First Aid Measures

INHALATION: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: Remove contaminated clothing and shoes, and wash exposed areas with soap and plenty of water. Wash contaminated clothing prior to reuse; discard shoes. Seek medical attention if discomfort persists.

SWALLOWING: Do not induce vomiting. Get immediate medical aid.

EYE CONTACT: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: *There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.*

5. Fire Fighting Measures

FLAMMABLE PROPERTIES: Vapor forms explosive mixtures with air and oxidizing agents.

SUITABLE EXTINGUISHING MEDIA: CO_2, dry chemicals, water spray, or fog.

PRODUCTS OF COMBUSTION: Carbon dioxide, carbon monoxide

PROTECTION OF FIREFIGHTERS: DANGER! Flammable liquid and vapor. Evacuate all personnel from danger area. Use self-contained breathing apparatus and protective clothing. Immediately cool surrounding containers with water spray from maximum distance, taking care not to extinguish flames. Avoid spreading burning liquid with water. Remove ignition sources if without risk. If flames are accidentally extinguished, explosive reignition may occur. Reduce vapors with water spray or fog. Stop flow of liquid if without risk, while continuing cooling water spray. Remove all containers from area of fire if without risk. Allow fire to burn out. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

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Specific Physical and Chemical Hazards. If escaping vapors catches fire, do not extinguish flames. Flammable and toxic vapors may spread from leak and could explode if reignited by sparks or flames. Vapors are heavier than air and may collect in low spots. Explosive atmospheres may linger. Before entering area, especially confined areas, check with an appropriate device. Although no pressure relief device is required by the DOT, 1-Hexene cylinders generally are equipped with one.

Protective Equipment and Precautions for Firefighters. Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Flammable liquid and vapor.

Personal Precautions. Vapor forms explosive mixtures with air. (See section 5.) Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus and protective clothing where needed. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if without risk. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

Environmental Precautions. Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING: May irritate skin, eyes, and respiratory tract. Use only with adequate ventilation or respiratory protection. (See section 8.) Do not get liquid or vapor in eyes, on skin, or on clothing. Have safety showers and eyewash fountains immediately available. ***Keep away from heat, sparks, and open flame.*** Use only spark-proof tools and explosion-proof equipment. ***Protect containers from damage.*** Use a suitable hand truck to move containers; do not drag, roll, slide, or drop. Electrical equipment must be non-sparking or explosion-proof. For other precautions in using this product, see section 16.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Store in a cool, dry area only in the DOT-approved container in which product was received. Separate containers of this product from oxygen, chlorine, and other oxidizers by at least 20 ft (6.1 m), or use a barricade of noncombustible material. This barricade should be at least 5 ft (1.53 m) high and have a fire resistance rating of at least ½ hour. ***Post "No Smoking or Open Flames" signs in storage and use areas.*** There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Keep containers closed. Store only where temperature will not exceed 125°F (52°C). Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

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RECOMMENDED PUBLICATIONS: For further information on storage, handling, and use, see NFPA 30, *Flammable and Combustible Liquids Code*, published by the National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101; 1-800-344-3555; www.nfpa.org.

8. Exposure Controls/Personal Protection

COMPONENT	OSHA PEL	ACGIH TLV-TWA (2006)
1-Hexene	N.E.*	50 ppm

*N.E.–Not Established.

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IDLH = Not available.

ENGINEERING CONTROLS:

Local Exhaust. Use an explosion-proof local exhaust system with sufficient air flow velocity to prevent oxygen deficiency and keep hazardous vapors in the worker's breathing zone below all applicable exposure limits.

Mechanical (General). Under certain conditions, general exhaust ventilation may be acceptable if it can maintain an adequate supply of air and keep hazardous vapors in the worker's breathing zone below all applicable exposure limits.

Special. None

Other. None

PERSONAL PROTECTIVE EQUIPMENT:

Skin Protection. Wear work gloves when handling containers; rubber where contact with product may occur. Metatarsal shoes for cylinder handling. Protective clothing where needed. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

Eye/Face Protection. Wear safety glasses when handling containers. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Respiratory Protection. Respirators must be acceptable to MSHA and NIOSH. Respiratory protection must conform to OSHA 29 CFR 1910.134. Select per OSHA 29 CFR 1910.134 and ANSI Z88.2.

9. Physical and Chemical Properties

APPEARANCE:	Colorless liquid
ODOR:	Sweet
ODOR THRESHOLD:	65 ppm
PHYSICAL STATE:	Liquid at normal temperature and pressure
pH:	Not applicable.
MELTING POINT at 1 atm:	-219.6°F (-139.8°C)
BOILING POINT at 1 atm:	146.3°F (63.5°C)
FLASH POINT (test method):	-15°F (-26.1°C) CC
EVAPORATION RATE (Butyl Acetate = 1):	Not available.

FLAMMABILITY:	Flammable
FLAMMABLE LIMITS IN AIR, % by volume:	**LOWER:** 1.20% **UPPER:** 6.9%
VAPOR PRESSURE at 70°F (21.1°C):	3.0 psia (20.7 kPa abs)
VAPOR DENSITY at 70°F (21.1°C) and 1 atm:	0.217 lb/ft^3 (3.48 kg/m^3) (calculated)
SPECIFIC GRAVITY (H_2O = 1) at 68/39.2°F (20/4°C):	0.6734
SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm:	2.9
SOLUBILITY IN WATER:	Insoluble
PARTITION COEFFICIENT: n-octanol/water:	Not available.
AUTOIGNITION TEMPERATURE:	509°F (265°C)
DECOMPOSITION TEMPERATURE:	Not available.
PERCENT VOLATILES BY VOLUME:	100
MOLECULAR WEIGHT:	84.16
MOLECULAR FORMULA:	CH_2:$CH(CH_2)_3CH_3$ or C_6H_{12}

10. Stability and Reactivity

CHEMICAL STABILITY: ☐ Unstable ☒ Stable

CONDITIONS TO AVOID: Exposure to heat, sparks, or flame

INCOMPATIBLE MATERIALS: Oxidizers, such as oxygen, chlorine, and fluorine

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide, carbon monoxide

POSSIBILITY OF HAZARDOUS REACTIONS: ☒ May Occur ☐ Will Not Occur

1-Hexene vapor forms explosive mixtures with air and oxidizing agents.

11. Toxicological Information

ACUTE DOSE EFFECTS: None known.

STUDY RESULTS: None known.

12. Ecological Information

ECOTOXICITY: No adverse ecological effects expected.

OTHER ADVERSE EFFECTS: This product does not contain any Class I or Class II ozone-depleting chemicals.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier. For emergency disposal, may be burned in a suitable flare or burner if permitted by federal, state, and local regulations.

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14. Transport Information

DOT/IMO SHIPPING NAME: 1-Hexene

HAZARD CLASS: 3	**PACKING GROUP/Zone:** II	**IDENTIFICATION NUMBER:** UN2370	**PRODUCT RQ:** None

SHIPPING LABEL(s): FLAMMABLE LIQUID

PLACARD (when required): FLAMMABLE LIQUID

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

MARINE POLLUTANTS: 1-Hexene is not listed as a marine pollutant by DOT.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:

EPA (ENVIRONMENTAL PROTECTION AGENCY)

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): None

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

TPQ: None
EHS RQ (40 CFR 355): None

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes
DELAYED: No
PRESSURE: No
REACTIVITY: No
FIRE: Yes

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

1-Hexene is not subject to reporting under Section 313.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

1-Hexene is not listed as a regulated substance.

TSCA: TOXIC SUBSTANCES CONTROL ACT: 1-Hexene is listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

1-Hexene is not listed in Appendix A as a highly hazardous chemical. However, any process that involves a flammable liquid on site in one location in quantities of 10,000 lb (4536 kg) or greater is covered under this regulation unless the liquid is used as a fuel.

STATE REGULATIONS:

CALIFORNIA: 1-Hexene is not listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

PENNSYLVANIA: 1-Hexene is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: ***Flammable liquid and vapor.*** Use piping and equipment adequately designed to withstand pressures to be encountered. Use a backflow prevention device in any piping. Use only with compatible materials and equipment. Ground all equipment. ***May form explosive mixtures with air.*** Store and use with adequate ventilation at all times. Keep away from oxidizing agents and other flammables. ***Never work on a pressurized system.*** If there is a leak, close the cylinder valve. Blow the system down in a safe and environmentally sound manner in compliance with all federal, state, and local laws; then repair the leak. ***Never place a compressed gas cylinder where it may become part of an electrical circuit.***

Mixtures. When you mix two or more gases or liquefied gases, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

NFPA RATINGS:		**HMIS RATINGS:**	
HEALTH	= 1	HEALTH	= 1
FLAMMABILITY	= 3	FLAMMABILITY	= 3
INSTABILITY	= 0	PHYSICAL HAZARD	= 1
SPECIAL	= None		

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED:	CGA-510 used; no standard connection assigned.
PIN-INDEXED YOKE:	Not applicable.
ULTRA-HIGH-INTEGRITY CONNECTION:	Not applicable.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlet V-1 listed below.

EPAPA005001068

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information can be found in the following materials published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, http://www.cganet.com/Publication.asp.

AV-1	*Safe Handling and Storage of Compressed Gases*
P-1	*Safe Handling of Compressed Gases in Containers*
—	*Handbook of Compressed Gases, Fourth Edition*

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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PRAXAIR®

Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113

Printed in USA

Celanese

Product name:	Hexylene glycol
MSDS number:	276
Material number:	80276
Published date:	07/29/2005

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product: Hexylene glycol
MSDS number: 276
Material number: 80276

Manufacturer name and address:

Celanese Ltd.
1601 W. LBJ Freeway
P.O. Box 819005
Dallas, TX 75381-9005
United States
Phone: 972 443 4000
Internet: www.celanesechemicals.us

Transportation emergency phone numbers:
In USA, call 800 424 9300
Outside USA, call 703 527 3887, collect calls accepted

2. Composition / Information on Ingredients

Component	CAS Number	Percent %	OSHA hazard category:
HEXYLENE GLYCOL	107-41-5	99.3	Hazardous

3. Hazards Identification

Emergency Overview:

CAUTION!
•Combustible liquid and vapor.
•May cause respiratory tract, skin and eye irritation.

Product Description

Appearance: Clear, colorless liquid.
Odor: Mild, sweetish odor.

Potential health effects

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
703 527 3887 Outside USA, collect calls accepted, 24 hrs/day
Product information: 800 835 5235

Product name:	Hexylene glycol
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Routes of exposure: Skin, eyes, inhalation, ingestion.

Immediate effects:

Skin: May cause skin irritation. Symptoms of exposure may include: Drying, cracking or inflammation of skin.

Eyes: Exposure to vapors and liquid Causes eye irritation. Symptoms of exposure may include: Eye irritation, burning sensation, pain, watering, and/or change of vision.

Inhalation: Harmful if inhaled. Symptoms of exposure may include: Central nervous system depression with nausea, dizziness, headache, stupor, uncoordinated or strange behavior or unconsciousness. Nasal discharge, hoarseness, coughing, chest pain and breathing difficulty.

Ingestion: May be harmful if swallowed. Symptoms of exposure may include: Nausea, vomiting, loss of appetite, gastrointestinal irritation and/or diarrhea. Inflammation of mouth, throat, esophagus and/or stomach. Central nervous system depression with nausea, headache and mental sluggishness.

Reproductive: No evidence of reproductive effects.

Mutagenic: Does not show mutatgenic potential in most in vitro tests.

Target organ effects:
•Overexposure (prolonged or repeated exposure) may cause:
Central nervous system depression
Irritation of the respiratory tract
Irritation of the digestive tract
Local irritation at the site of exposure

Medical conditions which may be aggravated by exposure:
Significant exposure to this chemical may adversely affect people with acute or chronic disease of the:
Respiratory Tract
Skin
Eyes
Central nervous system

For further information, see:
Section 4 - First Aid Measures
Section 5 - Fire Fighting Measures
Section 6 - Accidental Release Measures
Section 8 - Exposure Controls/Personal Protection
Section 9 - Physical and Chemical Properties
Section 10 - Stability and Reactivity

4. First Aid Measures

Transportation emergency:	800 424 9300	CHEMTREC, 24 hrs/day
	703 527 3887	Outside USA, collect calls accepted, 24 hrs/day
Product information:	800 835 5235	

Skin: Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Call a physician if irritation develops and persists. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. Get medical attention immediately.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion: If large quantities of this material are swallowed, call a physician immediately. Do NOT induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person. Call a physician.

5. Fire Fighting Measures

NFPA: Health: 1 Flammability: 1 Reactivity: 0

Flammable properties

Flash point (test method): 93 C (199 F)

Flammable limits in air, % by volume:

Upper: 9.9 %

Lower: 1 %

Autoignition temperature: 306 C (583 F)

Products of combustion: Carbon Monoxide.

Extinguishing Media: Use alcohol type aqueous film forming foam for large fires. Use CO_2 or dry chemical for small fires.

Fire Fighting Instructions: Water spray should be used to cool fire-exposed structures and vessels. Water spray can be used to reduce the intensity of flames and to dilute spills to a non-flammable mixture. Keep personnel removed from and upwind of fire. If potential for exposure to vapors or products of combustion exists, wear full fire fighting turnout gear and NIOSH approved self-contained breathing apparatus. Oxidizing chemicals may accelerate the burning rate in a fire situation.

Fire Fighting Environmental Concerns: Thoroughly decontaminate bunker gear and other fire-fighting equipment before re-use.

6. Accidental Release Measures

Spill or Leak Instructions

Eliminate ignition sources. See Section 8 for appropriate personal protective equipment. Contain spill with dikes of soil or nonflammable absorbent to minimize contaminated area. If fire potential exists, blanket spill with alcohol type aqueous film-forming foam or use water fog stream to disperse vapors. Avoid run-off into storm sewers and ditches leading to waterways. If required, notify state and local authorities. Place leaking containers in well-ventilated area. Clean up small spills by using a nonflammable absorbent or flushing sparingly with water. Contain larger spills with nonflammable diking or absorbent. Clean up by vacuuming or sweeping.

Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. Assess the spill situation, as the spill may not evolve large amounts of hazardous airborne contaminants in many outdoor spill situations. It may be advisable in some cases to simply monitor the situation until spilled product is removed.

7. Handling and Storage

Handling:

Use with adequate ventilation. Keep containers closed when not in use. Always open containers slowly to allow any excess pressure to vent. Avoid breathing vapor. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Decontaminate soiled clothing thoroughly before re-use. Destroy contaminated leather clothing.

Storage:

Do not store with incompatible materials. See Section 10. Stability and Reactivity. Keep all containers tightly closed when not in use. Store out of direct sunlight and on an impermeable floor.

8. Exposure Controls / Personal Protection

Engineering Controls:

General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred.

Protective Equipment

A safety shower and eyebath should be readily available.

Skin protection:

Wear impervious clothing and gloves to prevent contact. Nitrile rubber is recommended. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Eye/face protection:

Wear chemical goggles when there is a reasonable chance of eye contact.

Product name:	Hexylene glycol
MSDS number:	276
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Respiratory protection:

Based on workplace contaminant level and working limits of the respirator, use a respirator approved by NIOSH. The following is the minimum recommended equipment for an occupational exposure level. To estimate an occupational exposure level see Section 3, Section 8 and Section 11.

For concentrations > 1 and < 100 times the occupational exposure level: Use Type C full facepiece supplied-air respirator operated in positive-pressure or continuous-flow mode.

For concentrations > 100 times the occupational exposure level or greater than the IDLH level or unknown concentrations (such as in emergencies): Use self-contained breathing apparatus with full facepiece in positive-pressure mode or Type C positive-pressure full facepiece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus escape system.

For escape: Use self-contained breathing apparatus with full facepiece or any respirator specifically approved for escape.

Exposure guidelines

Component	CAS Number	Percent %	ACGIH TWA	ACGIH STEL	ACGIH CEILING	OSHA TWA	OSHA STEL	OSHA CEILING	Celanese WEL *	Mexico TWA	Mexico STEL	Mexico CEILING
HEXYLENE GLYCOL	107-41-5	99.3	-	-	25 ppm	-	-	25 PPM	-	25 ppm	-	-

Component	CAS Number	Percent %	1990 NIOSH IDLH (Recognized by OSHA)	1994 NIOSH IDLH
HEXYLENE GLYCOL	107-41-5	99.3	-	-

Comments:

No IDLH level has been established by NIOSH.

9. Physical and Chemical Properties

Appearance:	Clear, colorless liquid.
Odor:	Mild, sweetish odor.
pH:	5
Vapor Pressure:	0.04 mm Hg at 20 deg C
Vapor Density (Air=1 @ 20°C):	4.08
Freezing Point:	- 98 C (- 144 F)
Melting Point:	- 50 C (- 58 F)
Solubility in Water @ 20°C:	100 %

Transportation emergency:	800 424 9300	CHEMTREC, 24 hrs/day
	703 527 3887	Outside USA, collect calls accepted, 24 hrs/day
Product information:	800 835 5235	

Product name:	Hexylene glycol
MSDS number:	276
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Specific Gravity: 0.93 at 20 deg C

Molecular Weight: 118.2

10. Stability and Reactivity

Stability: Stable.

Incompatibility: Keep away from sulfuric acid, phosphoric acid and other dehydrating agents, acetic anhydride, strong oxidizing agents such as peroxides, oxygen, nitric acid, perchloric acid or chromium trioxide.

Hazardous Combustion or Decomposition Products: Thermal decomposition products may include oxides of carbon.

Hazardous Polymerization: Hazardous polymerization will not occur.

11. Toxicological Information

Component Toxicological Information

Component	HEXYLENE GLYCOL

Acute Exposure:

Oral LD50: 3692 - 4790 mg/kg (rats); slightly toxic to animals. CNS depression was reported in animals at oral doses of 1-4 g/kg. In a limited study, humans ingested 5g/day for 5 days without apparent adverse effects.

Inhalation LC50: > 0.31 mg/l (rats, 1 hr.); practically nontoxic to animals. Acute overexposure (100ppm-1000ppm) in humans for 15 min. resulted in respiratory irritation.

Skin: Moderately irritating to rabbit skin (24 hrs.). In humans, minimal irritation was reported during patch testing. Dermal LD50: 9250-13200 mg/kg (rabbits); practically nontoxic to animals. Skin sensitization studies conducted according to current scientific principles are not available.

Eye: Liquid is highly irritating to rabbits eyes. Eye irritation was reported in humans exposed to 50 ppm in air.

Mutagenicity: Hexylene gylcol did not produce mutations or chromosome damage in vitro in the Ames test with Salmonella typhimurium, in the mitotic recombination test with Saccharomyces cerevisiae, or in the cytogenetic analysis of Chinese hamster ovary cells.

Carcinogenicity: No information.

Reproductive/Developmental Effects: The fertility of male rats given an average oral dose of 148 to 190 mg/kg/day of hexylene glycol for 130 days was unchanged when compared to that of the control group.

Repeated Exposure: Hexylene glycol was administered to rats in their diet for 4 months at concentrations equivalent to 150 or 200 mg/kg/day. The NOEL was 150 mg/kg/day. At 200 mg/kg/day, some unspecified changes in kidney tissue were noted. It produced no ill effects when given orally to rats at a dose of 590 mg/kg/day for six months. Rats and rabbits exposed to aerosol concentrations of 700 mg/m^3 for 7 hours a day for 9 days showed no adverse pathologic effects.

12. Ecological Information

Component Ecological Information

Component	HEXYLENE GLYCOL

Ecotoxicity: Hexylene glycol exhibits low acute toxicity to aquatic species.

Fish (Carassius auratus) 96-hr. LC50 = 12000 ppm (flow-through).
Fish (Gambusia affinis) 96-hr. LC50 = 9910 ppm (flow-through).
Fish (Ictalurus punctatus) 96-hr. LC50 = 12350 (flow-through).
Fish (Lepomis macrochirus) 96-hr. LC50 = 12800 ppm (flow-through).
Fish (Lepomis macrochirus) 96-hr. LC50 > 10000 ppm (static).
Fish (Pimephales promelas) 96-hr. LC50 = 8690 ppm (flow-through).
Fish (Pimephales promelas) 96-hr. LC50 = 10700 ppm (static).
Fish (Salmo gairdneri) 96-hr. LC50 = 9450 ppm (flow-through).
Fish (Alburnus alburnus) 96-hr. LC50 = 8000 ppm (static).
Fish (Carassius auratus) 24-hr. LC50 > 5000 ppm (static).
Fish (Menidia beryllina) 96-hr. LC50 = 10000 ppm (static).
Crustacean (Artemia salina) 24-hr. EC50 = 5900 ppm (static).
Crustacean (Ceriodaphnia sp.) 48-hr. EC50 = 2800 ppm (static).
Crustacean (Daphnia magna) 48-hr. EC50 = 5410 - 8700 ppm (flow-through).
Crustacean (Daphnia magna) 48-hr. EC50 = 3200 ppm (static).
Crustacean (Daphnia pulex) 48-hr. EC50 = 3300 ppm (static).
Crustacean (Nitocra spinipes) 96-hr. EC50 = 7600 ppm (static).
Crustacean (Orconnectes immunis) 96-hr EC50 = 16500-33000 ppm (flow-through).
Crustacean (Tanytarsus dissimilis) 96-hr. EC50 = 4310 ppm (flow-through).
Bacteria (Photobacterium phosphoreum) 5-min. EC50 = 3070 ppm.
Terrestrial (Arbacia punctulata) 48-hr. EC50 = 9486-13555 ppm.

Environmental Fate:

Degradation: Hexylene glycol was readily biodegradable in the MITI test, the Modified Zahn-Wellens test, the Sturm test, the Modified OECD test, and the closed bottle test.

Bioaccumulation: The calculated log n-octanol/water partition coefficient was < 0.14. This suggests that hexylene glycol has low potential to bioaccumulate.

13. Disposal Considerations

Dispose of spilled material in accordance with state and local regulations for waste that is non-hazardous by Federal definition. Note that this information applies to the material as manufactured; processing, use, or contamination may make this information inappropriate, inaccurate, or incomplete.

Note that this handling and disposal information may also apply to empty containers, liners and rinsate. State or local regulations or restrictions are complex and may differ from federal regulations. This information is intended as an aid to proper handling and disposal; the final responsibility for handling and disposal is with the owner of the waste. See Section 9 - Physical and Chemical Properties.

14. Transport Information

US Department of Transportation:

UN/NA Number:	NA 1993
Shipping name:	Combustible liquid n.o.s. (Hexylene glycol)
Hazard class:	3 (Combustible material)
Packing Group:	PG III
Emergency Response Guide:	128

ICAO/IATA:

Proper Shipping Name:	HEXYLENE GLYCOL
Hazard Classification:	Not Regulated.

IMDG:

Proper Shipping Name:	HEXYLENE GLYCOL
Hazard Class:	Not Regulated.
Flash point (test method):	93 C (199 F)

Transport Canada

Trade Information
Schedule B Code (export): 2905.39.0000
Harmonization Code (import): 29053960

15. Regulatory Information

Transportation emergency:	800 424 9300	CHEMTREC, 24 hrs/day
	703 527 3887	Outside USA, collect calls accepted, 24 hrs/day
Product information:	800 835 5235	

Product name:	Hexylene glycol
MSDS number:	276
Material number:	80276
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U.S. STATE REGULATIONS

Chemicals associated with the product which are subject to the state right-to-know regulations are listed along with the applicable state(s):

HEXYLENE GLYCOL 107-41-5

Pennsylvania	Listed
New Jersey	Listed
Illinois	Listed
Massachusetts	Listed
Rhode Island	Listed

U.S. FEDERAL REGULATIONS

TSCA Inventory: We certify that all components are either on the TSCA inventory or qualify for an exemption.

Environmental Regulations:

SARA 311:

Acute health:	Yes
Chronic health:	No
Fire:	Yes
Sudden release of pressure:	No
Reactive:	No

INTERNATIONAL REGULATIONS

International Chemical Inventory

Listed on the chemical inventories of the following countries or qualifies for an exemption:

AUSTRALIA,CHINA,CANADA,EUROPE,KOREA,PHILIPPINES, JAPAN

16. Other Information

Prepared by: Product Stewardship Department
Celanese Ltd.

Transportation emergency:	800 424 9300	CHEMTREC, 24 hrs/day
	703 527 3887	Outside USA, collect calls accepted, 24 hrs/day
Product information:	800 835 5235	

Celanese

Product name:	Hexylene glycol
MSDS number:	276
Material number:	80276
Published date:	07/29/2005

Hazard ratings This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.

NFPA: Health: 1 Flammability: 1 Reactivity: 0

HMIS: Health: 1 Flammability: 1 Reactivity: 0

Revisions: The following sections have been revised since the last issue of this MSDS.

14. Transport Information

For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Celanese makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. This material may be released from gas, liquid, or solid materials made directly or indirectly from it. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards. Material safety data sheets are provided on the Internet by Celanese as a service to its customers. Possession of an Internet MSDS does not indicate that the possessor of the MSDS was a purchaser or user of the subject product.

Material Safety Data Sheet

Hydrochloric acid

ACC# 95545

Section 1 - Chemical Product and Company Identification

MSDS Name: Hydrochloric acid
Catalog Numbers: AC124620000, AC124620010, AC124620011, AC124620025, AC124620026, AC124620051 AC124620051, AC124620100, AC124620250, AC124630000, AC124630010, AC124630011 AC124630011, AC124630025, AC124630026, AC124630100, AC124635000, AC124635001 AC124635001, AC352020000, AC389300000, AC389310000, AC423790000, AC423790025 AC423790025, AC423790026, AC423790250, AC423795000, AC423795001
Synonyms:
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7647-01-0	Hydrochloric acid	32-36	231-595-7
7732-18-5	Water	balance	231-791-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available. Appearance: colorless clear liquid.
Not available.
Target Organs: Respiratory system, eyes, skin.

Potential Health Effects
Eye: May cause irreversible eye injury. Vapor or mist may cause irritation and severe burns. Contact with liquid is corrosive to the eyes and causes severe burns. May cause painful sensitization to light.
Skin: May cause skin sensitization, an allergic reaction, which becomes evident upon -exposure to this material. Contact with liquid is corrosive and causes severe burns and ceration.
Ingestion: May cause circulatory system failure. Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause corrosion and permanent tissue

destruction of the esophagus and digestive tract.
Inhalation: May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Causes chemical burns to the respiratory tract. Exposure to the mist and vapor may erode exposed teeth. Causes corrosive action on the mucous membranes.
Chronic: Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. May cause conjunctivitis and

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid imme diately.
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. May ignite or explode on contact with steam or moist air. Containers may explode when heated.
Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Large spills may be neutralized with dilute alkaline solutions of soda ash (sodium carbonate, Na2CO3), or lime (calcium oxide, CaO). Avoid runoff into storm sewers and ditches which lead to waterways. Provide ventilation. Do not get water inside containers. A vapor suppressing foam may be used to reduce vapors. Cover with dry earth, dry sand, or other non-combustible material followed with plastic sheet to minimize spreading and contact with

water.

Section 7 - Handling and Storage

Handling: Use only in a well-ventilated area. Contents may develop pressure upon prolonged storage. Do not breathe dust, mist, or vapor. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Do not ingest or inhale. Use only in a chemical fume hood. Use caution when opening. Keep from contact with moist air and steam.
Storage: Do not store in direct sunlight. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Do not store in metal containers.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Hydrochloric acid	2 ppm Ceiling	50 ppm IDLH	5 ppm Ceiling; 7 mg/m3 Ceiling
Water	none listed	none listed	none listed

OSHA Vacated PELs: Hydrochloric acid: No OSHA Vacated PELs are listed for this chemical. Water: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid
Appearance: colorless
Odor: pungent odor - strong odor
pH: <1
Vapor Pressure: 125mbar @20 deg C
Vapor Density: 1.26
Evaporation Rate:>1.00
Viscosity: 1.9 mPa.s @15 deg C
Boiling Point: 57 deg C @760mmHg

Freezing/Melting Point:-35 deg C
Decomposition Temperature:1782 deg C
Solubility: miscible with water: 823 g/l (0°C); 561
Specific Gravity/Density:1.180
Molecular Formula: ClH
Molecular Weight:36.45

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Mechanical shock, incompatible materials, excess heat, exposure to moist air or water.
Incompatibilities with Other Materials: Metals, strong oxidizing agents, bases, acetic anhydride, alkali metals, aluminum, amines, copper, copper alloys, fluorine, sodium hydroxide, steel, sulfuric acid, vinyl acetate, potassium permanganate, cesium acetylene carbide, lithium silicide, rubidium acetylene carbide, rubidium carbide, sodium, aldehydes (e.g. acetaldehyde, acrolein, chloral hydrate, formaldehyde), caustics (e.g. ammonia, ammonium hydroxide, calcium hydroxide, potassium hydroxide, sodium hydroxide), sulfides (inorganic, e.g. ferric sulfide, lead sulfide, sodium sulfide), epoxides (e.g. butyl glycidyl ether), water reactive substances (e.g. acetic anyhdride, alkyl aluminum chloride, calcium carbide, ethyl dichlorosilane), chlorosulfonic acid, oleum, methyl vinyl ether, perchloric acid, calcium phosphide, acetates, cesium carbide, carbides.
Hazardous Decomposition Products: Hydrogen chloride, chlorine, hydrogen gas.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7647-01-0: MW4025000; MW4031000
CAS# 7732-18-5: ZC0110000
LD50/LC50:
CAS# 7647-01-0:
Inhalation, mouse: LC50 = 1108 ppm/1H;
Inhalation, mouse: LC50 = 20487 mg/m3/5M;
Inhalation, mouse: LC50 = 3940 mg/m3/30M;
Inhalation, mouse: LC50 = 8300 mg/m3/30M;
Inhalation, rat: LC50 = 3124 ppm/1H;
Inhalation, rat: LC50 = 60938 mg/m3/5M;
Inhalation, rat: LC50 = 7004 mg/m3/30M;
Inhalation, rat: LC50 = 45000 mg/m3/5M;
Inhalation, rat: LC50 = 8300 mg/m3/30M;
Oral, rabbit: LD50 = 900 mg/kg;

CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;

Carcinogenicity:
CAS# 7647-01-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: Embryo or Fetus: Stunted fetus, ihl-rat TCLo=450 mg/m3/1H.Specific Developmental Abnormalities: homeostasis, ihl-rat TCLo=450 mg/m3/1H.
Reproductive Effects: Inhalation, rat: TCL0 = 450 mg/m3/1H
Mutagenicity: sln-dmg-ihl:100 ppm/24H sln-dmg-orl:100 ppm cyt-grh-par:20 mg cyt-ham lung:30 mmol/l cyt-ovr-ham:8 mmol/l
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Bluegill/Sunfish: 3.6 mg/L; 48H; Lethal (unspecified) No data available.
Environmental: No information available.
Physical: No information available.
Other: Biodegradable.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	HYDROCHLORIC ACID	HYDROCHLORIC ACID
Hazard Class:	8	8
UN Number:	UN1789	UN1789
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7647-01-0 is listed on the TSCA inventory.
CAS# 7732-18-5 is listed on the TSCA inventory.

CAS# 7732-18-5 is listed on Canada's DSL List.

Canada - WHMIS

not available.

; product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7647-01-0 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 7/06/1999
Revision #4 Date: 7/13/2006

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 7647-01-0: 5000 lb final RQ; 2270 kg final RQ
SARA Section 302 Extremely Hazardous Substances
CAS# 7647-01-0: 500 lb TPQ (gas only)
SARA Codes
CAS # 7647-01-0: immediate.
Section 313
This material contains Hydrochloric acid (CAS# 7647-01-0, 32-36%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 7647-01-0 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 7647-01-0 is listed as a 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:
CAS# 7647-01-0 is considered highly hazardous by OSHA.
ATE
CAS# 7647-01-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
C
Risk Phrases:
R 34 Causes burns.
R 37 Irritating to respiratory system.

Safety Phrases:
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)
CAS# 7647-01-0: 1
CAS# 7732-18-5: No information available.
Canada - DSL/NDSL
CAS# 7647-01-0 is listed on Canada's DSL List.

C/D/N ISOTOPES INC.
88 Leacock Street
Pointe-Claire, Quebec H9R 1H1
Toll-Free (Canada & USA): 1-800-565-4696
Tel.: 1-514-697-6254 • Fax: 1-514-697-6148
www.cdnisotopes.com

MATERIAL SAFETY DATA SHEET

Sheet No. 6655

SECTION 1: PRODUCT IDENTIFICATION

Catalog No.: D-4008
Product Name: *n*-Hexadecyl-d_{33} Alcohol
CAS No.: 284474-73-3

SECTION 2: CHEMICAL INFORMATION (UNLABELLED)

Chemical Name: *n*-HEXADECYL ALCOHOL
CAS No.: 36653-82-4
Synonyms: Hexadecanol; Alcohol C-16; Palmityl Alcohol; Cetyl Alcohol

SECTION 3: HAZARDS IDENTIFICATION

Known Hazards: IRRITANT

SECTION 4: FIRST AID MEASURES

Skin Contact: Wash with water.
Ingestion: Medical assistance for gastric lavage.
Inhalation: Remove to fresh air, artificial respiration or oxygen if necessary.

SECTION 5: FIRE FIGHTING MEASURES

Extinguishing Media: Carbon dioxide, dry chemical powder, foam.
Special Fire Fighting Equipment: Wear a self-contained breathing apparatus and protective clothing.
Unusual Fire and Explosion Hazards: None indicated.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
Spill Clean-up Methods: Provide adequate ventilation. Carefully scoop up, place in plastic bag and hold for waste disposal.

SECTION 7: HANDLING AND STORAGE

Usage/Handling Precautions: Good fumehood
Storage Conditions: Adequate ventilation.

SECTION 8: EXPOSURE CONTROL / PERSONAL PROTECTION

Respiratory Protection: Self-contained breathing apparatus or chemical cartridge.
Hand Protection: Chemical-resistant gloves, solvent-resistant gloves.
Eye Protection: Wear safety goggles.
Other Protective Equipment: Protective clothing.
Other Protective Measures: Provide safety showers and eyewash station near workplace.

C/D/N ISOTOPES INC.
Toll-Free (Canada & USA): 1-800-565-4696
Tel.: 1-514-697-6254 • Fax: 1-514-697-6148
www.cdnisotopes.com

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White solid

Boiling Point (°C):	190 (15 mm)	**Density:**	0.82
Melting Point (°C):	49.3	**Vapour Density (Air = 1):**	8.34
Volatiles (%):	Slight	**Water Solubility (%):**	Low
Flash Point (°C):	134	**Method:**	Closed cup
Autoignition Temperature (°C):	250		

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.
Incompatibility (Materials to Avoid): Oxidizing/reducing agents.
Hazardous Decomposition Products: CO/CO_2 on combustion.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute and Chronic Health Hazards

Oral LD_{50}: 5000 mg/kg (rat) **Dermal LD_{50}:** 1600 mg/kg (rat)
TLV: None verified.

Effects of Overexposure: Irritant (eyes, respiratory, skin).

SECTION 12: ECOLOGICAL INFORMATION

Data not yet available.

SECTION 13: DISPOSAL CONSIDERATIONS

Disposal Procedures: Via licensed disposal company. Dispose of according to federal and local regulations.

SECTION 14: TRANSPORT INFORMATION

Contact C/D/N Isotopes Inc.

SECTION 15: REGULATORY INFORMATION

TLV: None verified.

SECTION 16: OTHER INFORMATION

This product is not radioactive. The data given for this product are those of the corresponding unlabelled product indicated in Section 2, unless specifically indicated otherwise. Safety data for the labelled compounds are generally unavailable but the hazards and properties are assumed to be similar or identical to those of the unlabelled compounds. While the information set forth is believed to be accurate, C/D/N ISOTOPES INC. extends no warranties with respect hereto and disclaims all liabilities from reliance thereon. All judgements as to the suitability of the data presented with respect to the use of this product are the responsibility of the purchaser and intended user.

Date: May 8, 2004

C/D/N ISOTOPES INC. Vincent Guay

Vincent Guay, Ph.D.

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MATERIAL SAFETY DATA SHEET
Infineum

duct Name: Infineum F7580
Revision Date: 04Mar2008

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT
Product Name: Infineum F7580
Product Description: Petroleum Product Additive
Product Code: 33822100
Intended Use: Diesel fuel additive

COMPANY IDENTIFICATION
Supplier: INFINEUM USA L.P.
P.O. Box CN 135
Linden, NJ. 07036 USA

24 Hour Health Emergency 800-726-2015
Transportation Emergency Phone 800-424-9300
Product Technical Information 800-654-1233

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)
ALKOXYLATED ALKYL PHENOL
ALKYL ALCOHOL
SOLVENT NAPHTHA (PETROLEUM), HEAVY AROMATIC

Hazardous Constituent(s) Contained in Complex Substance(s)
NAPHTHALENE
PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL PHYSICAL / CHEMICAL EFFECTS
Combustible. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an incendiary electrical discharge.

POTENTIAL HEALTH EFFECTS
Irritating to skin. Possible human cancer hazard. Danger of adverse health effects by a single exposure. Corrosive to eyes. May cause permanent damage. May cause central nervous system depression.

Target Organs: Nervous system | Skin | Eye |

ENVIRONMENTAL HAZARDS
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID: Health: 3 Flammability: 2 Reactivity: 0
HMIS Hazard ID: Health: 3* Flammability: 2 Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION
Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT
Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

EYE CONTACT
Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

INGESTION
Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN
If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

FIRE FIGHTING
Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Combustible. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide, Nitrogen oxides, Smoke, Fume

FLAMMABILITY PROPERTIES
Flash Point [Method]: >62C (144F)
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/A

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES
In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity for oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES
Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not get water inside containers. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Prevent entry into waterways, sewer, basements or confined areas. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Water Spill:

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

'IRONMENTAL PRECAUTIONS
Prevent entry into waterways, sewers, basements or confined areas.

EPAPA005001094

duct Name: Infineum F7580
Revision Date: 04Mar2008

SECTION 7 HANDLING AND STORAGE

HANDLING
Avoid contact with skin. Avoid contact with eyes. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Use only with adequate ventilation. Use proper bonding and/or grounding procedures. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source).

Loading/Unloading Temperature: 5°C (41°F) - 54°C (129°F)

Transport Temperature: N/D
Transport Pressure: [STP]

Static Accumulator: This material is a static accumulator.

STORAGE
Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be grounded and bonded. Drums must be grounded and bonded and equipped with self-closing valves, pressure vacuum bungs and flame arresters.
Storage Temperature: 5°C (41°F) - 54°C (129°F)
Storage Pressure: [STP]

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Source Form Limit / Standard Note Source ALKYL ALCOHOL N/A TWA 50 ppm N/A Supplier NAPHTHALENE N/A TWA 50 mg/m3 10 ppm N/A OSHA Z1 NAPHTHALENE Inhalable STEL 15 ppm 79 mg/m3 N/A Supplier NAPHTHALENE Inhalable TWA 10 ppm 52 mg/m3 N/A Supplier PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE) N/A TWA 25 ppm N/A ACGIH SOLVENT NAPHTHA (PETROLEUM), HEAVY AROMATIC#Inhalable#TWA#17 ppm#100 mg/m3#N/A#Supplier#

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:
No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
Chemical resistant gloves are recommended.

Eye Protection: Chemical goggles and face shield are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: 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. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS
See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 additional data.

GENERAL INFORMATION
Physical State: Liquid

duct Name: Infineum F7580
Revision Date: 04Mar2008

Color: Amber
Odor: N/D
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION
Relative Density: 0.905
Density (at 15 °C): 915 kg/m³ (7.64 lbs/gal, 0.92 kg/dm³)
Flash Point [Method]: >62C (144F)
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/A
Boiling Point / Range: N/A
Vapor Density (Air = 1): N/D
Vapor Pressure: [Negligible]
Evaporation Rate (n-butyl acetate = 1): N/A
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/A
Solubility in Water: Negligible
Viscosity: 9.16 cSt (9.16 mm2/sec) at 40 C | 15.92 cSt (15.92 mm2/sec) at 20C
Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION
Freezing Point: N/A
Melting Point: N/A
Pour Point: -45°C (-49°F)
Coefficient of Thermal Expansion: 0.00094 V/VDEGC
Decomposition Temperature: N/A

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Open flames and high energy ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation Toxicity: No end point data.	May cause central nervous system effects.

Irritation: No end point data.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Toxicity: No end point data.	Minimally Toxic.
Skin	
Toxicity: No end point data.	Minimally Toxic.
Irritation: No end point data.	Irritating to the skin.
Eye	
Irritation: No end point data.	Corrosive to eyes. May cause permanent damage.

CHRONIC/OTHER EFFECTS
Contains:
NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.

Additional information is available by request.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
NAPHTHALENE	91-20-3	5

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	2 = NTP SUS	3 = IARC 1
4 = IARC 2A	5 = IARC 2B	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Expected to partition to water. Some partitioning to sediment and wastewater solids. Minimally volatile.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS
Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION
RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrositivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT)
Proper Shipping Name: CORROSIVE LIQUIDS, N.O.S. (NONYLPHENOL)
Hazard Class & Division: 8
ID Number: 1760
Packing Group: III
Marine Pollutant: No
Product RQ: 1847.74 lbs - NAPHTHALENE
ERG Number: 154
Label(s): 8
Transport Document Name: CORROSIVE LIQUIDS, N.O.S. (NONYLPHENOL), 8, UN1760, PG III, RQ NAPHTHALENE

LAND (TDG)
Proper Shipping Name: CORROSIVE LIQUIDS, N.O.S. (NONYLPHENOL)
Hazard Class & Division: 8
Number: 1760
Packing Group: III
Special Provisions: 16
SEA (IMDG)

duct Name: Infineum F7580
Revision Date: 04Mar2008

Proper Shipping Name: CORROSIVE LIQUIDS, N.O.S. (NONYLPHENOL)
Hazard Class & Division: 8
EMS Number: F-A, S-B
UN Number: 1760
Packing Group: III
Label(s): 8
Transport Document Name: CORROSIVE LIQUIDS, N.O.S. (NONYLPHENOL), 8, UN1760, PG III,

AIR (IATA)
Proper Shipping Name: CORROSIVE LIQUIDS, N.O.S. (NONYLPHENOL)
Hazard Class & Division: 8
UN Number: 1760
Packing Group: III
Label(s): 8
Transport Document Name: CORROSIVE LIQUIDS, N.O.S. (NONYLPHENOL), 8, UN1760, PG III

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is ssified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: DSL, AICS, IECSC, TSCA, EINECS

EPCRA: This material contains no extremely hazardous substances.

CERCLA:
Chemical Name CAS Number Typical Value Component RQ Product RQ NAPHTHALENE 91-20-3 5 - 9.9% 100 lbs 1847.74 lbs

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. Immediate Health. Delayed Health.

SARA (313) TOXIC RELEASE INVENTORY:
Chemical Name CAS Number Typical Value NAPHTHALENE 91-20-3 5 - 9.9% PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE) 95-63-6 1 - 4.9%

The Following Ingredients are Cited on the Lists Below:
Chemical Name CAS Number List Citations ALKYL ALCOHOL 68526-85-2 17 NAPHTHALENE 91-20-3 4, 5, 10, 13, 16, 17, 18, 19 PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE) 95-63-6 1, 13, 16, 17, 18, 19 TRACE METAL IMPURITIES N/A 10, 11 TRACE REPORTABLE AROMATIC COMPOUNDS N/A 10, 11

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	2 = ACGIH A1	3 = ACGIH A2
4 = OSHA Z	5 = TSCA 4	6 = TSCA 5a2
7 = TSCA 5e	8 = TSCA 6	9 = TSCA 12b
= CA P65 CARC	11 = CA P65 REPRO	12 = CA RTK
13 = IL RTK	14 = LA RTK	15 = MI 293
16 = MN RTK	17 = NJ RTK	18 = PA RTK
19 = RI RTK		

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 06: Protective Measures was modified.
Section 06: Notification Procedures - Header was modified.
Section 13: Empty Container Warning was modified.
Section 08: Hand Protection was modified.
Section 07: Loading/Unloading Temperature C(F) was modified.
Section 07: Transport Temperature C(F) was modified.
Section 07: Storage Temperature C(F) was modified.
Section 15: List Citations Table was modified.
Section 15: List Citation Table - Header was modified.
Section 15: National Chemical Inventory Listing was modified.
tion 06: Notification Procedures was modified.
ction 09: Decomposition Temperature was added.
Section 09: Decomposition Temp - Header was added.
Section 06: Accidental Release - Spill Management - Water was deleted.
Section 15: TSCA Class 2 Statement was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: ALKYL ALCOHOL, NAPHTHALENE, SOLVENT NAPHTHA (PETROLEUM), HEAVY AROMATIC, PSEUDOCUMENE (1,2,4-TRIMETHYLBENZENE)
DANGER!
HEALTH HAZARDS
Irritating to skin. Possible human cancer hazard. Danger of adverse health effects by a single exposure. Corrosive to eyes. May cause permanent damage.
Target Organs: Nervous system | Skin | Eye |

PHYSICAL HAZARDS
Combustible. Material can accumulate static charges which may cause an incendiary electrical discharge.

PRECAUTIONS
Avoid contact with skin. Avoid contact with eyes. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Use only with adequate ventilation. Use proper bonding and/or grounding procedures.

FIRST AID
: Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

SPILL/LEAK
Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not get water inside containers. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Prevent entry into waterways, sewer, basements or confined areas. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Water Spill: Report spills as required to appropriate authorities.
Use
Not intended or suitable for use in or around a household or dwelling.

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

The information contained in this document is based upon data believed to be reliable at the time of going to press and relates only to the matters specifically mentioned in this document. Although Infineum has used reasonable skill and care in the preparation of this information, in the absence of any overriding obligations arising under a specific contract, no representation, warranty (express or implied), or guarantee is made as to the suitability, accuracy, reliability or completeness of the information; nothing in this document shall reduce the user's responsibility to satisfy itself as to the suitability, accuracy, reliability, and completeness of such information for its particular use; there is no warranty against intellectual property infringement; and Infineum shall not be liable for any loss, damage or injury that may occur from the use of this information other than death or personal injury caused by its negligence. No statement shall be construed as an endorsement of any product or process. For greater certainty, before use of information contained in this document, particularly if the product is used for a purpose or under conditions which are abnormal or not reasonably foreseeable, this information must be reviewed with the supplier of such information.

Internal Use Only MHC: 0, 0, 1, 5, 4, 0
DGN: 6003391 (1008425) (NA Core)

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Brenntag Canada Inc.

BRENNTAG

MATERIAL SAFETY DATA SHEET

ISOBUTYL ACETATE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Rd.
Toronto, ON
M8Z 2G6
(416) 259-8231

Website: http:\\www.brenntag.ca

WHMIS#: 00060418
Index: GCD1107/06C
Effective Date: 2006 September 11
Date of Revision: 2006 September 11

EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)

Toronto, ON (416) 226-6117	Montreal, QC (514) 861-1211	Winnipeg, MB (204) 943-8827
Edmonton, AB (780) 424-1754	Calgary, AB (403) 263-8660	Vancouver, BC (604) 685-5036

PRODUCT IDENTIFICATION

Product Name:	Isobutyl Acetate.
Chemical Name:	Isobutyl Acetate
Synonyms:	Acetic acid isobutyl ester ; 2-methyl-propyl acetate ; beta-methylpropyl Ethanoate.
Chemical Family:	Esters.
Molecular Formula:	C6H12O2 ; (CH3) 2 - CH - CH2 - O - C (= O) - CH3 .
Product Use:	*Industrial solvent, cleaner, degreaser.*

WHMIS Classification / Symbol:

B-2: Flammable Liquid
D-2B: Toxic (skin and eye irritant)

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV*	*% Concentration*
Isobutyl acetate	110-19-0	150 ppm	98 - 100

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Causes skin and eye irritation. Vapours are extremely irritating to eyes and respiratory tract. High vapour concentrations may cause drowsiness. Flammable liquid and vapour. May cause flash fire or explosion. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation:	Product is irritating to the nose, throat and respiratory tract. See "Other Health Effects" Section.
Skin Contact:	Isobutyl Acetate may cause symptoms of skin irritation such as reddening, swelling, rash, scaling, or blistering. May cause defatting, drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis.
Skin Absorption:	Not likely to be absorbed through the skin.
Eye Contact:	Vapours from this product are irritating to the eyes. Splashes to the eye may cause severe irritation, redness and pain.

Ingestion:	Ingestion is not a likely route of exposure. This product causes irritation, a burning sensation of the mouth and throat and abdominal pain.
Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. Intentional misuse of organic solvents (eg. "glue sniffing") over prolonged periods of time may be habit forming and lead to behavioural changes. May cause central nervous system (CNS) depression, liver damage and kidney damage. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. Liver damage is characterized by the loss of appetite, jaundice (yellowish skin colour), and occasional pain in the upper left-hand side of the abdomen. Signs and symptoms of kidney damage generally progress from oliguria, to blood in the urine, to total renal failure.

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical attention IMMEDIATELY.
Skin Contact:	Flush skin with running water for a minimum of 20 minutes. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. If irritation, redness, or a burning sensation develops and persists, obtain medical attention.
Eye Contact:	Flush skin with running water for a minimum of 20 minutes. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.
Note to Physicians:	This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Medical conditions that may be aggravated by exposure to this product include neurological and cardiovascular disorders, diseases of the skin, eyes or respiratory tract, preexisting liver and kidney disorders.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	*AutoIgnition Temperature (°C)*	*Flammability Limits in Air (%):* *LEL*	*UEL*
17 - 21 (3,4)	421 - 423 (3,4)	1.3 (3)	10.5 (3)

Flammability Class (WHMIS):	B-2: Flammable Liquid
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include oxides of carbon and irritating gases.
Unusual Fire or Explosion Hazards:	Vapours from this product are heavier than air, and may "travel" to a source of ignition (eg. pilot lights, heaters, electric motors) some distance away, and then "flash back" to the point of product discharge causing an explosion and fire. Closed containers exposed to heat may explode. Spilled material may cause floors and contact surfaces to become slippery. Enforce NO SMOKING rules.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Expected to be sensitive to static discharge when vapours are present between the lower and upper explosive limits.

EXTINGUISHING MEDIA

Fire Extinguishing Media:	Foam. Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog. This material may produce a floating fire hazard in extreme fire conditions. Water may be ineffective due to low flash point. Use water spraying for cooling.

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters:	Use water spray to cool fire-exposed containers or structures. Use water spray to disperse vapours; re-ignition is possible. Isolate materials that are not involved in the fire and protect personnel. Cool containers with flooding quantities of water until well after the fire is out.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Wear protective clothing. Do not use combustible materials such as sawdust as an absorbent. Eliminate all sources of ignition. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices:	Ground and bond equipment and containers to prevent a static charge buildup. Use spark-resistant tools and avoid "splash-filling" of containers. Use normal "good" industrial hygiene and housekeeping practices. Containers exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn. Vent container frequently, and more often in warm weather, to relieve pressure. Enforce NO SMOKING rules in area of use.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing vapours or mists. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Absorption via contact with skin, eyes and mucous membranes can contribute to the overall exposure. Consider measures to prevent absorption by these routes. Store wiping rags and similar material in metal cans with tight fitting lids.

STORAGE

Storage Temperature (°C):	See below.
Ventilation Requirements:	Ventilation should be explosion proof.
Storage Requirements:	Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40° C. Protect from direct sunlight. Protect against physical damage.
Special Materials to be Used for Packaging or Containers:	Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	Local exhaust ventilation required. Ventilation should be explosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue. Use the "buddy" system. The second person should be in view and trained and equipped to execute a rescue. (4)
PERSONAL PROTECTIVE EQUIPMENT (PPE)	
Eye Protection:	Safety glasses with side shields are recommended as minimal eye protection. Use full face-shield or chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.
Skin Protection:	Gloves and protective clothing made from butyl rubber, polyvinyl alcohol (PVA) or teflon should be impervious under conditions of use. Do not use gloves or protective clothing made from natural rubber, neoprene, polyethylene, PVC or viton. Attacks some types of rubber, plastics and coatings. Discard contaminated gloves. Prior to use, user should confirm impermeability.
Respiratory Protection:	No specific guidelines available. Do not use compressed oxygen in hydrocarbon atmospheres. A NIOSH/MSHA-approved air-purifying respirator equipped with organic vapour cartridges for concentrations up to 1,000 ppm organic vapours. An air-supplied respirator if concentrations are higher or unknown. Immediately Dangerous to Life and Health (IDLH) value: 1, 300 ppm. 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 equipment. In the event of failure of respiratory protective equipment, every effort should be made to exit immediately. (4)
Other Personal Protective Equipment:	Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact. Clothing and footwear that is fire retardant and dissipates static electrical charges should be worn when handling flammable materials. Natural fibers (cotton, wool, leather and linen) should be selected in favour of synthetic materials (rayon, nylon and polyester).

EXPOSURE GUIDELINES

SUBSTANCE	*ACGIH TLV*	*OSHA PEL*		*NIOSH REL*	
	(STEL)	*(TWA)*	*(STEL)*	*(TWA)*	*(STEL)*
Isobutyl acetate	—	150 ppm	---	150 ppm	---

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Liquid.
Appearance:	Clear, colourless liquid.
Odour:	Fruity odour.
Odour Threshold (ppm):	0.36 - 36 ppm.
Boiling Range (°C):	116.5
Melting/Freezing Point (°C):	- 99
Vapour Pressure (mm Hg at 20° C):	17.8
Vapour Density (Air = 1.0):	4.0
Relative Density (g/cc):	0.871
Bulk Density:	871 kg/m3
Viscosity:	Not available.
Evaporation Rate (Butyl Acetate = 1.0):	1.53
Solubility:	Soluble in all proportions in most organic solvents, such as ethanol, diethyl ether, ketones and other esters.
% Volatile by Volume:	Not available.
pH:	Not available.
Coefficient of Water/Oil Distribution:	1.72
Volatile Organic Compounds (VOC):	100%

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY	
Under Normal Conditions:	Stable.
Under Fire Conditions:	Flammable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition.
Materials to Avoid:	Strong oxidizers. Peroxides Lewis or mineral acids. Reducing agents. Strong bases. Nitric acid. Perchloric Acid. Chromium Trioxide. Chlorosulfonic Acid. Silica Gel. Amines. Alumina. Potassium tert-Butoxide.
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include oxides of carbon and irritating gases.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	*LD50 (Oral, Rat)*	*LD50 (Dermal, Rabbit)*	*LC50 (Inhalation, Rat, 4h)*
Isobutyl acetate	13 400 mg/kg (1)	> 17 400 mg/kg (1)	---

Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.
Reproductive Data:	No information is available and no adverse reproductive effects are anticipated.
Mutagenicity Data:	No adverse mutagenic effects are anticipated. See Below.
Teratogenicity Data:	No information is available and no adverse teratogenic/embryotoxic effects are anticipated.
Respiratory / Skin Sensitization Data:	See Below.
Synergistic Materials:	None known.
Other Studies Relevant to Material:	Application of 0.005 mL of undiluted Isobutyl Acetate on the eyes produced mild irritation in rabbits. (4) A standard Draize test produced moderate irritation on rabbit's eyes. (1,4) Application of 0.01 mL of undiluted Isobutyl Acetate caused no irritation after 24 hours. An unconfirmed study found that application of undiluted Isobutyl Acetate to intact or abraded skin, under cover, produced moderate irritation. (4) Rats exposed to 3,000 ppm for 6 hours experienced no adverse effects. All 6 rats exposed to 21,000 ppm became unconscious and died within 150 minutes. In another study, inhalation of 16,000 ppm killed 6/6 rats. (4) Skin sensitization was not observed in 28 volunteers exposed to 2 % Isobutyl Acetate in petrolatum. (4) Isobutyl Acetate does not show mutagenic potential (Ames Test). (3)

12. ECOLOGICAL INFORMATION

Ecotoxicity:	Low acute toxicity to aquatic organisms. (3) Fish (Leuciscus idus) 48-hr. LC50 = 190 ppm. Fish (Leuciscus idus melanotus) 48-hr. LC50 = 101 to 123 ppm. Crustacean (Daphnia magna) 24-hr. EC50 = 168 to 342 ppm. Crustacean (Artemia salina) 24-hr. EC50 = 1200 ppm.
Environmental Fate:	This product is biodegradable. There is evidence of photodegradation in air. May be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	None required.

Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue (liquid and/or vapour) and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not expose such containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death. Do not dispose of package until thoroughly washed out. Dispose of waste material at an approved landfill site in accordance with applicable local, provincial and federal regulations.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

ISOBUTYL ACETATE, Class 3, UN1213, PG II.

Label(s): Flammable Liquids. Placard: Flammable Liquids.

ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

ISOBUTYL ACETATE, Class 3, UN1213, PG II.

Label(s): Flammable Liquid. Placard: Flammable Liquid.

CERCLA-RQ: Not available. Exemptions: None known.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All constituents of this product are included on the DSL.

CEPA - NPRI: Isobutyl Alcohol

Controlled Products Regulations Classification (WHMIS):

B-2: Flammable Liquid

D-2B: Toxic (skin and eye irritant)

USA

Environmental Protection Act: All constituents of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Flammable Liquid, Skin and Eye Irritant.

NFPA: 1 Health, 3 Fire, 0 Reactivity (8)

HMIS: 1 Health, 3 Fire, 0 Reactivity (3)

INTERNATIONAL

EINECS (European Inventory of Existing Commercial Chemical Substances).

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s)
4. CHEMINFO, through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2005, American Conference of Governmental Industrial Hygienists, Cincinnati, 2005.
6. Regulatory Affairs Group, Brenntag Canada Inc.

7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.

8. NFPA 325M Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1994 Edition, Quincy, MA, 1994.

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

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Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 02/27/2007
Date Updated: 02/02/2006
Version 1.4

Section 1 - Product and Company Information

Product Name	ISOBUTYL ISOBUTYRATE, 99%
Product Number	278335
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
ISO-BUTYL ISO-BUTYRATE, 99%	97-85-8	No

Formula	C8H16O2
Synonyms	Isobutylester kyseliny isomaselne (Czech) * 2-Methylpropyl isobutyrate * 2-Methylpropyl 2-methylpropanoate * Propanoic acid, 2-methyl-, 2-methylpropyl ester (9CI)
RTECS Number:	NQ5250000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable. Irritant.
Irritating to eyes, respiratory system and skin.

HMIS RATING

HEALTH: 1
FLAMMABILITY: 3
REACTIVITY: 0

NFPA RATING

HEALTH: 1
FLAMMABILITY: 3
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 immediately.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

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

FLAMMABLE HAZARDS
Flammable Hazards: Yes

EXPLOSION HAZARDS
Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

FLASH POINT
104 °F 40 °C Method: closed cup

AUTOIGNITION TEMP
432 °C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Avoid contact with eyes, skin, and clothing. Do

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not breathe vapor. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

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.

Section 9 - Physical/Chemical Properties

Appearance	Color: Colorless Form: Clear liquid	
Property	**Value**	**At Temperature or Pressure**
Molecular Weight	144.21 AMU	
pH	N/A	
BP/BP Range	149.0 - 151.0 °C	
MP/MP Range	- 81.0 °C	
Freezing Point	N/A	
Vapor Pressure	1 mmHg	39.9 °C
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	0.854 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	104 °F 40 °C	Method: closed cup
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	432 °C	
Refractive Index	1.399	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

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N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents, Strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

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: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.
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.

TOXICITY DATA

Oral
Rat
12800 mg/kg
LD50

Inhalation
Rat
5,000 ppm
LC50

Skin
Rabbit
> 8600 mg/kg
LD50

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. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Isobutyl isobutyrate

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UN#: 2528
Class: 3
Packing Group: Packing Group III
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Isobutyl isobutyrate
IATA UN Number: 2528
Hazard Class: 3
Packing Group: III

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xi
Indication of Danger: Irritant.
R: 10-36/37/38
Risk Statements: Flammable. Irritating to eyes, respiratory system and skin.
S: 16-26-36
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Flammable. Irritant.
Risk Statements: Irritating to eyes, respiratory system and skin.
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes

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: Yes
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.
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EPAPA005001114

Material Safety Data Sheet

Isohexane

ACC# 05124

Section 1 - Chemical Product and Company Identification

MSDS Name: Isohexane
Catalog Numbers: AC383810000, AC383810010, AC383810025, AC383820000, AC383820010, AC383820025 AC383820025
Synonyms:
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
73513-42-5	Isohexane		unlisted

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available. Appearance: colorless clear liquid. Flash Point: -23 deg C.
Not available.
Target Organs: Lungs, skin.

Potential Health Effects
Eye: May cause eye irritation.
Skin: Causes skin irritation. May be harmful if absorbed through the skin.
Ingestion: May cause irritation of the digestive tract. May cause headache. May cause nausea and vomiting. May be harmful if swallowed. May cause lung damage.
Inhalation: May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. May be harmful if inhaled. Inhalation of vapors may cause drowsiness and dizziness.
Chronic: Not available.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Get medical aid. Wash mouth out with water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Flammable liquid and vapor.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use foam, dry chemical, or carbon dioxide. Water may be ineffective.
Flash Point: -23 deg C (-9.40 deg F)
Autoignition Temperature: 265 deg C (509.00 deg F)
Explosion Limits, Lower:1.2 Vol %
Upper: 7 Vol %
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Use spark-proof tools and explosion proof equipment. Avoid breathing dust, vapor, mist, or gas. Avoid contact with skin and eyes. Take precautionary measures against static discharges.
Storage: Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an

eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Isohexane	none listed	none listed	none listed

OSHA Vacated PELs: Isohexane: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Not available.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid

Appearance: colorless

Odor: petroleum-like - faint odor

pH: Not available.

Vapor Pressure: 180mmHg @21 deg C

Vapor Density: Not available.

aporation Rate: Not available.

scosity: Not available.

Boiling Point: 60 deg C @760mmHg

Freezing/Melting Point:-154 deg C

Decomposition Temperature: Not available.

Solubility: Insoluble.

Specific Gravity/Density:0.660

Molecular Formula:C6H14

Molecular Weight:86.18

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, ignition sources.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 73513-42-5 unlisted.

LD50/LC50:
Not available.

cinogenicity:
CAS# 73513-42-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. Log POW: 3.6
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a zardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	HEXANES	HEXANES
Hazard Class:	3	3
UN Number:	UN1208	UN1208
Packing Group:	II	II

Section 15 - Regulatory Information

'S FEDERAL

TSCA

CAS# 73513-42-5 is not listed on the TSCA inventory. It is for research and development use only.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313 No chemicals are 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 Substances 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:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 73513-42-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

lifornia Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN F N

Risk Phrases:

R 11 Highly flammable.
R 38 Irritating to skin.
R 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R 65 Harmful: may cause lung damage if swallowed.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.
S 9 Keep container in a well-ventilated place.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.
S 62 If swallowed, do not induce vomiting: seek medical advice immed iately and show this container or label.

WGK (Water Danger/Protection)

CAS# 73513-42-5: No information available.

Canada - DSL/NDSL
None of the chemicals in this product are listed on the DSL or NDSL list.
Canada - WHMIS
not available.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 8/04/2005
Revision #0 Date: Original.

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet
Isooctane

_# 28270

Section 1 - Chemical Product and Company Identification

MSDS Name: Isooctane
Catalog Numbers: AC167910000, AC167910025, AC167915000, AC265440000, AC265440010, AC265440025, AC265440050, AC268810000, AC268810010, AC268810025, AC295720000, AC295720010, AC295720025, AC326620000, AC326620010, AC326620025, AC326940000, AC326941000, AC326942500, AC364670000, AC364670010, AC364671000, AC412710000, AC412711000, AC421970000, AC421970020, AC421970200, AC421970250, AC421975000, AC421980000, AC421980040, AC421985000, AC424560000, AC424560010, AC424565000, AC610120040, AC610210040, NC9809854, O296-1, O296-4, O296J4, O296RS115, O296RS28, O296SK-1, O296SK-4, O296SS115, O296SS200, O296SS28, O296SS50, O297-4, O299-1, O299-4, O299FB200, O299FB50, O299J1, O299RS115, O299SS115, O299SS200, O299SS28, O299SS50, O300-1, O300-4, O301-1, O301-4
Synonyms: Isooctane; Isobutyltrimethylmethane; 2,4,4-Trimethylpentane.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
540-84-1	Isooctane	>95	208-759-1

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: -12 deg C.
Danger! Extremely flammable liquid and vapor. Vapor may cause flash fire. Breathing vapors may cause drowsiness and dizziness. Causes eye, skin, and respiratory tract irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage.
Target Organs: Central nervous system, lungs, eyes, skin.

Potential Health Effects
Eye: Causes eye irritation. Causes redness and pain. Exposure to high vapor concentrations may cause irritation.
Skin: Causes skin irritation. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal. May cause central nervous system depression.
Inhalation: Causes respiratory tract irritation. May cause narcotic effects in high concentration. Aspiration may lead to pulmonary edema.
Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis. In a subchronic oral laboratory study, isooctane produced kidney damage in male rats only. No comparable health hazard for kidney disease is known to occur in

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid. Wash clothing before reuse.
Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Liquid will float and may reignite on the surface of water. Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. May accumulate static electricity.
Extinguishing Media: Water may be ineffective. This material is lighter than water and insoluble in water. The fire could easily be spread by the use of water in an area where the water cannot be contained. Do NOT use straight streams of water. Dry chemical, alcohol foam, carbon dioxide.
Flash Point: -12 deg C (10.40 deg F)
Autoignition Temperature: 415 deg C (779.00 deg F)
Explosion Limits, Lower:1.1%
Upper: 6.0%
NFPA Rating: (estimated) Health: 1; Flammability: 3; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Avoid runoff into storm sewers and ditches which lead to waterways. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor or mist.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use process enclosure, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Facilities storing or utilizing this material should be equipped

with an eyewash facility and a safety shower. Ventilation fans and other electrical service must be non-sparking and have an explosion-proof design.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Isooctane	300 ppm TWA (listed under Octane).	75 ppm TWA; 350 mg/m3 TWA (listed under Octane).1000 ppm IDLH (listed under Octane).	500 ppm TWA; 2350 mg/m3 TWA (listed under Octane).

OSHA Vacated PELs: Isooctane: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless

Odor: gasoline-like

pH: Not applicable.

Vapor Pressure: 49.3 mm Hg @ 25 deg C

Vapor Density: 3.94 (air=1)

Evaporation Rate:< 1 (ether=1)

Viscosity: 0.51 mPas 22 deg C

Boiling Point: 98 - 99 deg C @ 760 mmHg

Freezing/Melting Point:-107 deg C

Decomposition Temperature: Not available.

Solubility: insoluble

Specific Gravity/Density:0.69 g/cm3

Molecular Formula:C8H18

Molecular Weight:114.23

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid: Ignition sources, excess heat, electrical sparks, confined spaces.

Incompatibilities with Other Materials: Strong oxidizing agents, strong acids, strong bases.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 540-84-1: SA3320000

LD50/LC50:

Not available.

Dermal LD50 (rabbit): >2000 mg/kg; Inhalation LC50 (rat): >3078.44 ppm/4H; Oral LD50 (rat) :>5000 mg/kg (values from Phillips 66).

Carcinogenicity:

CAS# 540-84-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Not available.

Teratogenicity: Not available.
Reproductive Effects: Not available.
Mutagenicity: See actual entry in RTECS for complete information.
·otoxicity: Not available.
...er Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	OCTANES	OCTANES
Hazard Class:	3	3
UN Number:	UN1262	UN1262
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 540-84-1 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 540-84-1: Effective 6/1/87, Sunset 12/19/95
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
CAS# 540-84-1: 1000 lb final RQ; 454 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 540-84-1: immediate, fire.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
CAS# 540-84-1 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
an Water Act:
None of the chemicals in this product are listed as Hazardous Substances 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:

None of the chemicals in this product are considered highly hazardous by OSHA.

'E

_AS# 540-84-1 can be found on the following state right to know lists: California, (listed as Octane), New Jersey, Pennsylvania, Minnesota, (listed as Octane), Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN F N

Risk Phrases:

R 11 Highly flammable.
R 38 Irritating to skin.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R 65 Harmful: may cause lung damage if swallowed.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.
S 9 Keep container in a well-ventilated place.
S 60 This material and its container must be disposed of as hazardou s waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.
S 62 If swallowed, do not induce vomiting: seek medical advice immed iately and show this container or label.

WGK (Water Danger/Protection)

CAS# 540-84-1: No information available.

Canada - DSL/NDSL

CAS# 540-84-1 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 540-84-1 (listed as Octane) is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997
Revision #14 Date: 6/06/2006

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Catalog Number: 198757
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 198757

Product name: ISOPROPYL ACETATE

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
ISOPROPYL ACETATE	108-21-4	90 - 100%	(250 ppm) TWA	250 ppm TWA; 950 mg/m³ TWA

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause irritation to the eyes, skin and respiratory system., Flammable

Category of Danger:
Flammable , Irritant

Principle routes of exposure: Skin
Inhalation: Irritating to respiratory system
Ingestion: Irritating to mouth, throat and stomach
Skin contact: Irritating to skin.
Eye contact: Contact with eyes may cause irritation

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard May Cause Eye, Skin and Respiratory Tract irritation.
Flammable
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation. Do not breathe vapors or spray mist Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid breathing vapors. Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure.

4. FIRST AID MEASURES

EPAPA005001126

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Carbon dioxide (CO2), Dry powder, Foam, Water may be ineffective., Use dry chemical, CO2, water spray or `alcohol` foam.
Extinguishing media which must not be used for safety reasons:	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards:	Moderate flammability. Explosion limits (per cent by volume) lower: 1.8% upper: 8.0% Extremely flammable
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	3 °C (closed cup)
Autoignition temperature:	460 °C

NFPA rating:

NFPA Health:	1
NFPA Flammability:	3
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Remove all sources of ignition. Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material. Ground and bond containers when transferring material

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EPAPA005001127

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: If splashes are likely to occur, wear: Safety glasses with side-shields Goggles
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless; fruity odor
Physical state:	Liquid
Formula:	C5H10O2
Molecular weight:	102.13
Melting point/range:	-73.4 °C
Boiling point/range:	88.4 °C at 1013 hPa
Density:	relative density = .872 at 20 °C
Vapor pressure:	62.5 hPa at 20 °C
Evaporation rate:	5.0 (butyl acetate = 1)
Vapor density:	3.52 (air = 1)
Solubility (in water):	Soluble
Flash point:	3 °C (closed cup)
Autoignition temperature:	460 °C

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-
Nitrates; strong oxidizers, alkalies, and acids	
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	**RTECS Number:**	**Selected LD50s and LC50s**
ISOPROPYL ACETATE	AI4930000	Inhalation LC50 Rat : 50600 mg/m³/8H Oral LD50 Rat : 6750 mg/kg Dermal LD50 Rabbit : >20 mL/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	A primary irritant.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

EPAPA005001128

Components	NIOSH - Health Effects	NIOSH - Target Organs
ISOPROPYL ACETATE		eyes, skin, respiratory system, CNS

12. ECOLOGICAL INFORMATION

Mobility: No data available
Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
ISOPROPYL ACETATE	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
ISOPROPYL ACETATE	1	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
ISOPROPYL ACETATE	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
ISOPROPYL ACETATE	Not Listed	indicator 0; Fully sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
ISOPROPYL ACETATE	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material. Ground and bond containers when transferring material

14. TRANSPORT INFORMATION

UN/Id No: 1220

DOT:

Proper shipping name: Isopropyl Acetate
IATA Hazard Label(s): Flammable Liquid
Hazard Class 3 - Flammable liquid
Packing group: II

Emergency Response Guide Number (ERG): 129

EPAPA005001129

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
ISOPROPYL ACETATE	Not Listed

TDG (Canada):

WHMIS hazard class: B2 flammable liquids

IMDG/IMO

Proper shipping name: Isopropyl Acetate

IMDG - Hazard Classifications IMDG class or division = 3
IMDG - Regulated Substances UN1220

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
ISOPROPYL ACETATE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
ISOPROPYL ACETATE	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	203-561-1; C5H10O2
Inventory - Japan:	2-727; 2-731
Korean KECL:	KE-21670
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
ISOPROPYL ACETATE	Not Listed	[present]	sn 1074	[present]

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
ISOPROPYL ACETATE	[present]	Toxic	Not Listed	19,000 ug/m^3 HLV; 5 ppmv HLV

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
ISOPROPYL ACETATE	Not Listed	Not Listed	None	None

EPAPA005001130

SARA 313 Notification:

The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification:

The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001131

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **ISOPROPYL ALCOHOL**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: ISOPROPYL ALCOHOL
Synonyms: None
Chemical Family: Alcohol
Application: Solvent

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Isopropanol	67-63-0	60 - 100%	200 ppm	400 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be absorbed through the skin. May be harmful if swallowed. Flammable.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician
Not Applicable

EPAPA005001132

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	53
Flash Point/Range (C):	11
Flash Point Method:	Not Determined
Autoignition Temperature (F):	750
Autoignition Temperature (C):	398
Flammability Limits in Air - Lower (%):	2
Flammability Limits in Air - Upper (%):	12

Fire Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Exposure Hazards May be ignited by heat, sparks or flames. Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce toxic gases.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 3, Reactivity 0
HMIS Ratings: Flammability 3, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse. Ground and bond containers when transferring from one container to another.

Storage Information Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator.
In high concentrations, supplied air respirator or a self-contained breathing apparatus.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Colorless
Odor:	Alcohol
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	0.8
Density @ 20 C (lbs./gallon):	6.70
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	177
Boiling Point/Range (C):	80
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	34
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	100
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	60.1

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from heat, sparks and flame.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin irritation. May be absorbed through the skin and produce effects similar to those caused by inhalation and/or ingestion.
Eye Contact	May cause eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions. May cause kidney damage.

Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	Repeated overexposure may cause liver and kidney effects.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 5840 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
***Reproductive /* Developmental Toxicity:**	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Resistant
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Isopropanol Solution, 3, UN1219, II, (11.7 C)
NAERG 129

Canadian TDG
Isopropanol Solution, 3, UN1219, II, (11.7 C)

ADR
UN1219,Isopropanol Solution, 3, II

Air Transportation

ICAO/IATA
UN1219,Isopropanol Solution, 3, II

Sea Transportation

IMDG
UN1219,Isopropanol Solution, 3, II, (11.7 C)
EmS F-E, S-D

Other Shipping Information

Labels: Flammable Liquid

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard Fire Hazard
EPA SARA (313) Chemicals	This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372: Isopropanol//67-63-0
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Ignitability D001
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.

EPAPA005001136

WHMIS Hazard Class	B2 Flammable Liquids D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001137

Material Safety Data Sheet

Isopropyl ether

ACC# 96175

Section 1 - Chemical Product and Company Identification

MSDS Name: Isopropyl ether
Catalog Numbers: AC158960000, AC158960025, AC180680000, AC180680010, AC180680025, AC390660000 AC390660000
Synonyms: Diisopropyl ether; DIPE; 2-Isopropoxypropane
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
108-20-3	Isopropyl ether	98+%	203-560-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available. Appearance: APHA: 15 max clear liquid. Flash Point: -29 deg C.
Not available.
Target Organs: Central nervous system, respiratory system, eyes, skin.

Potential Health Effects
Eye: May cause severe eye irritation. Causes redness and pain.
Skin: Non-irritating to the skin. Repeated or prolonged exposure may cause drying and cracking of the skin.
Ingestion: May cause nausea and vomiting. Causes cough, sore throat, chest pain, and lightheadedness.
Inhalation: May cause respiratory tract irritation. May cause effects similar to those described for ingestion. May cause narcotic effects in high concentration. Inhalation of vapors may cause drowsiness and dizziness.
Chronic: Prolonged or repeated skin contact may cause dermatitis.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Flammable liquid and vapor. May form explosive peroxides.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: -29 deg C (-20.20 deg F)
Autoignition Temperature: 405 deg C (761.00 deg F)
Explosion Limits, Lower:1.1 Vol %
Upper: 21 Vol %
NFPA Rating: (estimated) Health: 1; Flammability: 3; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Use spark-proof tools and explosion proof equipment. Avoid breathing dust, mist, or vapor. Avoid contact with skin and eyes. Use only in a chemical fume hood.
Storage: Keep away from sources of ignition. Store in a cool, dry place. Do not store in direct sunlight. Store in a tightly closed container. Flammables-area. Store under nitrogen. May form explosive peroxides on prolonged storage.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

'posure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Isopropyl ether	250 ppm TWA; 310 ppm STEL	500 ppm TWA; 2100 mg/m3 TWA 1400 ppm IDLH	500 ppm TWA; 2100 mg/m3 TWA

OSHA Vacated PELs: Isopropyl ether: 500 ppm TWA; 2100 mg/m3 TWA

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid

Appearance: APHA: 15 max

Odor: characteristic odor

': Not available.

.apor Pressure: 180mbar @20 deg C

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: 0.38 mPa s @25 deg C

Boiling Point: 68 deg C @760mmHg

Freezing/Melting Point:-85.5 deg C

Decomposition Temperature: Not available.

Solubility: 9 g/l (20°C)

Specific Gravity/Density:0.720

Molecular Formula:C6H14O

Molecular Weight:102.18

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. Light sensitive. May form explosive peroxides on prolonged storage.

Conditions to Avoid: High temperatures, incompatible materials, light, ignition sources, exposure to air.

Incompatibilities with Other Materials: Strong oxidizing agents, amines, mineral acids, aldehydes.

'azardous Decomposition Products: Carbon monoxide, carbon dioxide, peroxides.

,zardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 108-20-3: TZ5425000
LD50/LC50:
CAS# 108-20-3:
Inhalation, mouse: LC50 = 131 gm/m3;
Inhalation, mouse: LC50 = 130800 mg/m3;
Inhalation, rabbit: LC50 = 121 gm/m3;
Inhalation, rabbit: LC50 = 120600 mg/m3;
Inhalation, rat: LC50 = 162 gm/m3;
Inhalation, rat: LC50 = 161700 mg/m3;
Oral, mouse: LD50 = 3600 mg/kg;
Oral, rat: LD50 = 5880 mg/kg;
Skin, rabbit: LD50 = 20 mL/kg;

Carcinogenicity:
CAS# 108-20-3: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Pimephals prome: LC50 = 0.903 mg/L; 96H; . Biodegradation: 7% (APHA 219, 1971 at 20°C for 5 days)
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	DIISOPROPYL ETHER	DIISOPROPYL ETHER
Hazard Class:	3	3
UN Number:	UN1159	UN1159
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 108-20-3 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 108-20-3: immediate, fire, reactive.
Section 313 No chemicals are 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 Substances 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:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 108-20-3 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:

F

Risk Phrases:

R 11 Highly flammable.
R 19 May form explosive peroxides.
R 66 Repeated exposure may cause skin dryness or cracking.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.
S 9 Keep container in a well-ventilated place.

WGK (Water Danger/Protection)

CAS# 108-20-3: 1

Canada - DSL/NDSL

CAS# 108-20-3 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 108-20-3 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

SDS Creation Date: 5/19/1999
Revision #3 Date: 11/04/2006

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

4

HUNTSMAN

Material Safety Data Sheet

Section 1. Chemical Product and Company Identification

Product name **JEFFOL® G-31-28** MSDS#4789

Huntsman Polyurethanes (an international business unit of Huntsman International LLC.)

286 Mantua Grove Rd.
West Deptford, NJ 08066-1723

For Polyurethanes product information/assistance:
West Deptford: (800)257-5547
Auburn Hills: (800)553-8624
Canadian Office: (905)678-9150

In Case of Emergency

Spills Leaks Fire or Exposure Call Chemtrec: (800) 424-9300
Medical Emergency Information: (800) 328-8501

Section 2. Composition, Information on Ingredients

Name	CAS #	% by Weight
Polyether polyol	9082-00-2	60-100

*** Occupational Exposure Limit(s), if available, are listed in section 8**

Section 3. Hazards Identification

This material is classified as NON-hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200).

Physical State and Appearance Liquid.

Potential Acute Health Effects

Eyes Slightly hazardous in case of eye contact (irritant).

Skin Slightly hazardous in case of skin contact (irritant).

Inhalation Slightly hazardous in case of inhalation.

Ingestion Slightly hazardous in case of ingestion.

GENERAL INFORMATION Read the entire MSDS for a more thorough evaluation of the hazards.

Section 4. First Aid Measures

Eye Contact Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact Wash with soap and water. Get medical attention if symptoms occur.

Inhalation If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Notes to Physician Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

Section 5. Fire Fighting Measures

Auto-ignition Temperature Not available.

Flash Points Closed cup: >110°C (230°F).

Flammable Limits Not available.

Products of Combustion Thermal decomposition products are toxic and may include hydrocarbons, oxides of carbon and other irritating gases.

Fire Hazards in Presence of Various Substances Slightly flammable to flammable in presence of open flames, sparks and static discharge.

Fire Fighting Media and Instructions SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Protective Clothing (Fire) Splash goggles. Full suit. Boots. Gloves.

Section 6. Accidental Release Measures

For major spills call Chemtrec (800-424-9300).
See Safety Data Sheet section 8 Personal protective equipment

Small Spill and Leak Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill and Leak Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7. Handling and Storage

Handling Avoid breathing vapors or spray mists. Avoid contact with eyes, skin and clothing.

Storage Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8. Exposure Controls, Personal Protection

Preventive Measures Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

Engineering Controls Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of 'Industrial Ventilation, a manual of Recommended Practice.'

Personal Protection

Eyes Chemical safety goggles. If there is a potential for splashing, use a full face shield.

Body and Hands Lab coat.

Respiratory Wear appropriate respirator when ventilation is inadequate.

Consult your supervisor or S.O.P. for special handling directions

Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Product Name	Exposure Limits
No occupational exposure limits have been assigned.	

Section 9. Physical and Chemical Properties

Physical State and Appearance	Liquid.
pH	Not available.
Boiling/Condensation Point	Not available.
Melting/Freezing Point	Not available.
Evaporation Rate	Not available.
Flash Points	Closed cup: >110°C (230°F).

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Not available.
Incompatibility with Various Substances	Slightly reactive to reactive with alkalis.
Hazardous Decomposition Products	Thermal decomposition products are toxic and may include hydrocarbons, oxides of carbon and other irritating gases.
Hazardous Polymerization	Will not occur.

Section 11. Toxicological Information

Toxicity Data

Ingredient Name	Test	Result	Route	Species
Polyether polyol	LD50	>5000 mg/kg	Oral	Rat
	LD50	>2000 mg/kg	Dermal	Rabbit

Inhalation	Slightly hazardous in case of inhalation.
Skin Contact	Slightly hazardous in case of skin contact (irritant).
Eye Contact	Slightly hazardous in case of eye contact (irritant).
Ingestion	Slightly hazardous in case of ingestion.
Remarks	This chemical has produced mild skin sensitization in an amimal study. However, skin sensitization has not been seen in humans following many years experience in the manufacture and use of this chemical. [POLYMER OF GLYCEROL/EO/PO]
Carcinogenic remarks	**The ingredients of this product are not classified as carcinogenic by ACGIH or IARC, not regulated as carcinogens by OSHA, and not listed as carcinogens by NTP.**
Mutagenic Effects	None known.
Reproductive Effects	None known.
Teratogenic effects	None known.

Section 12. Ecological Information

Ecotoxicity	Not available.

Section 13. Disposal Considerations

Waste Information	Non-hazardous waste.The generation of waste should be avoided or minimized wherever possible. Dispose of waste material at an approved waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems. Empty containers should be decontaminated and either passed to an approved drum recycler or destroyed.

Section 14. Transport Information

Transportation Emergency Number 1-800-424-9300 (CHEMTREC).

DOT Classification	Not regulated.
TDG Classification	Not regulated.

IMO/IMDG Classification Not regulated.

ICAO/IATA Classification Not regulated.

Section 15. Regulatory Information

U.S. Federal Regulations

This material is classified as NON-hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200).

HCS Classification Not regulated.

TSCA 8(b) inventory:All Ingredients Listed.

SARA Title III Section 313 (40 CFR Part 372):

No ingredients listed.

This product does not contain nor is it manufactured with ozone depleting substances.

State Regulations California prop. 65: No ingredients listed.

Canadian Regulations

This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.

WHMIS (Canada) Not controlled under WHMIS (Canada).

CEPA DSL/NDSL:All Ingredients Listed.

Section 16. Other Information

Hazardous Material Information System (U.S.A.)

Health	0
Fire Hazard	1
Reactivity	0

National Fire Protection Association (U.S.A.)

HUNTSMAN

JEFFOL® G-31-28

Specific Hazard

Trademarks: JEFFOL® is a registered trademark of Huntsman Petrochemical Corporation in one or more countries, but not all countries.

Notice to Reader

While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity, and behavior of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behavior should be determined by the user and made known to handlers, processors and end users.

Verified by newhodm.
Printed 9/13/2004.

MATERIAL SAFETY DATA SHEET

MSDS No: 093

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/ UNDERTAKING

UNIMIN CORPORATION
258 Elm Street
New Canaan, CT 06840

Emergency Telephone Number
(203) 966-8880

Telephone Number for Information
(203) 966-8880

PRODUCT NAME: Kaolin Slurry

SYNONYMS: Kaolin, China Clay, Hydrated Aluminum Silicate

Date Prepared: October 2005

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

CAS# / EINECS #	Component	Percentage	EU Classification (67/548/EEC)
1332-58-7	Kaolin (Aluminum Silicate)	>65%	Xn R48/20
14808-60-7 / 238-878-4	Crystalline Silica in the form of Quartz	<3%	Xn R48/20
14464-46-1 / 238-455-4	Crystalline Silica in the form of Cristobalite	<1.5%	Xn R48/20
12001-26-2	Mica (Muscovite)	<1%	Xn R48/20
13463-67-7 / 236-675-5	Titanium Dioxide	<2%	Not applicable
7732-18-5/ 231-791-2	Water	<34%	Not applicable

Refer to section 16 for further information on EU Classification.

See Section 8 for occupational exposure limit information

SECTION 3: HAZARDS IDENTIFICATION

This product is an aqueous slurry of a chemically inert, non-combustible mineral.

EMERGENCY OVERVIEW
WARNING!

Lung injury and cancer hazard. Do not breathe dust. May cause delayed lung injury. Long term exposure can cause silicosis. Silicosis is a respiratory disease, which can result in delayed, disabling and sometimes fatal lung injury. IARC has determined that crystalline silica inhaled from occupational sources can cause cancer in humans. Risk of injury is dependent on the duration and level of exposure. A single exposure will not result in serious adverse effects. See **"Health Hazards" in Section 11 for detailed information.** See exposure limit presentation in Section 8 for further information.

Avoid creating dust when handling, using or storing. Use only with adequate ventilation to keep exposure below recommended exposure limits.

EU Classification of Substance/Preparation: Harmful (Xn) R48/20

SECTION 4: FIRST AID MEASURES

Gross Inhalation: Remove victim to fresh air. If breathing has stopped, perform artificial respiration. If breathing is difficult have qualified personnel administer oxygen. Get prompt medical attention.

Skin Contact: No first aid should be needed since dermal contact with this product does not affect the skin. Wash exposed skin with soap and water before breaks and at the end of the shift.

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Eye Contact: Flush the eyes immediately with large amounts of running water, lifting the upper and lower lids occasionally. If irritation persists or for imbedded foreign body, get immediate medical attention.

Ingestion: If large amounts are swallowed, get immediate medical attention.

SECTION 5: FIREFIGHTING MEASURES

Flash Point (Method Used): Non-combustible, inorganic material.

Autoignition Temp: Will not burn.

Flammable Limits: LEL: Not applicable UEL: Not applicable

Extinguishing Media: This product will not burn but is compatible with all extinguishing media. Use any media that is appropriate for the surrounding fire.

Special Fire Fighting Procedures: None required with respect to this product. Firefighters should always wear self-contained breathing apparatus for fires indoors or in confined areas.

Unusual Fire and Explosion Hazards: None.

Hazardous Combustion Products: None.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Wear appropriate protective equipment. If uncontaminated, collect using dustless method (HEPA vacuum or wet method) and place in appropriate container for use. If contaminated: a) use appropriate method for the nature of contamination, and b) consider possible toxic or fire hazards associated with the contaminating substances. Collect for appropriate disposal.

SECTION 7: HANDLING AND STORAGE

Do not breathe dust. Do not rely on your sight to determine if dust is in the air. Silica may be in the air without a visible dust cloud. Use normal precautions against bag breakage or spills of bulk material. Avoid creation of respirable dust. Use good housekeeping in storage and use areas to prevent accumulation of dust in work area.

To reduce the risk of developing silicosis, lung cancer and other adverse health effects, NIOSH recommends reducing airborne exposure levels as low as possible below NIOSH's recommended exposure limit, substituting less hazardous materials when feasible, using appropriate respiratory protection when source controls cannot keep exposures below the recommended limit and making medical examinations available to exposed workers.

Use adequate ventilation and dust collection. To minimize exposure, wear a respirator approved for silica dust when using, handling, storing or disposing of this product or bag. Refer to the most recent standards of ANSI (Z88.2), OSHA (29 CFR 1910.134), MSHA (30 CFR Parts 56 and 57) and NIOSH Respirator Decision Logic. Maintain, clean and fit test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Launder clothing that has become dusty. Empty containers (bags, bulk containers, storage tanks, etc.) retain silica residue and must be handled in accordance with the provisions of this Material Safety Data Sheet. **WARN and TRAIN** employees in accordance with state and federal regulations.

WARN YOUR EMPLOYEES (AND YOUR CUSTOMERS AND USERS IN CASE OF RESALE) BY POSTING, AND OTHER MEANS, OF THE HAZARDS AND OSHA PRECAUTIONS AND ANY OTHER APPLICABLE REGULATORY PRECAUTIONS TO BE USED. PROVIDE TRAINING FOR YOUR EMPLOYEES ABOUT OSHA PRECAUTIONS.

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See also American Society for Testing and Materials (ASTM) Standard Practice E1132-99a, "Standard Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica".

Additional information on silica hazards and precautionary measures can be found at the following websites:
NIOSH Joint Campaign on Silicosis Prevention http://www.cdc.gov/niosh/sicampn.html
OSHA Crystalline Silica Website http://www.osha-slc.gov/SLTC/silicacrystalline/index.html
MSHA Silicosis Prevention Website http://www.msha.gov/S&HINFO/SILICO/SILICO.HTM
NIOSH Hazard Review – Health Effects of Occupational Exposure to Respirable Crystalline Silica Website
http://www.cdc.gov/niosh/02-129pd.html

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits

Definitions:
MSHA means Mine Safety and Health Administration.
NIOSH means National Institute for Occupational Safety and Health.
OSHA means Occupational Safety and Health Administration.
PEL means OSHA Permissible Exposure Limit.
REL means the NIOSH Recommended Exposure Limit.
TLV means American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value.
TWA means time-weighted average.

Quartz: OSHA PEL and MSHA Exposure Limit for Crystalline Silica, Quartz $\frac{10\ mg/m^3}{\%\ Silica + 2}$ (Respirable measured as an 8-hour TWA)
TLV- 0.05 mg/m 8-hour TWA (respirable fraction)

Cristobalite:
OSHA PEL and MSHA Exposure Limit for Crystalline Silica, Cristobalite $\frac{1}{2} \times \frac{10\ mg/m^3}{\%\ Silica + 2}$ (Respirable measured as an 8-hour TWA)
TLV- 0.05 mg/m 8-hour TWA (respirable fraction)

Kaolin: PEL - 5 mg/m^3 TWA (respirable fraction)
TLV- 2 mg/m^3 TWA (respirable fraction)
MSHA – 5 mg/m^3 TWA (respirable fraction)

Mica: PEL - 20 mppcfa TWA (respirable fraction)
TLV- 3 mg/m^3 TWA (respirable fraction)
MSHA – 20 mppcfa TWA (respirable fraction)

Titanium Dioxide: PEL - 5 mg/m^3 TWA (total dust)
TLV- 10 mg/m^3 TWA
MSHA – 15 mg/m^3 TWA (total dust)

NIOSH has issued its REL of 50 micrograms respirable free silica per cubic meter of air (0.05 mg/m^3) as determined by a full shift sample up to 10-hour working day, 40 hours per week. NIOSH has recommended that OSHA and MSHA adopt the NIOSH REL as the OSHA PEL and the MSHA Exposure Limit. The 1974 NIOSH Criteria for a Recommended Standard for Occupational Exposure to Crystalline Silica should be consulted for more detailed information. Additionally, NIOSH, in a publication entitled NIOSH Hazard Review Health Effects of Occupational Exposure to Respirable Silica (April 2002), stated "...that workers have a significant risk of developing chronic silicosis when they are exposed to respirable crystalline silica over a working lifetime at the current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL), the Mine Safety and Health Administration (MSHA) PEL, or the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL). ...Current sampling and analytical methods used to evaluate occupational exposure to respirable crystalline silica do not meet the accuracy criterion needed to quantify exposures at concentrations below the NIOSH REL of 0.05 mg/m^3 as a time-weighted average (TWA) for up to a 10-hr workday during a 40-hr workweek. Until improved sampling and analytical methods are developed for respirable crystalline silica, NIOSH

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will continue to recommend an exposure limit of 0.05 mg/m^3 to reduce the risk of developing silicosis, lung cancer, and other adverse health effects. NIOSH also recommends minimizing the risk of illness that remains for workers exposed at the REL by substituting less hazardous materials for crystalline silica when feasible, by using appropriate respiratory protection when source controls cannot keep exposures below the NIOSH REL, and by making medical examinations available to exposed workers."
Crystalline silica exists in several forms, the most common of which are quartz (i.e. this product), trydimite and cristobalite, with quartz being the most common form found in nature. If quartz is heated to more than 870°C, it can change form to trydimite and if quartz is heated to more than 1450°C, it can change form to cristobalite. The OSHA PELs and MSHA Exposure Limits for trydimite and cristobalite are one-half of the PEL for quartz.

Ventilation: Use local exhaust as required to maintain exposures as far as possible below applicable occupational exposure limits. See also ACGIH "Industrial Ventilation - A Manual for Recommended Practice" (current edition). Control of exposure to dust must be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general or local exhaust ventilation and substitution of less toxic materials).

Respiratory Protection: When effective engineering controls are not feasible, or while they are being implemented, appropriate respiratory protection must be used. Use appropriate respiratory protection for respirable particulates based on consideration of airborne workplace concentrations and duration of exposure arising from intended end use. Refer to the most recent standards of ANSI (Z88.2), OSHA (29 CFR 1910.134), MSHA (30 CFR Parts 56 and 57) and NIOSH Respirator Decision Logic.

Gloves: Protective gloves recommended.

Eye Protection: Safety glasses or goggles recommended.

Other Protective Equipment/Clothing: As appropriate for the work environment. Dusty clothing should be laundered before reuse.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: White to cream colored slurry with an earthy odor.

pH: Not determined
Boiling Point: Same as water
Melting Point: Not applicable
Solubility in Water: Kaolin is insoluble
Percent Volatile: >34% (water)
Flash Point (Method Used): Non-combustible, inorganic material.
Autoignition Temp: Will not burn.

Specific Gravity (water=1): 1.78 - 2.58
Vapor Pressure: Same as water
Vapor Density: Same as water
Evaporation Rate: Not applicable
Fusion Range: 1569-1785°C
Flammable Limits: LEL: Not applicable
UEL: Not applicable

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable

Conditions to Avoid: When exposed to high temperatures, free quartz can change crystal structures to form tridymite (above 870°C) or cristobalite (above 1470°C) which have greater health hazards than quartz.

Incompatibility: Powerful oxidizing agents such as fluorine, chlorine trifluoride, manganese trioxide, etc.

Hazardous Decomposition Products: Silica will dissolve in hydrofluoric acid producing a corrosive gas, silicon tetrafluoride.

Hazardous Polymerization: Will not occur.

Conditions to Avoid: None

SECTION 11: TOXICOLOGICAL INFORMATION

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HEALTH HAZARDS:

Inhalation: Breathing dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may have the following serious chronic health effects:

Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling and sometimes fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop mycobacterial infections (tuberculous and non-tuberculous) and fungal infections. Inhalation of air with a very high concentration of respirable silica dust can cause the most serious forms of silicosis in a matter of months or a few years. Some epidemiologic studies have concluded that there is significant risk of developing silicosis even at airborne exposure levels that are equal to the recommended NIOSH REL, the ACGIH TLV, the OSHA PEL, and the MSHA Exposure Limit.

Pneumoconiosis: Excessive inhalation of respirable kaolin dust or mica dust may cause pneumoconiosis, a respiratory disease, which can result in delayed, progressive, disabling and sometimes fatal lung injury. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with pneumoconiosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1 - carcinogenic to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibrils (published in June 1997) in conjunction with the use of these materials. The National Toxicology Program classifies respirable crystalline silica as "known to be a human carcinogen". Refer to the Tenth Report on Carcinogens (2002). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

Other Data with Possible Relevance to Human Health:

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by fibrosis of the lungs, skin and other internal organs) rheumatoid arthritis, systemic lupus erythematosus, sarcoidosis, chronic bronchitis, chronic obstructive pulmonary disease (COPD), emphysema, chronic kidney disease and end-stage renal disease.

For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pages 761-768, 1997, and see also NIOSH Hazard Review – Health Effects of Occupational Exposure to Respirable Crystalline Silica, April 2002 (see Section 7 for NIOSH Hazard Review Website).

Skin Contact: No adverse effects expected.

Eye Contact: Contact may cause mechanical irritation and possible injury.

Ingestion: No adverse effects expected for normal, incidental ingestion.

Chronic Health Effects: See "Inhalation" subsection above with respect to silicosis, cancer status and other data with possible relevance to human health.

Medical Conditions Aggravated by Exposure: Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to respirable dust.

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Signs and Symptoms of Exposure: Exposure to dust may cause mucous membrane and respiratory irritation, cough, sore throat, nasal congestion, sneezing and shortness of breath. However, there may be no immediate signs or symptoms of exposure to hazardous concentrations of respirable crystalline silica (quartz). See "Inhalation" subsection above for symptoms of silicosis. The absence of symptoms is not necessarily indicative of safe conditions.

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Acute Toxicity Values: Silica: LD50 oral rat >22,500 mg/kg.
Titanium Dioxide: LD50 oral rat >12,000 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

Silica: LC50 carp >10,000 mg/L/72 hr. This product is not expected to present an environmental hazard.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: These products are not classified as a hazardous waste under US EPA RCRA regulations. If uncontaminated, dispose as an inert, non-metallic mineral. If contaminated, dispose in accordance with all applicable local, state/provincial and federal regulations in light of the contamination present. Local regulations may be more stringent than regional and national requirements. It is the responsibility of the waste generator to determine the toxicity and physical characteristics of the material to determine the proper waste identification and disposal in compliance with applicable regulations.

SECTION 14: TRANSPORT INFORMATION

U.S. DOT HAZARD CLASSIFICATION
- Proper Shipping Name: Not Regulated
- Technical Name: N/A
- UN Number: N/A
- Hazard Class/Packing Group: N/A
- Labels Required: None
- DOT Packaging Requirements: N/A
- Exceptions: N/A

SECTION 15: REGULATORY INFORMATION

SARA 311/312: Hazard Categories for SARA Section 311/312 Reporting: Chronic Health

SARA 313 This Product Contains the Following Chemicals Subject to Annual Release Reporting Requirements Under the SARA Section 313 (40 CFR 372): None

CERCLA Section 103 Reportable Quantity: None

California Proposition 65: This product contains crystalline silica (respirable) which is known to the State of California to cause cancer.

Toxic Substances Control Act: All of the components of this product are listed on the EPA TSCA Inventory or exempt from premanufacture notification requirements.

European Inventory of Commercial Chemical Substances: All of the components of this product are listed on the EINECS Inventory or exempt from notification requirements.

European Community Labeling: Harmful Xn
Contains crystalline silica, quartz (238-878-4), cristobalite (238-455-4), kaolin and mica
R48/20 Harmful: danger of serious damage to health by prolonged exposure by inhalation.
S22 Do not breathe dust
S38 In case of insufficient ventilation, wear suitable respiratory equipment.

Canadian Environmental Protection Act: All the components of this product are listed on the Canadian Domestic Substances List or exempt from notification requirements.

Canadian WHMIS Classification: Class D, Division 2, Subdivision A (Very Toxic Material causing other Toxic Effects)

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This MSDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the MSDS contains all of the information required by the CPR.

Japan METI: All of the components of this product are existing chemical substances as defined in the Chemical Substance Control Law.

Australian Inventory of Chemical Substances: All of the components of this product are listed on the AICS inventory or exempt from notification requirements.

Korea: All of the components of this product are listed on the ECL inventory or exempt from notification requirements.

Philippines: All of the components of this product are listed on the PICCS inventory or exempt from notification requirements.

16: OTHER INFORMATION

EU Classes and Risk Phrases for Reference (See Sections 2 and 3)
Xn Harmful
R48/20 Harmful: Danger of serious damage to health by prolonged exposure by inhalation.
S22 Do not breathe dust
S38 In case of insufficient ventilation, wear suitable respiratory equipment.

NFPA Hazard Rating:	Health: 1	Fire: 0	Reactivity: 0
HMIS Hazard Rating:	Health: *	Fire: 0	Reactivity: 0

* Warning - Chronic health effect possible - inhalation of silica dust may cause lung injury/disease (silicosis). Take appropriate measures to avoid breathing dust. See Section 3.

References:

Registry for Toxic Effects of Chemical Substances (RTECS), 2005
Patty's Industrial Hygiene and Toxicology
NIOSH Hazard Review – Health Effects of Occupational Exposure to Respirable Crystalline Silica, April 2002
NTP Eleventh Report on Carcinogens, 2005
IARC Monograph Volume 68, Silica, Some Silicates and Organic Fibres, 1997
Hazardous Substances Data Bank (HSDB), 2005

Revision Summary: Revised composition (Section 2), Revised Exposure Limits (Section 8), Revised EU Labeling, Section 15).

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. The information set forth herein is based on technical data the Unimin Corporation believes reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside the control of Unimin Corporation, no warranties, expressed or implied, are made and no liability is assumed in connection with any use of this information. Any use of these data and information must be determined by the user to be in accordance with federal, state and local laws and regulations.

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Close

Material Safety Data Sheet

ULTRA Scientific · 250 Smith Street · North Kingstown, RI, USA 02852 · 401-294-9400

Product # WRK-155 **Last Updated: 11/14/2006**

Section I *Product Identification*

Name: Ketones ULTRAkit
Matrix: none

Section II *Composition / Information on Ingredients*

Component	*CAS #*	*% by Wt.*	*LD50*	*OSHA PEL*	*ACGIH TLV*	*RTECS #*	*Codes*
Kit contains nineteen ampules, vials, or bottles							
acetone	000067-64-1	100.0000	9750 mg/kg oral rat	2400 mg/m3	1188 mg/m3	AL3150000	
2-butanone	000078-93-3	100.0000	3400 mg/kg oral rat	590 mg/m3	590 mg/m3	EL6475000	G
3-methyl-2-butanone	000563-80-4	100.0000	N/A	N/A	N/A	N/A	
2-pentanone	000107-87-9	100.0000	N/A	200 ppm	200 ppm	SA7875000	
3-pentanone	000096-22-0	100.0000	N/A	N/A	200 ppm	SA8050000	
2-hexanone	000591-78-6	100.0000	2590 mg/kg oral rat	410 mg/m3	20 mg/m3	MP1400000	
3-methyl-2-pentanone	000565-61-7	100.0000	N/A	N/A	N/A	N/A	
4-methyl-2-pentanone	000108-10-1	100.0000	2080 mg/kg oral rat	400 mg/m3	200 mg/m3	N/A	G
3-hexanone	000589-38-8	100.0000	N/A	N/A	N/A	N/A	
2-heptanone	000110-43-0	100.0000	N/A	N/A	N/A	N/A	
-heptanone	000106-35-4	100.0000	N/A	N/A	N/A	N/A	
2-methyl-3-hexanone	007379-12-6	100.0000	N/A	N/A	N/A	N/A	
5-methyl-2-hexanone	000110-12-3	100.0000	N/A	N/A	N/A	N/A	
2-octanone	000111-13-7	100.0000	N/A	N/A	N/A	RH1484000	
2-nonanone	000821-56-6	100.0000	N/A	N/A	N/A	N/A	
2-decanone	000693-54-9	100.0000	N/A	N/A	N/A	N/A	
2-undecanone	000112-12-9	100.0000	N/A	N/A	N/A	N/A	
2-dodecanone	006175-49-1	100.0000	N/A	N/A	N/A	N/A	
2-tridecanone	000593-08-8	100.0000	N/A	N/A	N/A	N/A	

Codes: A-OSHA regulated carcinogen; B-IARC Group 1 carcinogen; C-IARC Group 2A carcinogen; D-IARC Group 2B carcinogen; E-NTP Group 1 carcinogen; F-NTP Group 2 carcinogen; G-SARA Title III compound; H-California Proposition 65 compound.

Section III *Hazards Identification*

All chemicals should be considered hazardous - direct physical contact should be avoided.

Section IV *First Aid Measures*

Inhalation: If inhaled, remove to fresh air. Give oxygen, if necessary. Contact a physician.

Skin Contact: In case of skin contact, flush with copious amounts of water. Remove contaminated clothing. Contact a physician.

Eye Contact: In case of eye contact, flush with copious amounts of water, lifting eyelids occasionally. Contact a physician.

Ingestion: If ingested, contact poison center immediately for recommended procedure. Contact a physician.

Section V ***Fire Fighting Measures***

Fire and Explosion Hazard Data for Compound

Fire Hazard: N/A

Extinguishing Media: Carbon dioxide, dry chemical powder, or water spray.

Section VI ***Accidental Release Measures***

Ventilate area of the leak or spill. Wear appropriate personal protective equipment as specified in Section VIII. A leaking bottle, vial, or ampule may be placed in a plastic bag, and normal disposal procedures followed. Take up spilled material with sand or other non-combustible absorbant material, and place in an appropriate container for later disposal. Flush spill area with water.

Section VII ***Handling and Storage***

May be stored at room temperature

Keep in a tightly closed container, and store in a corrosion proof area.

This product should only be used by persons trained in the safe handling of hazardous chemicals.

Section VIII ***Exposure Controls / Personal Protection***

Ensure that there is adequate ventilation to prevent airborne levels from exceeding recommended exposure limits (see Section II). Use appropriate MSHA/NIOSH approved safety equipment. Wear chemical goggles, face shield, gloves, and chemical resistant clothing, such as a laboratory coat and/or a rubber apron, to prevent contact with eyes, skin, and clothing.

ection IX ***Physical and Chemical Properties***

Physical Data for Compound

Melting Pt.: N/A	***Boiling Pt.:*** N/A	***Density:*** N/A
Vapor Pressure: N/A	***Vapor Density:*** N/A	***Water Solubility:*** N/A
Appearance: liquid	***Odor:*** N/A	***Flash Point:*** N/A
Auto-Ignition Temperature: N/A	***LEL:*** N/A	***UEL:*** N/A

Section X ***Stability and Reactivity***

Reactivity Data for Compound

Stability: stable ***Incompatibilities:*** N/A

Hazardous Decomposition Products: N/A

Hazardous Effects of Polymerization: none

Section XI ***Toxicological Information***

See Section II for specific toxicological information for the ingredients of this product.

Section XII ***Ecological Information***

No information is available.

Section XIII ***Disposal Considerations***

Recycle, if possible. Any material which cannot be saved for recovery or recycling should be disposed of at an appropriate and approved waste disposal facility. Processing, use, and/or contamination of this product may change waste management requirements. Observe all applicable federal, state, and local environmental regulations concerning disposal.

Section XIV Transport Information

Shipment Type: Dangerous Goods in Excepted Quantity (US DOT Small Quantity Exemption)
UN Number: UN3316 ***Shipping Class:*** 9 ***Packing Group:***

Section XV Regulatory Information

No information is available.

Section XVI Other Information

The above information is believed to be correct, but does not purport to be all-inclusive. This data should be used only as a guide in handling this material. ULTRA Scientific, Inc., shall not be held liable for any damage resulting from handling or from contact with the above product.

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Material Safety Data Sheet

Catalog Number: 902140
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 902140

Product name: LARD

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
LARD	N/A	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

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5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards: Burning produces irritant fumes.
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: Not determined
Autoignition temperature: Not determined
NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment.
Environmental precautions: Prevent product from entering drains.
Methods for cleaning up: Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid
Formula: Not applicable
Melting point/range: No data available at this time.
Boiling point/range: No Data available at this time.
Density: No data available
Vapor pressure: No data available
Evaporation rate: No data available
Vapor density: No data available

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Solubility (in water):	No data available
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
LARD	Not Available	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
LARD	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
LARD	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
LARD	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
LARD	Not Listed	Not Listed	Not Listed

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Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
LARD	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
LARD	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
LARD	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
LARD	
Inventory - United States TSCA - Sect. 8(b)	Not Listed
Canada DSL Inventory List -	Not Listed

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
LARD	Not Listed	Not Listed	Not Listed	Not Listed

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Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
LARD	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
LARD	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001169

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **LATEX 2000**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: LATEX 2000
Synonyms: None
Chemical Family: Polymer
Application: Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Latex		30 - 60%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye and skin irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

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5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors.
Storage Information	Store in a cool well ventilated area. Keep container closed when not in use. Product has a shelf life of 24 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Organic vapor respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Milky white
Odor:	Ammonia
pH:	8.5-10

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity @ 20 C (Water=1):	1.00
Density @ 20 C (lbs./gallon):	8.33
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	212
Boiling Point/Range (C):	100
Freezing Point/Range (F):	32
Freezing Point/Range (C):	0
Vapor Pressure @ 20 C (mmHg):	17
Vapor Density (Air=1):	< 1
Percent Volatiles:	46-48
Evaporation Rate (Butyl Acetate=1):	< 1
Solubility in Water (g/100ml):	Disperses
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	>600

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Styrene. 1,3-Butadiene.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Vapors given off by heated product may be harmful.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Lung disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined

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Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

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15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001174

Material Safety Data Sheet

Catalog Number: 225139
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 225139

Product name: LAURIC ACID

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
LAURIC ACID	143-07-7	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Toxic: danger of very serious irreversible effects if swallowed. May also have serious irreversible effects through skin contact or inhalation.

Category of Danger:
Toxic , Carc. cat. 3

Principle routes of exposure: Skin
Inhalation: Harmful: possible risk of irreversible effects through inhalation.
Ingestion: Toxic: danger of very serious irreversible effects if swallowed.
Skin contact: Harmful: danger of serious damage to health by prolonged skin contact.
Eye contact: Risk of serious damage to eyes

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard Toxic if swallowed
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid breathing vapors. Do not breathe vapors or spray mist Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure.

4. FIRST AID MEASURES

EPAPA005001175

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Drink 1 or 2 glasses of water. Induce vomiting if person is conscious.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep container tightly closed in a dry and well-ventilated place. Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: Goggles
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

EPAPA005001176

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless crystals with a faint but characteristic odor, like oil of bay.
Physical state:	Solid
Formula:	C12-H24-O2
Molecular weight:	200.32
Melting point/range:	44 °C (112 °F)
Boiling point/range:	299 °C (570 °F)
Density:	0.883 (water = 1)
Vapor pressure:	Very low at 25 °C 1 mm Hg (0.133 kPa) at 121 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Practically not soluble
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Incompatible with sulfuric acid, bases, ammonia, amines, alkylene oxide, epichlorohydrin.

Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
LAURIC ACID	OE9800000	Oral LD50 Rat : 12 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	Possible carcinogen
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

EPAPA005001177

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
LAURIC ACID	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
LAURIC ACID	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
LAURIC ACID	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
LAURIC ACID	Not Listed	indicator 4; ICCA sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
LAURIC ACID	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
LAURIC ACID	Not Listed

TDG (Canada):

WHMIS hazard class: D2b toxic materials

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

EPAPA005001178

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
LAURIC ACID	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
LAURIC ACID	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	205-582-1; C12H24O2
Inventory - Japan:	2-608
Korean KECL:	KE-12855
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
LAURIC ACID	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
LAURIC ACID	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
LAURIC ACID	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

EPAPA005001179

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End of Safety Data Sheet

EPAPA005001180

Material Safety Data Sheet

Catalog Number: 102143
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 102143

Product name: LAURYL ALCOHOL

Synonyms: DODECYL ALCOHOL
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
LAURYL ALCOHOL	112-53-8	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Precautions - ANSI Label Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available

EPAPA005001181

Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	Flammable
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	ca. 140 °C (open cup)
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Remove all sources of ignition. Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

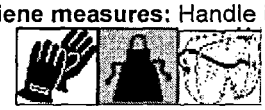
Storage:

ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Technical measures/storage conditions:	Keep away from heat and sources of ignition
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.



9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Formula:	C12H26O
Molecular weight:	186.3
Melting point/range:	23.7 - 23.9 °C

EPAPA005001182

Boiling point/range:	255 - 265 °C at 1013 hPa
Density:	.8309 g/cm3 at 24 °C
Vapor pressure:	.00022 hPa at 20 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Moderately soluble
Flash point:	ca. 140 °C (open cup)
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Incompatible with strong acids, caustics, aliphatic amines, isocyanates, oxidizers.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
LAURYL ALCOHOL	JR5775000	Oral LD50 Rat : >12800 mg/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
LAURYL ALCOHOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
LAURYL ALCOHOL	1	Not Listed	LC50 (96 hr) fathead minnow (0.12 g):1.01 mg/L. Cond:Flow-through, 24-26 °C, pH 7.5, 45.5 mg/L CaCO3.

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Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
LAURYL ALCOHOL	IC50 (48 hr) freshwater algae (Tetrahymena pyriformis):1.0 mg/L.:	EC50 (5,30 min) Photobacterium phosphoreum:0.06-0.34 mg/L Microtox test.:	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
LAURYL ALCOHOL	Not Listed	indicator 2; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
LAURYL ALCOHOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
LAURYL ALCOHOL	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
LAURYL ALCOHOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

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International Inventories

Components	
LAURYL ALCOHOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	203-982-0; C12H26O
Inventory - Japan:	2-217
Korean KECL:	KE-12888
Philippines PICCS:	Present

U.S. regulations:

Components	**California Proposition 65 -**	**Massachusetts Right to Know List:**	**New Jersey Right to Know List:**	**Pennsylvania Right to Know List:**
LAURYL ALCOHOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	**Florida substance List:**	**Rhode Island Right to Know List:**	**Illinois - Toxic Air Contaminants**	**Connecticut - Hazardous Air Pollutants**
LAURYL ALCOHOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	**SARA 313 Emission reporting/Toxic Release of Chemicals**	**CERCLA/SARA - Section 302 Extremely Haz**	**NTP:**	**IARC:**
LAURYL ALCOHOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001185

The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

LIGHT AROMATIC DISTILLATE
6063CR Revised 13-MAY-2005

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

Corporate MSDS Number : DU005986
CAS Number : 67891-80-9

Tradenames and Synonyms

LAD

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS
Product Information : 1-800-231-0998
Transport Emergency : CHEMTREC: 1-800-424-9300
Medical Emergency : 1-800-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
*BENZENE	71-43-2	42-47
C5's		19-23
*DICYCLOPENTADIENE	77-73-6	10-12
*TOLUENE	108-88-3	4-5
C6's (non-aromatics)		3-4
C7's (non-aromatics)		2-3
PIPERYLENE	504-60-9	2-3
C11+		2-3
1-METHYLCYCLOPENTENE	693-89-0	2
*STYRENE	100-42-5	1
*ETHYLBENZENE	100-41-4	1
ISOPRENE	78-79-5	1
*1,3-BUTADIENE	106-99-0	0.2

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Potential Health Effects

Skin contact may cause skin irritation with discomfort or rash; or defatting of the skin resulting in skin irritation with discomfort or rash. Skin contact with Butene may cause skin burns. Prolonged contact may cause drying of the skin with discomfort, itching, burning sensation, blister formation, or rash. Some components can cause skin sensitization or skin photosensitization with allergic rash and dermatitis. Evidence suggests that skin permeation can occur in amounts capable of producing systemic toxicity.

Eye contact may cause eye irritation with discomfort, tearing, or blurring of vision; contact with some components may cause eye burns. Liquid toluene splashed into the eye will burn the cornea if not promptly removed.

Inhalation may cause nausea, headache or weakness; loss of appetite; irregular heartbeat with "heart thumping", apprehension, and lightheadedness sometimes progressing to loss of consciousness; irritation of the nose, throat and lungs with cough, difficult breathing or shortness of breath, possibly resulting in pulmonary edema (body fluid in the lungs) with wheezing, abnormal lung sounds, severe shortness of breath and bluish discoloration of the skin; symptoms may be delayed. Fatality is possible from gross overexposure.

Inhalation or ingestion may cause temporary nervous system depression with dizziness, headache, confusion, incoordination, and loss of consciousness; or nervous system effects such as muscular weakness, paralysis of extremities, incoordination, decreased reation time and visual disturbances.

Ingestion may cause gastrointestinal irritation with upper abdominal pain, "heartburn", nausea, vomiting, and diarrhea. However, there may be no symptoms at all. A serious ingestion hazard is aspiration (liquid entering the lungs during ingestion or vomiting) which may result in "chemical pneumonia". Symptoms include coughing, gasping, choking, shortness of breath, bluish discoloration of the skin, rapid breathing and heart rate, and fever. Pulmonary edema or bleeding, drowsiness, confusion, coma and seizures may occur in more serious cases. Symptoms may develop immediately or as late as 24 hours after the exposure, depending on how much chemical entered the lungs.

Repeated or prolonged inhalation or ingestion exposures may cause abnormal liver function with jaundice; abnormal kidney function with bloody, flank pain, bladder irritation and kidney failure; or abnormal blood forming system functioning with anemia; or red blood cell destruction.

(HAZARDS IDENTIFICATION - Continued)

Higher or prolonged exposures to benzene may cause reduced white blood cell production; aplastic anemia or leukemia with symptoms of lightheadedness, loss of appetite, abdominal discomfort, blurring of vision, shortness of breath, pale skin, easy bruising, nose bleeds, bleeding from gums and excessive menstrual flow; temporary lung irritation with cough, discomfort, difficulty breathing, or shortness of breath; temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation; pulmonary edema (body fluid in the lungs) with cough, wheezing, abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin; decreased pulse rate and blood pressure; abnormal liver or kidney function; or temporary nervous system depression with dizziness, headache, confusion, and loss of consciousness; or neurological impairment such as decreased reaction time and visual disturbances. Symptoms may be delayed. Fatality may occur from gross overexposure.

Epidemiologic studies suggest that benzene may pose a risk of aplastic anemia and certain types of leukemia in humans. One published study reports an increased risk of urothelial cancer after high annual exposure to benzene; the results are based on a relatively small number of individuals.

Epidemiologic studies demonstrate significant risk of neurological effects from toluene.

In humans exposed to Styrene, genetic damage was observed in peripheral white blood cells. Three studies have suggested an association between leukemia and lymphomas and exposure to Styrene. However, because of concomitant exposure to other chemicals it is not possible to single out Styrene as the causative agent.

Individuals with preexisting diseases of the bone marrow, the central or peripheral nervous system, liver or kidneys may have increased susceptibility to the toxicity of excessive exposures.

Carcinogenicity Information

The following components are listed by IARC, NTP, OSHA or ACGIH as carcinogens.

Material	IARC	NTP	OSHA	ACGIH
BENZENE	1	X	X	A1
STYRENE	2B			
ETHYLBENZENE	2B			A3
ISOPRENE	2B	X		
1,3-BUTADIENE	2A	X	X	A2

DuPont controls the following materials as carcinogens:

(HAZARDS IDENTIFICATION - Continued)

BENZENE. 1,3-BUTADIENE.

FIRST AID MEASURES

First Aid

INHALATION
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reuse.

EYE CONTACT
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION
If swallowed, do not induce vomiting. Immediately give two glasses of water or activated charcoal slurry. Never give anything by mouth to an unconscious person. Call a physician.

NOTE:
To prepare activated charcoal slurry, suspend 50 grams activated charcoal in 400 mL water and mix thoroughly. Administer 5 mL/kg, or 350 mL for an average adult.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point : -33 C (-27 F)
Flammable limits in Air, % by Volume
LEL : 0.8 %
UEL : 6.3 %

** (LELs and UELs are based upon Dicyclopentadiene) **

Flammable liquid. Vapor forms explosive mixture with air. Vapors or gases may travel considerable distances to ignition source and flash back.

Hazardous gases/vapors produced in fire are carbon monoxide and carbon dioxide.
Fire and Explosion Hazards:

Heating greatly increases explosive hazard.

(FIRE FIGHTING MEASURES - Continued)

Extinguishing Media

Water Fog, Foam, Dry Chemical.

Carbon Dioxide (CO2).

While water spray (fog) may be used for cooling containers, it may not be effective in fighting the fire. A water stream may splash and spread the flaming liquid.

Fire Fighting Instructions

Wear self-contained breathing apparatus. Wear full protective equipment. Shut off source of fuel, if possible and without risk. Cool tank/container with water spray. Runoff from fire control may be a pollution hazard.

Keep personnel removed and upwind of fire. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect those attempting to stop a leak. Water spray may be used to flush spills away from exposures.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Evacuate personnel, thoroughly ventilate area, use self-contained breathing apparatus.

Initial Containment

Remove source of heat, sparks, flame, impact, friction or electricity. Dissipate vapor with water spray. Dike spill. Prevent material from entering sewers, waterways, or low areas.

Spill Clean Up

Recover free liquid for reuse or reclamation.

Accidental Release Measures

Soak up spilled material with inert absorbent. Do not use combustible materials such as sawdust.

If Light Aromatic Distillate is spilled and not recovered, or is recovered as a waste for treatment or disposal, the CERCLA Reportable Quantity is 100 lbs. (release of an unlisted Hazardous Waste characteristic of ignitibility).

(ACCIDENTAL RELEASE MEASURES - Continued)

The CERCLA Reportable Quantity for n-hexane is 1 lb., 1 lb. for 1,3-butadiene, 10 lbs. for benzene, 100 lbs. for isoprene, 100 lbs. for piperylene, 1,000 lbs. for toluene, and 1,000 lbs. for styrene.

HANDLING AND STORAGE

Handling (Personnel)

Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Wash clothing after use.

Handling (Physical Aspects)

Ground container when pouring. Use of non-sparking and explosion-proof equipment may be necessary depending on type of

(ACCIDENTAL RELEASE MEASURES - Continued)

The CERCLA Reportable Quantity for n-hexane is 1 lb., 1 lb. for 1,3-butadiene, 10 lbs. for benzene, 100 lbs. for isoprene, 100 lbs. for piperylene, 1,000 lbs. for toluene, and 1,000 lbs. for styrene.

HANDLING AND STORAGE

Handling (Personnel)

Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Wash clothing after use.

Handling (Physical Aspects)

Ground container when pouring. Use of non-sparking and explosion-proof equipment may be necessary depending on type of operation. Keep away from heat, sparks and flames.

Storage

Keep container in a cool place. Store in a well ventilated place. Store in a dark place. Keep container tightly closed. Store in accordance with Federal Regulations. Do not store or consume food, drink or tobacco in areas where they may become contaminated with this material.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Keep container tightly closed.

Use sufficient ventilation to keep employee exposure below recommended exposure limits.

Personal Protective Equipment

The OSHA standard has specific requirements for personal protective equipment including respiratory protection. Refer to OSHA Standards 29 CFR 1910.1028 (Benzene) and 1910.134 (Respiratory Protection) for respirator requirements. Eye contact with liquid benzene must be prevented, and skin exposure limited as much as possible. Eye and face protection must conform to OSHA Standard 1910.133 (Eye and Face Protection).

Only personal protective clothing which provides a good barrier against benzene should be used. "Viton" is recommended for protective gloves if prolonged contact with the liquid is expected. For incidental, or splash protection, neoprene or butyl rubber gloves will be

(EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

sufficient for routine use.

If liquid benzene contacts protective clothing, the clothing should be removed promptly and decontaminated.

Exposure Guidelines

Applicable Exposure Limits

BENZENE

PEL	(OSHA)	: 1 ppm, 8 Hr. TWA 5 ppm, STEL 0.5 ppm, Action Level
TLV	(ACGIH)	: 0.5 ppm, 1.6 mg/m3, 8 Hr. TWA, Skin, A1 STEL 2.5 ppm, 8 mg/m3, Skin, A1
AEL *	(DuPont)	: 0.5 ppm, 8 & 12 Hr. TWA 5 ppm, 15 minute TWA

DICYCLOPENTADIENE

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: 5 ppm, 27 mg/m3, 8 Hr. TWA
AEL *	(DuPont)	: None Established

TOLUENE

PEL	(OSHA)	: 200 ppm, 8 Hr. TWA 300 ppm, Ceiling 500 ppm - 10 Min. Max.
TLV	(ACGIH)	: 50 ppm, 188 mg/m3, 8 Hr. TWA, Skin, A4
AEL *	(DuPont)	: 50 ppm, 8 & 12 Hr. TWA

STYRENE

PEL	(OSHA)	: 100 ppm, 8 Hr. TWA 200 ppm, Ceiling 600 ppm - 5 Min. Max
TLV	(ACGIH)	: 20 ppm, 85 mg/m3, 8 Hr. TWA, A4 STEL 40 ppm, 170 mg/m3, A4
AEL *	(DuPont)	: 20 ppm, 8 & 12 Hr. TWA 40 ppm, 15 minute TWA

ETHYLBENZENE

PEL	(OSHA)	: 100 ppm, 435 mg/m3, 8 Hr. TWA
TLV	(ACGIH)	: 100 ppm, 8 Hr. TWA, A3 STEL 125 ppm
AEL *	(DuPont)	: 25 ppm, 8 & 12 Hr. TWA

ISOPRENE

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: None Established
WEEL	(AIHA)	: 50 ppm, 8 Hr. TWA

1,3-BUTADIENE

(Applicable Exposure Limits - Continued)

PEL	(OSHA)	: 1 ppm, 8 Hr. TWA STEL 5 ppm, 15 minute TWA Action Level 0.5 ppm
TLV	(ACGIH)	: 2 ppm, 4.4 mg/m3, 8 Hr. TWA, A2
AEL *	(DuPont)	: 2 ppm, 8 & 12 Hr. TWA STEL 5 ppm, 15 minute TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point	: 70 C (158 F)
Melting Point	: -35 C (-31 F)
Odor	: Sweet hydrocarbon
Form	: Liquid
Color	: Amber
Specific Gravity	: 0.88

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Avoid heat, sparks, flame or build-up of static electricity.

Incompatibility with Other Materials

Incompatible with strong oxidants and strong acids.

Decomposition

Decomposes with heat.

Hazardous gases/vapors produced are carbon monoxide and carbon dioxide.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

BENZENE

EYE:

Animal testing indicates this material is an eye irritant.

SKIN:

Animal testing indicates this material is a skin irritant, but not a skin sensitizer.

INGESTION:

LD50, rat: 930 mg/kg.
Repeated exposure caused: Anemia. Long-term exposure caused: Alterations to the blood-forming system. Altered white blood cell count. Tremors or convulsions. Histopathological changes of the reproductive organs, adrenals, lungs, liver, stomach. Decreased body weight.

INHALATION:

4 hour, LC50, rat: 13,700 ppm.
Single exposure to high doses caused: Tremors or convulsions. Altered respiratory rate. Altered heart rate. Cardiac sensitization, a potentially fatal disturbance of heart rhythm associated with a heightened sensitivity to the action of epinephrine. Repeated exposure caused: Altered bone marrow function. Altered hematology. Altered immune system function. Narcosis. Tremors or convulsions. Histopathological changes of the liver, spleen, thymus, ovaries, testes, sperm. Increased kidney weight. Long-term exposure caused: Altered bone marrow function. Altered hematology. Narcosis. Altered immune system function. Increased mortality. Histopathological changes of the kidneys, testes.

CARCINOGENIC, DEVELOPMENTAL, REPRODUCTIVE, MUTAGENIC EFFECTS:

Data show an increased incidence of tumors in laboratory animals. Animal data show developmental effects only at exposure levels producing other toxic effects in the adult animal. Reproductive data on female rats show: No change in reproductive performance. Reproductive data on male rats show: No change in reproductive performance. Tests have shown that this material produces genetic damage in bacterial and mammalian cell cultures, and in animals. A weak genotoxic effect in germ cells of animals has been reported. In animal testing, this material has not caused permanent genetic damage in reproductive cells of mammals (has not produced heritable genetic damage).

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity

Benzene
96-hour LC50, fathead minnows: 35 mg/L

Dicyclopentadiene
48-hour LC50, red killifish : 25 mg/L

DISPOSAL CONSIDERATIONS

Waste Disposal

Cleaned-up material may be an RCRA Hazardous Waste due to the ignitibility characteristic and individual components. Do not flush to surface water or sanitary sewer system.

Treatment, storage, transportation and disposal must be in accordance with applicable Federal, State, and local regulations. Recover nonusable free liquid and dispose of in an approved and permitted incinerator, biological treatment system, or transfer to a permitted disposal contractor.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO
Proper Shipping Name : PETROLEUM DISTILLATES, N.O.S.
Hazard Class : 3
UN No. : 1268
DOT/IMO Label : FLAMMABLE LIQUID
Packing Group : II

Shipping Containers

Barge
Tank Car

Reportable Quantity : 10 lb/4.54 kg (BENZENE)
10 lb/4.54 kg (1,3-BUTADIENE)
5,000 lb/2,270 kg (HEXANE)

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status : Reported/Included.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes
Chronic : Yes
Fire : Yes
Reactivity : No
Pressure : No

LISTS:

Extremely Hazardous Substance	-No
CERCLA Hazardous Material	-(*)
Toxic Chemical	-(Yes)**

*See Disposal Information.
**See Components.

LIGHT AROMATIC DISTILLATE is a flammable liquid as defined by OSHA in 29 CFR 1910.1200(c). Use of this product may require compliance with 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals.

OTHER INFORMATION

NFPA, NPCA-HMIS

NPCA-HMIS Rating

Health	: 3 (Chronic Health Effects)
Flammability	: 3
Reactivity	: 0

Personal Protection rating to be supplied by user depending on use conditions.

Additional Information

BENZENE must be handled strictly in conformance with the OSHA Regulation set forth in Section 1028, Part 1910 of Title 29 of the Code of Federal Regulations. This regulation had detailed requirements such as: exposure limits, monitoring, establishing regulated areas, protective equipment, handling, training, medical practices and recordkeeping. These requirements must be followed.

WARNING!

This material contains 42-47% Benzene (17-43-2), 4-5% Toluene (108-88-3), and 0.2% 1,3-Butadiene (106-99-0), known

(Continued)

to the state of California to cause cancer or reproductive toxicity.

"SKIN" NOTATION DEFINITION:

The "Skin" notation indicates that liquid and vapor can penetrate skin and mucous membranes. Therefore, control of vapor inhalation alone may not be sufficient to prevent absorption of an excessive dose; skin contact should also be avoided.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsible for MSDS : MSDS Coordinator
> : DuPont Chemical Solutions Enterprise
Address : Wilmington, DE 19898
Telephone : (800) 441-7515

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

Cover Sheet:
French MSDS:

MSDS NUMBER: 5007-GATC
CUSTOMER NUMBER:
STOCK NUMBER:
CIN NUMBER: 0429-08
STCC NUMBER:

Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: 10/11/94

MSDS NUMBER .....: 5007-GATC
PRODUCT NAME .....: LIGNOCHEM LIGNIN LIQUOR

MSDS ID CODE .....:
MSDS OTHER CODES .:
PART NUMBERS .....: 0429-00

------SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION ------

MSDS NUMBER .....: 5007-GATC
PRODUCT NAME .....: LIGNOCHEM LIGNIN LIQUOR
SYNONYMS .....: SPENT SULFITE LIQUOR
CHEMICAL NAME ....:
CHEMICAL FAMILY ..: AMMONIUM LIGNOSULFONATE AND WOOD SUGAR
MANUFACTURER .....: BADGER PAPER MILLS, INC.
DIVISION .....:
PRODUCT CODES ....:
ADDRESS .....: 200 WEST FRONT STREET
CITY .....: PESHTIGO
STATE .....: WI
ZIP CODE .....: 54157
EMERGENCY PHONE ..: 715-582-4551
CHEMTREC PHONE ...:
OTHER CALLS .....:
MSDS PREPARED BY .:
EFFECTIVE DATE ...: 10/11/94
PRINT DATE .....:
PRODUCT USE .....:

********** ADDITIONAL INFORMATION **********
CHEMICAL NAME AND SYNONYMS: SPENT SULFITE LIQUOR

------SECTION 2 - COMPOSITION INFORMATION ON INGREDIENTS ------

********** ADDITIONAL INFORMATION **********
CHEMICAL NAME AND SYNONYMS: SPENT SULFITE LIQUOR

------SECTION 3 - HAZARDS IDENTIFICATION ------

EMERGENCY OVERVIEW:

RELEVANT ROUTE(S) OF EXPOSURE:

SIGNS AND SYMPTOMS OF ACUTE OVEREXPOSURE:

CHRONIC OVEREXPOSURE:

MEDICAL CONDITIONS GENREALLY AGGRAVATED BY EXPOSURE:

POTENTIAL HEALTH EFFECTS:
EYES:

SKIN:

INGESTION:

INHALATION:

CARCINOGENICITY: NTP:
IARC:
OSHA:
ACGIH:
OTHER:

------SECTION 4 - FIRST AID MEASURES ------

EYES:

SKIN:

INGESTION:

INHALATION:

ANTIDOTES:

NOTES TO PHYSICIANS AND/OR PROTECTION FOR FIRST-AIDERS:

********** ADDITIONAL INFORMATION **********
FLUSH WITH LARGE AMOUNTS OF WATER.

------SECTION 5 - FIRE FIGHTING PROCEDURES ------

FLAMMABLE LIMITS IN AIR : UPPER LIMIT:
(% BY VOLUME) : LOWER LIMIT:

FLASH POINT : VALUE : VERY HIGH
: DEGREES C/F:
: METHOD USED:

AUTOIGNITION TEMPERATURE : TEMPERATURE:
: DEGREES C/F:

EXTINGUISHING MEDIA:
WATER

FIRE FIGHTING INSTRUCTIONS:
WATER - MATERIAL WILL NOT BURN UNLESS ATOMIZED AND BURNED AT HIGH TEMPERATURES.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
IF BURNING, MATERIAL WILL GIVE OFF SULFUR DIOXIDE (SO2) AND HYDROGEN SULFIDE (H2S).

EPAPA005001200

FLAMMABILITY CLASSIFICATION:

PROPAGATION OR BURNING RATE OF SOLID MATERIALS:

KNOWN OR ANTICIPATED HAZARDOUS PRODUCTS OF COMBUSTION:

PROPERTIES OF BOTH FLAMMABLE AND NONFLAMMABLE MATERIALS THAT MAY INITIATE OR UNIQULEY CONTRIBUTE TO THE INTENSITY OF A FIRE:

------SECTION 6 - ACCIDENTAL RELEASE MEASURES ------

ACCIDENTAL RELEASE MEASURES:
DILUTE WITH WATER

------SECTION 7 - HANDLING AND STORAGE ------

HANDLING AND STORAGE:
WHEN HOT AND STILL VISCOUS, THE MATERIAL CAN CAUSE BURNS WASH OFF IMMEDIATELY WITH WATER.

OTHER PRECAUTIONS:

------SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION ------

ENGINEERING CONTROLS

ENGINEERING CONTROLS:

VENTILATION REQUIREMENTS:

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION:
SHOULD BE WORN

SKIN PROTECTION:
PROTECTIVE GLOVES NEEDED WHEN HOT

RESPIRATORY PROTECTION:
NONE - UNLESS BURNING, THEN SELF-CONTAINED RESPIRATORS NEEDED.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

EXPOSURE GUIDELINES:

WORK HYGIENIC PRACTICES:

------SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ------

APPEARANCE:
DARK SYRUPY LIQUID

ODOR:
BURNT SUGAR ODOR

PHYSICAL STATE :

PH VALUE :
PH CONCENTRATION :
VAPOR PRESSURE VALUE (MMHG) :
TEMPERATURE:
DEGREES C/F:
VAPOR DENSITY (AIR 1) :
BOILING POINT TEMPERATURE : 230
DEGREES C/F: F
MELTING POINT TEMPERATURE :
DEGREES C/F:

FREEZING POINT TEMPERATURE :
DEGREES C/F:

SOLUBILITY IN WATER:
COMPLETE

REACTIVITY IN WATER:

SPECIFIC GRAVITY : 1.249
DENSITY (WATER=1)
PARTICLE SIZE :
VOLATILE ORGANIC COMPOUNDS :
(VOC) CONTENT
SOFTENING POINT :
EVAPORATION RATE BASIS (=1) :
RATE:
BULK DENSITY :
HEAT VALUE :
PERCENT VOLATILE : 19.4 (WATER)
OCTANOL/WATER PARTITION :
COEFFICIENT
SATURATED VAPOR :
CONCENTRATION
MOLECULAR WEIGHT :
MOLECULAR/CHEMICAL FORMULA :
WEIGHT PER GALLON :
VISCOCITY :

------SECTION 10 - STABILITY AND REACTIVITY ------

STABILITY:
STABLE

CONDITIONS TO AVOID (STABILITY):

INCOMPATIBILITY WITH OTHER MATERIALS:

HAZARDOUS DECOMPOSITION PRODUCTS:

HAZARDOUS POLYMERIZATION:
WILL NOT OCCUR

CONDITIONS TO AVOID (POLYMERIZATION):

------SECTION 11 - TOXICOLOGICAL INFORMATION ------

COMPONENT :
LD50 VALUE:
UNIT:
ANIMAL:
ROUTES:
LC50 VALUE:
UNIT:
ANIMAL:
ROUTES:

TOXICOLOGICAL INFORMATION:

------SECTION 12 - ECOLOGICAL INFORMATION ------

ECOLOGICAL INFORMATION:

------SECTION 13 - DISPOSAL CONSIDERATIONS ------

DISPOSAL CONSIDERATIONS:
DILUTE WITH WATER AND CAN BE SENT TO SANITARY TREATMENT PLANT.

------SECTION 14 - TRANSPORT INFORMATION ------

U.S. DOT

PROPER SHIPPING NAME :
HAZARD CLASS :
ID NUMBER :

PACKING GROUP :
LABELS :

AIR - ICAO OR IATA

PROPER SHIPPING NAME :
HAZARD CLASS :
ID NUMBER :
PACKING GROUP :
LABELS :

WATER - IMDG

PROPER SHIPPING NAME :
HAZARD CLASS :
ID NUMBER :
PACKING GROUP :
LABELS :

OTHER

REPORTABLE QUANTITY :
ADDITIONAL INFO :

------SECTION 15 - REGULATORY INFORMATION ------

U.S. FEDERAL REGULATIONS:

STATE REGULATIONS:

INTERNATIONAL REGULATIONS:

SARA HAZARDS: ACUTE:
CHRONIC:
REACTIVE:
FIRE:
PRESSURE:

------SECTION 16 - OTHER INFORMATION ------

NFPA CODES: HEALTH:
FLAMMABILITY:
REACTIVITY:
OTHER:

HMIS CODES: HEALTH:
FLAMMABILITY:
REACTIVITY:
PROTECTION:

LABEL STATEMENTS:

OTHER INFORMATION:

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The information on this MSDS has been obtained by GATX Rail from shippers or other sources. The description of the product you are handling may differ from that on the MSDS.

This document is not current as of 06/15/2007.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **LIME**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: LIME
Synonyms: None
Chemical Family: Inorganic
Application: pH Control

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Calcium hydroxide	1305-62-0	60 - 100%	5 mg/m^3	15 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye and skin burns. May cause respiratory irritation. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin
Wash with soap and water. Get medical attention if irritation persists. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician
Not Applicable

5. FIRE FIGHTING MEASURES

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not Determined
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store away from acids. Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White
Odor:	Odorless
pH:	12.2
Specific Gravity @ 20 C (Water=1):	2.24
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	75
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined

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9. PHYSICAL AND CHEMICAL PROPERTIES

Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	0.2
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.1

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong acids.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	Causes severe skin irritation. May cause skin burns on prolonged contact.
Eye Contact	Causes severe eye irritation May cause eye burns.
Ingestion	Irritation of the mouth, throat, and stomach.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 7340 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

EPAPA005001207

Genotoxicity: Not determined

Reproductive / Developmental Toxicity: Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air) Not determined

Persistence/Degradability Not determined

Bio-accumulation Not Determined

Ecotoxicological Information

Acute Fish Toxicity: TLM96: 100-500 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity: TLM96: 478,520 ppm (Mysidopsis bahia) SPP @ 8 ppb
Acute Algae Toxicity: Not determined

Chemical Fate Information Not determined

Other Information Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method Bury in a licensed landfill according to federal, state, and local regulations.

Contaminated Packaging Empty container completely. Transport with all closures in place. Return for reuse or dispose in a sanitary landfill according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

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15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001209

Material Safety Data Sheet

Catalog Number: 102187
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 102187

Product name: LINOLEIC ACID

Synonyms: 9,12-Octadecadienoic Acid; Leinoleic Acid; 9,12-Linoleic Acid
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
LINOLEIC ACID	60-33-3	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

EPAPA005001210

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards: Burning produces irritant fumes.
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: Not determined
Autoignition temperature: Not determined
NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment.
Environmental precautions: Prevent product from entering drains.
Methods for cleaning up: Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:
0°C

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor Colorless oil
Physical state: Liquid
Formula: C18-H32-O2
Molecular weight: 280.44
Melting point/range: -5 °C (23 °F); -12 °C (10 °F)
Boiling point/range: 229-230 °C (444-446 °F)
Density: 0.9022 (water = 1)

EPAPA005001211

Vapor pressure:	Very low at 25 °C 16 mm Hg (2.13 kPa) at 229 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Insoluble
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
LINOLEIC ACID	RF9990000	Oral LD50 Mouse : >50 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
LINOLEIC ACID	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
LINOLEIC ACID	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
LINOLEIC ACID	Not Listed	Not Listed	Not Listed

EPAPA005001212

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
LINOLEIC ACID	Not Listed	indicator 4; Fully and ICCA sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
LINOLEIC ACID	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
LINOLEIC ACID	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
LINOLEIC ACID	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components
LINOLEIC ACID

Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present

EPAPA005001213

Inventory - China:	Present
EU EINECS List -	200-470-9; C18H32O2
Inventory - Japan:	2-609
Korean KECL:	KE-26285
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
LINOLEIC ACID	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
LINOLEIC ACID	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
LINOLEIC ACID	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

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End of Safety Data Sheet

EPAPA005001214

Material Safety Data Sheet

Catalog Number: 102188
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 102188

Product name: LINOLENIC ACID

Synonyms: 9,12,15-Octadecatrienoic Acid
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
LINOLENIC ACID	463-40-1	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause irritation to the eyes, skin and respiratory system.

Category of Danger:
Irritant

Principle routes of exposure: Skin
Inhalation: Irritating to respiratory system
Ingestion: Irritating to mouth, throat and stomach
Skin contact: Irritating to skin.
Eye contact: Contact with eyes may cause irritation

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard May Cause Eye, Skin and Respiratory Tract irritation.
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid breathing vapors. Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

EPAPA005001215

Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
0°C

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep container tightly closed in a dry and well-ventilated place. Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing
Eye protection: Goggles
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

EPAPA005001216

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless
Physical state:	Liquid
Formula:	C18-H30-O2
Molecular weight:	278.44
Melting point/range:	-11.3 °C (11.7 °F)
Boiling point/range:	230-232 °C (446-449.6 °F) at 1 mmHg
Density:	0.916 at 20 °C (water = 1)
Vapor pressure:	Very low 0.05 mm Hg (7 Pa) at 125 °C (257 °F)
Evaporation rate:	Practically zero
Vapor density:	No data available
Solubility (in water):	Insoluble
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
LINOLENIC ACID	Not Available	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	A primary irritant.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
LINOLENIC ACID	Not Listed	Not Listed	Not Listed

EPAPA005001217

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
LINOLENIC ACID	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
LINOLENIC ACID	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
LINOLENIC ACID	Not Listed	Not Listed	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
LINOLENIC ACID	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
LINOLENIC ACID	Not Listed

TDG (Canada):

WHMIS hazard class: D2b toxic materials

:

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
LINOLENIC ACID	Not Listed	Not Listed

IMO-labels:

EPAPA005001218

15. REGULATORY INFORMATION

International Inventories

Components	
LINOLENIC ACID	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	207-334-8; C18H30O2
Korean KECL:	KE-26427
Philippines PICCS:	Present

U.S. regulations:

Components	**California Proposition 65 -**	**Massachusetts Right to Know List:**	**New Jersey Right to Know List:**	**Pennsylvania Right to Know List:**
LINOLENIC ACID	Not Listed	Not Listed	Not Listed	Not Listed

Components	**Florida substance List:**	**Rhode Island Right to Know List:**	**Illinois - Toxic Air Contaminants**	**Connecticut - Hazardous Air Pollutants**
LINOLENIC ACID	Not Listed	Not Listed	Not Listed	Not Listed

Components	**SARA 313 Emission reporting/Toxic Release of Chemicals**	**CERCLA/SARA - Section 302 Extremely Haz**	**NTP:**	**IARC:**
LINOLENIC ACID	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001219

Material Safety Data Sheet

Latex Liquid

ACC# 89840

Section 1 - Chemical Product and Company Identification

MSDS Name: Latex Liquid
Catalog Numbers: S76777, S81112
Synonyms:
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
Not available	Natural Rubber Solids	62.0	unlisted
7732-18-5	Water	37.8	231-791-2
1336-21-6	Ammonium hydroxide	<1.0	215-647-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white liquid.
Caution! May cause eye and skin irritation. May cause respiratory and digestive tract irritation.
Target Organs: None known.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause irritation of the digestive tract.
Inhalation: May cause respiratory tract irritation.
Chronic: Prolonged or repeated skin contact may cause dermatitis.

Section 4 - First Aid Measures

es: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: *Substance is noncombustible; use agent most appropriate to extinguish* surrounding fire.
Flash Point: Not available.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: Not published.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs

Natural Rubber Solids	none listed	none listed	none listed
Water	none listed	none listed	none listed
ammonium hydroxide	none listed	none listed	none listed

OSHA Vacated PELs: Natural Rubber Solids: No OSHA Vacated PELs are listed for this chemical. Water: No OSHA Vacated PELs are listed for this chemical. Ammonium hydroxide: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: 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: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: white

Odor: ammonia-like

pH: Not available.

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: Not available.

Freezing/Melting Point: Not available.

Decomposition Temperature: Not available.

Solubility: Partially soluble.

Specific Gravity/Density: Not available.

Molecular Formula: Not available.

Molecular Weight: Not available.

Section 10 - Stability and Reactivity

Chemical Stability: Stable.

Conditions to Avoid: Incompatible materials.

Incompatibilities with Other Materials: Acids (mineral, non-oxidizing, e.g. hydrochloric acid, hydrofluoric acid, muriatic acid, phosphoric acid), acids (mineral, oxidizing, e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), acids (organic, e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), aldehydes (e.g. acetaldehyde, acrolein, chloral hydrate, formaldehyde), carbamates (e.g. carbanolate, carbofuran), esters (e.g. butyl acetate, ethyl acetate, propyl formate), halogenated organics (e.g. dibromoethane, hexachlorobenzene, methyl chloride, trichloroethylene), isocyanates (e.g. methyl isocyanate), ketones (e.g. acetone, acetophenone, MEK, MIBK), metals (alkali and alkaline, e.g. cesium, potassium, sodium), metals as powders (e.g. hafnium, raney nickel), metals and metal compounds (toxic, e.g. beryllium, lead acetate, nickel carbonyl, tetraethyl lead), nitrides (e.g. potassium nitride, sodium nitride),

nitriles (e.g. acetonitrile, methyl cyanide), nitro compounds (organic, e.g. nitrobenzene, nitroglycerine, picric acid, trinitrotoluene), organophosphates, phosphothioates (e.g. methylparathion, parathion, phorate, thionazin), epoxides (e.g. butyl glycidyl ether), explosives (e.g. ammonium nitrate, hydrazoic acid, sodium azide), polymerizable compounds (e.g. butadiene, methyl acrylate, styrene, vinyl chloride), water reactive substances (e.g. acetic anyhdride, alkyl aluminum chloride, calcium carbide, ethyl dichlorosilane).
Hazardous Decomposition Products: Nitrogen oxides (NOx) and ammonia (NH3).
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7732-18-5: ZC0110000
CAS# 1336-21-6: BQ9625000
LD50/LC50:
CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;

CAS# 1336-21-6:
Draize test, rabbit, eye: 250 ug Severe;
Draize test, rabbit, eye: 44 ug Severe;
Oral, rat: LD50 = 350 mg/kg;

Carcinogenicity:
CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 1336-21-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA

Natural Rubber Solids is not listed on the TSCA inventory. It is for research and development use only.

CAS# 7732-18-5 is listed on the TSCA inventory.

CAS# 1336-21-6 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

emical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 1336-21-6: 1000 lb final RQ; 454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 1336-21-6: immediate, delayed.

Section 313 No chemicals are 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:

CAS# 1336-21-6 is listed as a 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:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

CAS# 1336-21-6 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 7732-18-5: No information available.
CAS# 1336-21-6: 2

Canada - DSL/NDSL

CAS# 7732-18-5 is listed on Canada's DSL List.
CAS# 1336-21-6 is listed on Canada's DSL List.

Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 1336-21-6 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 2/10/1998
Revision #3 Date: 10/03/2005

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEETS (MSDS) On-Line
OSHA-Required Health And Safety Information!

Section 1

MATERIAL SAFETY DATA SHEET # 47

Hercules Lube Oil

Date Prepared: 18-Jun-86 Last Reviewed: 24-Mar-94

Meets OSHA 29 CFR 1910.1200

Hercules Chemical Co, Inc.
111 South Street
Passaic, NJ 07055-7398
Tel (800) 221-9330
Fax (800) 333-3456
E-Mail info@herchem.com

Section 2 - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Comman Name(s), CAS Numbers)	OSHA PEL	ACGIH TLV	Other Limits	% Upper Bound Limits if SARA Reportable
This product is not considered hazardous under OSHA 29 CFR1910.1200				

HMIS Hazard Rating: Health: 0 Flammability: 1 Reactivity: 0 Personal Protection: A

Section 3 - Physical/Chemical Characteristics

Boiling Point (°F):	Specific Gravity (H^20=1):	Vapor Density (Air=1):	Vapor Pressure (mm Hg):
N/D	0.88	N/D	N/D

Melting Point (°F):	Evaporation Rate:	Solubility in Water:
N/D		Not soluble

Appearance And Color: Light amber liquid **Odor:** Mild petroleum

Section 4 - Fire And Explosion Hazard Data

Flash Point:	Flammable Limits:	LEL:	UEL:
(COC) 410	N/D		

Extinguishing Media: Water spray, dry chemical, foam or carbon dioxide.

Special Firefighting Procedures:
Use water spray to cool fire-exposed containers. If spill or leak had not ignited, use water spray to disperse the vapors and to provide protection for persons attempting to stop the leak.

Unusual Fire And Explosion Hazards:

EPAPA005001226

None

Section 5 - Reactivity Data

Stability: Stable

Conditions To Avoid: None

Incompatability (Materials To Avoid): Strong oxidizing agents.

Hazardous Decomposition: Carbon monoxide, carbon dioxide, aldehydes & ketones, combustible products of nitrogen and sulfur.

Hazardous Polymerizatrion: Will Not Occur

Section 6 - Health Hazard Data

Routes of Entry: **Inhalation?** YES/secondary **Skin?** YES/primary **Ingestion?** YES/secondary

Health Hazards:
None

Carcinogenicity: **NTP?** NO **IARC?** NO **OSHA Regulated?** NO

Signs And Symptoms of Exposure:
None expected other than possible minimal irritant.

Medical Conditions Generally Aggravated By Exposure:
No appreciable effect.

Emergency And First Aid Procedures:
EYE CONTACT: As with most foreign materials, should eye contact occur, flush eyes with plenty of water. SKIN CONTACT: Wash with soap and water.

Section 7 - Precautions For Safe Handling And Use:

Steps To Be Taken In Case Material Is Released Or Spilled:
Contain spill. Wipe up or absorb on suitable material or shovel up.

Waste Disposal Method:
Product does not have RCRA characteristics or meet the criteria of hazardous waste if discarded in its purchased form.

Precautions To Be Taken In Handling And Storing:
Minimum feasible handling temperatures should be maintained.

Other Precautions:
Periods of exposure to high temperatures should be minimized.

Section 8 - Control Measures:

Respiratory Protection: For normal use, none required. If sprayed as a mist, use fume-mist respirator.

Ventilation: **Local Exhaust?** Acceptable **Special?** N/A
Mechanical: N/A **Other:** N/A

Gloves: None required

Eye Protection: Goggles

Other Protective Clothing: None required

Work/Hygienic Practices: Wash thoroughly after handling.

EPAPA005001227

Additional Information:

DOT B/L Description: Lubricating Oil NOI

DOT Hazard Class Information: N/A

NJ Right-To-Know Labeling Information:
Label must state all ingredients in Section 2 plus Trade Secret Registration Numbers (TSR's) 313-48300-
5005P, 5028P

| Home Page |

| MSDS | Wholesaler Info | Contractor Info | Homeowner & Industrial Info |

Hercules Chemical Co, Inc.
111 South Street
Passaic, NJ 07055-7398
Tel 1-800-221-9330
Fax 1-201-777-4115
E-Mail info@herchem.com

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EPAPA005001228

Redox Logo with tag line

MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION

Product Name : LUBE OIL ADDITIVE

Other Names :

Uses : No information available.

Organisation	Location	Telephone	Ask For
Redox Pty Ltd	2 Swettenham Road Minto NSW 2566 Australia	02-97333000	Technical Officer
Poisons Information Centre	Westmead NSW	131126 1800-251525	

2. HAZARD IDENTIFICATION

NOT Hazardous according to criteria of NOHSC

Risk Phrases

Safety Phrases

ERMA New Zealand Approval Code : No Data

HSNO Hazard Classification : No Data

This Material Safety Data Sheet may not provide exhaustive guidance for all HSNO Controls assigned to this substance. The ERMA website www.ermanz.govt.nz should be consulted for a full list of triggered controls and cited regulations

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Entity	CAS No.	Proportions (%)
LUBE OIL		100

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed

DO NOT INDUCE VOMITING. If conscious give 2 glasses of water Get immediate medical attention.

Eye

Flush with water at least 15 minutes. Get medical attention if eye irritation develops or persists.

Skin

Wash with soap and water. Get medical attetion if irritation develops. Launder contaminated clothing before reuse.

Inhaled

Remove exposed person to fresh air if adverse are observed.

Advice to Doctor

EPAPA005001229

Treat sym[illegible]atically.

Additional Information

Aggravated medical conditions caused by exposure

No information available.

5. FIRE FIGHTING MEASURES

Extinguishing Media

Firefighters should wear full protective gear including self-contained breathing apparatus. Use carbon dioxide, dry chemical or foam type extinguishers. Water can be use to cool and protect exposed materia.

Hazards from Combustion Products

Combustible liquid. Avoid contact with reative chemicals. Thermal decomposition include smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion.

Special protective precautions and equipment for fire fighters

No Data Available

Flammability Conditions

Combustible liquid.

Additional Information

Hazchem Code : N/A

6. ACCIDENTAL RELEASE MEASURES

Emergency procedures

Methods and materials for containment and clean up

pick up free liquid for recycle and/or disposal. Residual liquid can be absorbed on inert material.

7. HANDLING AND STORAGE

Precautions for safe handling

Ensure an eye bath and safety shower is readily available.

Conditions for safe storage, including any incompatibles

Keep containers closed when not in use. Wash thoroughly after handling empty container contains product residue which may exhibit hazards of product. Avoid contact with reactive chemicals.

Container Type
No Data Available

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National Exposure Standards

None established.

Biological Limit Values

No Data Available

Engineering Controls

Use with adequate ventilation.

Personal Protection

EPAPA005001230

Skin pro[illegible] - use nitrile or neoprene gloves. Long sleeve shirt is recommended. Eye protection - [illegible]y glasses. Respiratory protection - under normal use conditions, respirator is not usu[illegible]red.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Dark brown liquid, mild odor.
Formula	Not available.
Odour	No Data Available
Vapour Pressure	Not Applicable
Vapour Density	No data
Boiling Point	Not available. deg C
Melting Point	Not available. deg C
Solubility in water	Insoluble
Specific Gravity	0.86 @ 15.6 Deg C (Water = 1)
Flash Point	Test Unknown > 102
pH	Not available. ( )
Flammability Limits (as percentage volume in air)	
Lower Explosion Limit	Not available.
Upper Explosion Limit	Not available.
Ignition Temperature	No Data
Specific Heat Value	No Data
Particle Size	No Data
Volatile Organic Compounds (VOC) content	No Data
Evaporation Rate	No Data
Viscosity	No Data
Percent Volatile	No Data
Octanol/Water partition coefficient	No Data
Saturated Vapour Concentration	No Data
Additional Characteristics	No Data
Flame Propagation/Burning Rate of Solid Materials	No Data
Properties of materials that may initiate or contribute to fire intensity	No Data
Potential for Dust Explosion	No Data
Reactions that Release Flammable Gases	No Data
Fast or Intensely Burning Characteristics	No Data
Non-flammables that could contribute unusual hazards to a fire	No Data
Release of invisible flammable vapours and gases	No Data
Decomposition Temperature	No Data

Additional Information

10. STABILITY AND REACTIVITY

Chemical Stability : No Data

Conditions to avoid : No Data

Incompatible Materials : No Data

Hazardous Decomposition Products : No Data

Hazardous Reactions : No Data

11. TOXICOLOGICAL INFORMATION

Toxicity Data

Oral LD50 = >5000 mg/kg (rats) Not expected to cause eye irritation. Based on data from components or similar material. Not expected to be primary skin irritator. Based on data from components or similar materials. Dermal LD50 = >2000 mg/kg (rabbits) Not data available to indicate product of components may be a toxic inhalation hazard. Not data available to indicate product of components may cause respiratory irritation under normal workplace conditions and good industrial hygiene practice. Not data available to indicate product of components may be a skin sensitizer Not data available to indicate product of components may be a respiratory sensitizer.

Health Effects - Acute

Swallowed

EPAPA005001231

No adv[illegible].th effects.

Eye

No adverse health effect.

Skin

No adverse health effects.

Inhaled

No adverse health effects.

12. ECOLOGICAL INFORMATION

Ecotoxicity : No Data

Persistence and degradability : No Data

Mobility : No Data

Additional information

Environmental fate (exposure) : No Data

Bioaccumulative potential : No Data

13. DISPOSAL CONSIDERATIONS

Disposal

Dispose in a accordance with local, state and federal regulation.

Special Precautions for land fill or incineration

No Data Available

14. TRANSPORT INFORMATION

UN No.	Not Allocated
Shipping Name	LUBE OIL ADDITIVE
Dangerous Goods Class	
Subsidiary Risk	C.1
Pack Group	
Precaustion for User	None Allocated
Hazchem Code	None Allocated
	No Data
	N/A

15. REGULATORY INFORMATION

Poisons Schedule N/A

EPAPA005001232

EPG	
AICS Name	No Data
NZ Toxic Substance	N
Additional information	No Data

16. OTHER INFORMATION

Revision Date : Apr 2003

Additional information

Legend to abbreviations and acronyms:

<	less than
>	greater than
AICS	Australian Inventory of Chemical Substances
CAS	Chemical Abstracts Service (Registry Number)
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
ERMA	Environmental Risk Management Authority
HSNO	Hazardous Substance and New Organism
IDLH	Immediately Dangerous to Life and Health
LC50	LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.
LD50	LD stands for "Lethal Dose". LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals
Misc	miscible
N/A	Not Applicable
NIOSH	National Institute for Occupational Safety and Health
NOHSC	National Occupational Health and Safety Commission
OECD	Organization for Economic Co-operation and Development
PEL	Permissible Exposure Limit
RCP	Reciprocal Calculation Procedure
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
UN	United Nations (number)
cm2	square centimetres
deg C ('C)	degrees Celsius
g	gram
g/cm3	grams per cubic centimetre
g/l	grams per litre
immiscible	liquids are insoluble in each other
kg	kilogram
kg/m3	kilograms per cubic metre
ltr	Litre
m3	cubic metre
mbar	millibar
mg	milligram
mg/24H	milligrams per 24 hours
mg/kg	milligrams per kilogram
mg/m3	milligrams per cubic metre
miscible	liquids form one homogeneous liquid phase regardless of the amount of either component present
mm	millimetre
ppb	parts per billion
ppm	parts per million
ppm/2h	parts per million per 2 hours
ppm/6h	parts per millionper 6 hours
tne	tonne
ug/24H	micrograms per 24 hours
wt	weight

EPAPA005001233

Literature references:

No Data

Sources for data:

No Data

QEC Logo | Respons Care Logo

Australia **New Zealand** **Sydney Office** Adelaide Auckland 2 Swettenham Road telephone: +61 (0)2 97333000 Brisbane Christchurch Mintofacsimile: NSW +61 (0)2 2566 97333111 Melbourne Hawkes Bay Australia www.redox.com Perth sydney@redox.com Sydney

This MSDS summarises Redox Pty Ltd best knowledge of the health and safety hazard information of the selected substance and how to safely handle the selected substance in the workplace however Redox Pty Ltd expressly disclaims that the MSDS is a representation or guarantee of the chemcial specifications for the substance. Each user should read the MSDS and consider the information in the context of how the selected substance will be handled and used in the workplace including its use in conjunction with other substances.

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EPAPA005001234

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 02/03/2006

1 Identification of substance:

Product details:

Product name: Magnesium chloride

Stock number:
A14608
L10668

Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department
Emergency information:
During normal hours the Health, Safety and Environmental Department.
After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:
Description: (CAS#)
Magnesium chloride, anhydrous (CAS# 7786-30-3): 100%
Identification number(s):
EINECS Number: 232-094-6

3 Hazards identification

Hazard description:

Xn Harmful

Information pertaining to particular dangers for man and environment
R 68 Possible risk of irreversible effects.
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH	1
FIRE	0
REACTIVITY	1

Health (acute effects) = 1
Flammability = 0
Reactivity = 1

4 First aid measures

After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

(Contd. on page 2)

EPAPA005001236

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 02/03/2006

Product name: Magnesium chloride

(Contd. of page 1)

After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.
After swallowing Seek immediate medical advice.

5 Fire fighting measures

Suitable extinguishing agents
Product is not flammable. Use fire fighting measures that suit the surrounding fire.
Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Metal oxide fume
Hydrogen chloride (HCl)
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Person-related safety precautions:
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Measures for environmental protection:
Do not allow material to be released to the environment without proper governmental permits.
Measures for cleaning/collecting:
Dispose contaminated material as waste according to item 13.
Additional information:
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
Information for safe handling:
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Information about protection against explosions and fires:
The product is not flammable

Storage
Requirements to be met by storerooms and receptacles:
No special requirements.
Information about storage in one common storage facility:
Store away from oxidizing agents.
Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

(Contd. on page 3)

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Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 02/03/2006

Product name: Magnesium chloride

(Contd. of page 2)

8 Exposure controls and personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:
Not required.
Additional information: No data

Personal protective equipment
General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Breathing equipment:
Use suitable respirator when high concentrations are present.
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
Material of gloves
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties:

General Information	
Form:	Powder
Color:	White
Odor:	Not determined
Change in condition	
Melting point/Melting range:	713-714°C (1315-1317°F)
Boiling point/Boiling range:	1412°C (2574°F)
Sublimation temperature / start:	Not determined
Flash point:	Not applicable
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
Vapor pressure:	Not determined
Density at 20°C (68°F):	2.323 g/cm³

(Contd. on page 4)

EPAPA005001238

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 02/03/2006

Product name: Magnesium chloride

(Contd. of page 3)

10 Stability and reactivity

Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.
Materials to be avoided: Oxidizing agents
Dangerous reactions No dangerous reactions known
Dangerous products of decomposition:
Metal oxide fume
Hydrogen chloride (HCl)

11 Toxicological information

Acute toxicity:

LD/LC50 values that are relevant for classification:		
Oral	LD50	4700 mg/kg (mus) 2800 mg/kg (rat)

Primary irritant effect:
on the skin: Irritant to skin and mucous membranes.
on the eye: Irritating effect.
Sensitization: No sensitizing effects known.
Other information (about experimental toxicology):
Mutagenic effects have been observed on tests with bacteria.
Mutagenic effects have been observed with human fibroblast.
Mutagenic effects have been observed with human HeLa cells.
Mutagenic effects have been observed on tests with laboratory animals.
Subacute to chronic toxicity:
Inhalation of magnesium compounds may cause metal fume fever. Metallic magnesium which perforates the skin may cause local lesions. Some magnesium salts have produced muscle weakness, cardiac arrhythmias, respiratory effects and changes in blood chemistry following ingestion.
Subacute to chronic toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:
Behavioral - convulsions or effect on seizure threshold.
Behavioral - somnolence (general depressed activity).
Behavioral - analgesia.
Liver - changes in liver weight.
Cardiac - other changes.
Cardiac - arrhythmias (including changes in conduction).
Lungs, Thorax, or Respiration - other changes.
Lungs, Thorax, or Respiration - respiratory depression
Endocrine - hypoglycemia.
Endocrine - changes in spleen weight.
Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol).
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

USA

(Contd. on page 5)

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 02/03/2006

Product name: Magnesium chloride

(Contd. of page 4)

12 Ecological information:

General notes:
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations

Product:
Recommendation
Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

Not a hazardous material for transportation.

DOT regulations:
Hazard class: None

Land transport ADR/RID (cross-border)
ADR/RID class: None

Maritime transport IMDG:
IMDG Class: None

Air transport ICAO-TI and IATA-DGR:
ICAO/IATA Class: None

Transport/Additional information:
Not dangerous according to the above specifications.

15 Regulations

Product related hazard informations:

Hazard symbols:
Xn Harmful

Risk phrases:
68 Possible risk of irreversible effects.

Safety phrases:
36/37 Wear suitable protective clothing and gloves.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use:
For use only by technically qualified individuals.

(Contd. on page 6)

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 *Reviewed on 02/03/2006*

Product name: Magnesium chloride

(Contd. of page 5)

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: *Health, Safety and Environmental Department.*
Contact: *Darrell R. Sanders*

USA

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 08/01/2006

1 Identification of substance:

Product details:

Product name: Magnesium sulfate

Stock number: L13739

Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department
Emergency information:
During normal hours the Health, Safety and Environmental Department.
After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:
Description: (CAS#)
Magnesium sulfate, hydrate (CAS# 22189-08-8): 100%
Identification number(s):
EINECS Number: 231-298-2

3 Hazards identification

Hazard description: Not applicable
Information pertaining to particular dangers for man and environment
Not applicable
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

HEALTH	1
FIRE	0
REACTIVITY	0

Health (acute effects) = 1
Flammability = 0
Reactivity = 0

4 First aid measures

After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.
After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.
After swallowing Seek medical treatment.

(Contd. on page 2)

EPAPA005001242

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 08/01/2006

Product name: Magnesium sulfate

(Contd. of page 1)

5 Fire fighting measures

Suitable extinguishing agents
Product is not flammable. Use fire fighting measures that suit the surrounding fire.
Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Sulfur oxides (SOx)
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Person-related safety precautions:
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Measures for environmental protection:
Do not allow material to be released to the environment without proper governmental permits.
Measures for cleaning/collecting: Pick up mechanically.
Additional information:
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
Information for safe handling:
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
No special precautions are necessary if used correctly.
Information about protection against explosions and fires:
The product is not flammable

Storage
Requirements to be met by storerooms and receptacles:
No special requirements.
Information about storage in one common storage facility:
Store away from oxidizing agents.
Store away from water/moisture.
Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:
Not required.
Additional information: No data

(Contd. on page 3)

EPAPA005001243

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 08/01/2006

Product name: Magnesium sulfate

(Contd. of page 2)

Personal protective equipment
General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Breathing equipment:
Use suitable respirator when high concentrations are present.
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
Material of gloves
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties:

General Information	
Form:	Powder
Color:	White
Odor:	Odorless
Change in condition	
Melting point/Melting range:	Not determined
Boiling point/Boiling range:	Not determined
Sublimation temperature / start:	Not determined
Flash point:	Not applicable
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
Vapor pressure:	Not determined
Density:	Not determined
Solubility in / Miscibility with	
Water at 20°C (68°F):	710 g/l

10 Stability and reactivity

Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.
Materials to be avoided:
Oxidizing agents
Water/moisture
Dangerous reactions No dangerous reactions known

(Contd. on page 4)

EPAPA005001244

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 08/01/2006

Product name: Magnesium sulfate

(Contd. of page 3)

Dangerous products of decomposition: Sulfur oxides (SOx)

11 Toxicological information

Acute toxicity:
Primary irritant effect:
on the skin: May cause irritation
on the eye: May cause irritation
Sensitization: No sensitizing effects known.
Subacute to chronic toxicity:
Inhalation of magnesium compounds may cause metal fume fever. Metallic magnesium which perforates the skin may cause local lesions. Some magnesium salts have produced muscle weakness, cardiac arrhythmias, respiratory effects and changes in blood chemistry following ingestion.
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:

General notes:
Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations

Product:
Recommendation
Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

Not a hazardous material for transportation.

DOT regulations:
Hazard class: None

Land transport ADR/RID (cross-border)
ADR/RID class: None

Maritime transport IMDG:
IMDG Class: None

Air transport ICAO-TI and IATA-DGR:
ICAO/IATA Class: None

Transport/Additional information:
Not dangerous according to the above specifications.

USA

(Contd. on page 5)

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 12/05/2006 Reviewed on 08/01/2006

Product name: Magnesium sulfate

(Contd. of page 4)

15 Regulations

Product related hazard informations:
Observe the general safety regulations when handling chemicals

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

Information about limitation of use:
For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.
Contact: Darrell R. Sanders

USA

Material Safety Data Sheet

Methyl acetate

ACC# 14240

Section 1 - Chemical Product and Company Identification

MSDS Name: Methyl acetate
Catalog Numbers: AC181380000, AC181380010, AC181380025, AC371830000, AC371830010, AC371830025, AC371831000, M203-4, M203-500
Synonyms: Acetic acid, methyl ester; Methyl ethanoate.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
79-20-9	Methyl acetate	>99	201-185-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: colorless liquid. Flash Point: -10 deg C.
Danger! Extremely flammable liquid and vapor. Vapor may cause flash fire. Causes eye irritation. Breathing vapors may cause drowsiness and dizziness. Repeated exposure may cause skin dryness or cracking.
Target Organs: Central nervous system, eyes, skin.

Potential Health Effects
Eye: Causes eye irritation.
Skin: Repeated or prolonged exposure may cause drying and cracking of the skin. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.
Ingestion: May cause irritation of the digestive tract. Exposure may cause optic nerve degeneration and possible
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory

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tract irritation. May cause narcotic effects in high concentration. Exposure may produce optic nerve damage and possible blindness. Overexposure may lead to convulsions, shortness of breath, and stupor.
Chronic: Chronic inhalation may cause effects similar to those of acute inhalation.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid if irritation develops or persists. Flush skin with plenty of soap and water.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire. Extremely flammable liquid and vapor. Vapor may cause flash fire. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use foam, dry chemical, or carbon dioxide. Water may be ineffective.
Flash Point: -10 deg C (14.00 deg F)
Autoignition Temperature: 454 deg C (849.20 deg F)
Explosion Limits, Lower:3.1 vol %
Upper: 16.0 vol %
NFPA Rating: (estimated) Health: 2; Flammability: 3; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind,

or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor or mist.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Methyl acetate	200 ppm TWA; 250 ppm STEL	200 ppm TWA; 610 mg/m3 TWA 3100 ppm IDLH	200 ppm TWA; 610 mg/m3 TWA

OSHA Vacated PELs: Methyl acetate: 200 ppm TWA; 610 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: colorless
Odor: Pleasant odor
pH: Not available.
Vapor Pressure: 220 mbar @ 20 deg C
Vapor Density: 2.8 (air=1)
Evaporation Rate:11.8 (butyl acetate=1)
Viscosity: 0.38 mPas 20 deg C
Boiling Point: 57.4 deg C @ 760 mmHg
Freezing/Melting Point:-98 deg C
Decomposition Temperature: Not available.
Solubility: 250 g/l (20°C)
Specific Gravity/Density:.9300 g/cm3
Molecular Formula:C3H6O2
Molecular Weight:74.08

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, confined spaces.
Incompatibilities with Other Materials: Strong oxidizing agents, strong acids, strong bases.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 79-20-9: AI9100000
LD50/LC50:
CAS# 79-20-9:
Dermal, guinea pig: LD50 = >20 mL/kg;
Draize test, rabbit, eye: 100 mg/24H Moderate;
Draize test, rabbit, skin: 500 mg/24H Mild;
Draize test, rabbit, skin: 20 mg/24H Moderate;
Oral, rabbit: LD50 = 3705 mg/kg;
Oral, rat: LD50 = >5 gm/kg;
Skin, rabbit: LD50 = >5 gm/kg;

Carcinogenicity:
CAS# 79-20-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: Mutation data has been reported.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	METHYL ACETATE	METHYL ACETATE
Hazard Class:	3	3
UN Number:	UN1231	UN1231
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 79-20-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
CAS# 79-20-9: 40 CFR 799.5115
Section 12b
CAS# 79-20-9: Section 4
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 79-20-9: immediate, fire.
Section 313 No chemicals are 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 Substances 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:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 79-20-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols:

XI F

Risk Phrases:

R 11 Highly flammable.
R 36 Irritating to eyes.
R 66 Repeated exposure may cause skin dryness or cracking.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.

WGK (Water Danger/Protection)

CAS# 79-20-9: 1

Canada - DSL/NDSL

CAS# 79-20-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 79-20-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997
Revision #8 Date: 7/28/2006

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582 2537) for assistance.

METHYL ALCOHOL

1. Product Identification

Synonyms: Wood alcohol; methanol; carbinol
CAS No.: 67-56-1
Molecular Weight: 32.04
Chemical Formula: CH3OH
Product Codes:
J.T. Baker: 5370, 5595, 5794, 5811, 5842, 5869, 9049, 9063, 9065, 9066, 9067, 9069, 9070, 9071, 9073, 9076, 9077, 9091, 9093, 9096, 9097, 9098, 9263, 9822, 9830, V654
Mallinckrodt: 3004, 3006, 3016, 3017, 3018, 3024, 3041, 3701, 4295, 5160, 8814, H080, H488, H603, H985, V079, V571

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Methyl Alcohol	67-56-1	100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! VAPOR HARMFUL. MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. CANNOT BE MADE NONPOISONOUS. FLAMMABLE LIQUID AND VAPOR. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM AND

LIVER.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
A slight irritant to the mucous membranes. Toxic effects exerted upon nervous system, particularly the optic nerve. Once absorbed into the body, it is very slowly eliminated. Symptoms of overexposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death. A person may get better but then worse again up to 30 hours later.
Ingestion:
Toxic. Symptoms parallel inhalation. Can intoxicate and cause blindness. Usual fatal dose: 100-125 milliliters.
Skin Contact:
Methyl alcohol is a defatting agent and may cause skin to become dry and cracked. Skin absorption can occur; symptoms may parallel inhalation exposure.
Eye Contact:
Irritant. Continued exposure may cause eye lesions.
Chronic Exposure:
Marked impairment of vision has been reported. Repeated or prolonged exposure may cause skin irritation.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired liver or kidney function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Flash point: 12C (54F) CC
Autoignition temperature: 464C (867F)
Flammable limits in air % by volume:
lel: 6.0; uel: 36
Flammable Liquid and Vapor!
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Moderate explosion hazard and dangerous fire hazard when exposed to heat, sparks or flames. Sensitive to static discharge.
Fire Extinguishing Media:
Use alcohol foam, dry chemical or carbon dioxide. (Water may be ineffective.)
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Use water spray to blanket fire, cool fire exposed containers, and to flush non-ignited spills or vapors away from fire. Vapors can flow along surfaces to distant ignition source and flash back.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require 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.

J. T. Baker SOLUSORB® solvent adsorbent is recommended for spills of this product.

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7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

Exposure Controls/Personal Protection

Airborne Exposure Limits:
For Methyl Alcohol:

- OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA)
- ACGIH Threshold Limit Value (TLV):
200 ppm (TWA), 250 ppm (STEL) skin

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties.

Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.

Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.

Odor:
Characteristic odor.

Solubility:
Miscible in water.

Specific Gravity:
0.8

pH:
No information found.

% Volatiles by volume @ 21C (70F):
100

Boiling Point:
64.5C (147F)

Melting Point:
-98C (-144F)

Vapor Density (Air=1):
1.1

Vapor Pressure (mm Hg):
97 @ 20C (68F)

Evaporation Rate (BuAc=1):
5.9

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
May form carbon dioxide, carbon monoxide, and formaldehyde when heated to decomposition.

Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents such as nitrates, perchlorates or sulfuric acid. Will attack some forms of plastics, rubber, and coatings. May react with metallic aluminum and generate hydrogen gas.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Methyl Alcohol (Methanol) Oral rat LD50: 5628 mg/kg; inhalation rat LC50: 64000 ppm/4H; skin rabbit LD50: 15800 mg/kg; Irritation data-standard Draize test: skin, rabbit: 20mg/24 hr. Moderate; eye, rabbit: 100 mg/24 hr. Moderate. Investigated as a mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Methyl Alcohol (67-56-1)	No	No	None

---

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into the water, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into the air, this material is expected to exist in the aerosol phase with a short half-life. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into air, this material is expected to have a half-life between 10 and 30 days. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition.
Environmental Toxicity:
This material is expected to be slightly toxic to aquatic life.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

---

1. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: METHANOL
Hazard Class: 3
UN/NA: UN1230
Packing Group: II
Information reported for product/size: 358LB

International (Water, I.M.O.)

Proper Shipping Name: METHANOL
Hazard Class: 3, 6.1
UN/NA: UN1230
Packing Group: II
Information reported for product/size: 358LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Methyl Alcohol (67-56-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Methyl Alcohol (67-56-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Methyl Alcohol (67-56-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Methyl Alcohol (67-56-1)	5000	U154	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

Australian Hazchem Code: 2PE
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **1** Flammability: **3** Reactivity: **0**
Label Hazard Warning:

POISON! DANGER! VAPOR HARMFUL. MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. CANNOT BE MADE NONPOISONOUS. FLAMMABLE LIQUID AND VAPOR. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM AND LIVER.

Label Precautions:

Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Keep container closed.
Use only with adequate ventilation.
Keep away from heat, sparks and flame.

Label First Aid:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

No Changes.

Disclaimer:

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****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

pharmco-AAPER
SUBSIDIARIES OF COMMERCIAL ALCOHOLS, INC.
The Power of Three®

An ISO 9001:2000 Certified Company

Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300 or 202-483-7616

MATERIAL SAFETY DATA SHEETS

Part Number/Trade Name: METHYL AMYL ALCOHOL
This MSDS is valid for all grades and catalog numbers

General Information

Company's Name: PHARMCO PRODUCTS, INC.
Company's Street: 58 VALE RD.
Company's City: BROOKFIELD
Company's State: CT
Company's Zip Code: 06804
Company's Emerg Ph #: (800) 424-9300 Chemtrec
Company's Info Ph #: (203) 740-3471
Date MSDS Revised: Nishant-8/23/99

Safety Data Review Date:
Preparer's Company: PHARMCO PRODUCTS, INC.
Preparer's St Or P. O. Box: 58 VALE RD.
Preparer's City: BROOKFIELD
Preparer's State: CT
Preparer's Zip Code: 06804

Ingredients/Identity Information

Ingredient: METHYL ISOBUTYL CARBINOL
Ingredient Sequence Number: 01
Percent: 100.0
NIOSH (RTECS) Number: SA7350000

CAS Number: 108-11-2
OSHA PEL: S,25 PPM/40 STEL
ACGIH TLV: S,25 PPM/40STEL;9192

Physical/Chemical Characteristics

Appearance And Odor: WATER-LIKE LIQUID;MILD,NON RESIDUAL ODOR;GREEN COLOR ADDED
Boiling Point: 269F/132C
Vapor Pressure (MM Hg/70 F): 3.7MMHG

Vapor Density (Air=1): 3.5
Specific Gravity: 0.8075
Evaporation Rate And Ref: 0.43 (BU AC=1)
Solubility In Water: SLIGHT
Percent Volatiles By Volume: 100

Fire and Explosion Hazard Data

Flash Point: 102F/38.9C
Flash Point Method: TCC
Lower Explosive Limit: 1.0
Upper Explosive Limit: 5.5
Extinguishing Media: FOAM,DRY CHEMICAL,CO*2
Special Fire Fighting Proc: USE NIOSH/MSHA APPROVED SCBA IN AN ENCLOSED AREA.
Unusual Fire And Expl Hazrds: VAPORS ARE HEAVIER THAN AIR AND MAY SETTLE IN LOW PLACES,OR TRAVEL ALONG THE GROUND A LONG DISTANCE TO AN IGNITION SOURCE AND FLASH BACK.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): EXTREME HEAT

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Materials To Avoid: STRONG ACIDS OR ALKALIES
Hazardous Decomp Products: CO AND/OR CO*2 ON BURNING
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NONE NOTED

Health Hazard Data

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE:IRRITATING TO EYES AND SKIN ALSO TO RESPIRATORY TRACT,MAY CAUSE HEADACHE AND DROWSINESS. CHRONIC:NO DATA AVAILABLE.
Signs/Symptoms Of Overexp: EYES:IRRITATION WITH POSSIBLE CORNEAL INJURY.SKIN:MAY CAUSE MINIMAL IRRITATION INHALATION:IRRITATING TO RESPIRATORY TRACT,MAY CAUSE HEADACHE,AND DROWSINESS. INGESTION:NAUSEA, VOMITING,DIARRHEA AND DROWSINESS.
Med Cond Aggravated By Exp: PRE-EXISTING CONDITIONS MAY BE WORSEN.
Emergency/First Aid Proc: EYES:FLUSH THOROUGHLY WITH WATER FOR AT LEAST 15 MINUTES,SEEK MEDICAL ATTENTION.SKIN:WASH WITH PLENTY OF WATER. INHALATION:REMOVE TO FRESH AIR,CALL A PHYSICIAN. INGESTION:GIVE TWO GLASSES OF WATER & INDUCE VOMITING WHEN CONCIOUS,CALL A DOCTOR.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: USE PROPER PERSONAL PROTECTION;CONTAIN FREE LIQUID,USE SUITABLE ABSORBENT MATERIAL AND RECOVER FOR PROPER DISPOSAL.
Waste Disposal Method: DISPOSE OF COLLECTED MATERIAL IAW LOCAL,STATE AND FEDERAL REGS.
Precautions-Handling/Storing: STORE IN COOL,DRY AND WELL VENTILATED AREA; KEEP AWAY FROM HEAT,OPEN FLAMES AND SPARKS;KEEP CONTAINERS CLOSED WHEN NOT IN USE.

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED RESPIRATOR FOR ORGANIC VAPORS/MIST IF ABOVE PEL/TLV
Ventilation: LOCAL OR GENERAL
Protective Gloves: NEOPRENE
Eye Protection: CHEMICAL GOGGLES
Other Protective Equipment: EYE BATH,SAFETY SHOWER.
Work Hygienic Practices: AVOID CONTACT WITH EYES AND SKIN:DO NOT BREATHE VAPORS & MIST.

Transportation Data

DOT PSN Code: JMP
DOT Proper Shipping Name: METHYL ISOBUTYL CARBINOL
DOT Class: 3
DOT ID Number: UN2053
DOT Pack Group: III
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: JRN
IMO Proper Shipping Name: METHYLAMYL ALCOHOL
IMO Regulations Page Number: SEE 3366
IMO UN Number: 2053
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: QZI
IATA UN ID Number: 2053
IATA Proper Shipping Name: METHYL ISOBUTYL CARBINOL
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: QZI
AFI Prop. Shipping Name: METHYL ISOBUTYL CARBINOL
AFI Class: 3

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AFI ID Number: UN2053 AFI Label: FLAMMABLE LIQUID
AFI Pack Group: III AFI Basic Pac Ref: 7-7

Disposal Data

Landfill Ban Item: YES
Disposal Supplemental Data: IN CASE OF ACCIDENTAL EXPOSURE OR DISCHARGE, CONSULT HEALTH AND SAFETY FILE FOR PRECAUTIONS.
1st EPA Haz Wst Code New: D001
1st EPA Haz Wst Name New: IGNITIBLE
1st EPA Haz Wst Char New: IGNITABILITY
1st EPA Acute Hazard New: NO

Label Data

Common Name: METHYL AMYL ALCOHOL
Special Hazard Precautions: ACUTE:IRRITATING TO EYES AND SKIN ALSO TO RESPIRATORY TRACT,MAY CAUSE HEADACHE AND DROWSINESS. CHRONIC:NO DATA AVAILABLE. EYES:IRRITATION WITH POSSIBLE CORNEAL INJURY.SKIN:MAY CAUSE MINIMAL IRRITATION INHALATION: IRRITATING TO RESPIRATORY TRACT,MAY CAUSE HEADACHE,AND DROWSINESS. INGESTION:NAUSEA,VOMITING,DIARRHEA AND DROWSINESS.

The information contained herein is based on data considered to be accurate. However, no warranty is expressed regarding the accuracy of these data or the results to be obtained from the use thereof. It is the user's obligation to determine the conditions of safe use of the product.

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Material Safety Data Sheet

Catalog Number: 216932
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 216932

Product name: METHYL BUTYRATE

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
METHYL BUTYRATE	623-42-7	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause irritation to the eyes, skin and respiratory system., Flammable

Category of Danger:
Irritant , Flammable

Principle routes of exposure: Skin
Inhalation: Irritating to respiratory system
Ingestion: Irritating to mouth, throat and stomach
Skin contact: Irritating to skin.
Eye contact: Contact with eyes may cause irritation

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard May Cause Eye, Skin and Respiratory Tract irritation.
Flammable
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid breathing vapors. Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

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Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	3
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep container tightly closed in a dry and well-ventilated place. Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing
Eye protection: Goggles
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Formula:	C5H1OO2
Melting point/range:	No data available at this time.
Boiling point/range:	No Data available at this time.
Density:	No data available
Vapor pressure:	1 mm Hg at -26.8 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	No data available
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-
Incompatible with strong acids, nitrates, oxidizers.	
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
METHYL BUTYRATE	ET5500000	Inhalation LC50 Mouse : 18 gm/m^3/2H Oral LD50 Rat : >5 gm/kg Dermal LD50 Rabbit : 3560 mg/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	A primary irritant.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
METHYL BUTYRATE	Not Listed	Not Listed	Not Listed

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Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
METHYL BUTYRATE	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
METHYL BUTYRATE	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
METHYL BUTYRATE	Not Listed	Not Listed	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
METHYL BUTYRATE	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: 1237

DOT:

Proper shipping name: Methyl butyrate
IATA Hazard Label(s): Flammable Liquid
Hazard Class 3 - Flammable liquid
Packing group: II

Emergency Response Guide Number (ERG): 129

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
METHYL BUTYRATE	Not Listed

TDG (Canada):

WHMIS hazard class: B2 flammable liquids
D2b toxic materials

IMDG/IMO

Proper shipping name: Methyl butyrate

IMDG - Hazard Classifications IMDG class or division = 3

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IMDG - Regulated Substances UN1237

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
METHYL BUTYRATE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
METHYL BUTYRATE	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	210-792-1; C5H10O2
Inventory - Japan:	2-779
Korean KECL:	KE-03860
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
METHYL BUTYRATE	Not Listed	[present]	sn 1234	[present]

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
METHYL BUTYRATE	[present]	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
METHYL BUTYRATE	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

EPAPA005001267

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001268

999-002635

UNION CARBIDE CORPORATION

MATERIAL SAFETY DATA SHEET

Product Name: METHYL CELLOSOLVE(TM) SOLVENT **Effective Date:** 08/22/1998
MSDS#: 000000001313 **Page:** 1 of 15

Union Carbide urges each customer or recipient of this MSDS to study it carefully to become aware of and understand the hazards associated with the product. The reader should consider consulting reference works or individuals who are experts in ventilation, toxicology, and fire prevention, as necessary or appropriate to use and understand the data contained in this MSDS.

To promote safe handling, each customer or recipient should: 1) Notify its employees, agents, contractors and others whom it knows or believes will use this material or the information in this MSDS and any other information regarding hazards or safety; 2) Furnish this same information to each of its customers for the product; and 3) Request its customers to notify their employees, customers, and other users of the product of this information.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 IDENTIFICATION

Product Name	METHYL CELLOSOLVE(TM) SOLVENT
Chemical Name	2-Methoxyethanol
Chemical Family	Glycol Ethers
Common Name	METHYL CELLOSOLVE® SOLVENT
Formula	CH3OCH2CH2OH
Synonym	Ethylene Glycol Monomethyl Ether

1.2 COMPANY IDENTIFICATION

Union Carbide Corporation
39 Old Ridgebury Road
Danbury, CT 06817-0001

1.3 EMERGENCY TELEPHONE NUMBER

24 hours a day: 1-800-UCC-HELP (1-304-744-3487)
Number for non-emergency questions concerning MSDS (732) 563-5522
Additional information on this product may be obtained by calling the Union Carbide Corporation Customer Service Center at 1-800-568-4000.

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CELLOSOLVE® is a registered trademark of Union Carbide.

Eye Contact Liquid or vapor causes irritation, experienced as stinging, excess blinking and tear production, with excess redness and swelling of the conjunctiva. Corneal injury may occur.

Skin Contact No evidence of harmful effects from available information.

Skin Absorption Effects may include those described for swallowing. Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material.

Swallowing Moderately toxic. May cause headache, nausea, vomiting, dizziness, and weakness. Possible kidney damage may result from ingestion of large quantities of material.

Chronic, Prolonged or Repeated Overexposure

Effects of Repeated Overexposure Repeated exposure may cause injury to bone marrow and blood cells, kidney, liver, and testes.

Other Effects of Overexposure Repeated over-exposure to high concentrations of ethylene glycol monomethyl ether vapor or repeated, prolonged skin contact with undiluted material by humans has been associated with apathy, mental confusion, personality changes, weakness, fatigue, hearing loss, sleeplessness and loss of appetite.

Medical Conditions Aggravated by Exposure

Inhalation of material may aggravate asthma and inflammatory or fibrotic pulmonary disease.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

See Section 12 for Ecological Information.

4. FIRST AID PROCEDURES

4.1 INHALATION

Remove to fresh air. Give artificial respiration if not breathing. If breathing is difficult, oxygen may be given by qualified personnel. Obtain medical attention.

4.2 EYE CONTACT

Immediately flush eyes with water and continue washing for several minutes. Remove contact lenses, if worn. Obtain medical attention

4.3 SKIN CONTACT

Remove contaminated clothing. Wash skin with soap and water. If irritation persists or if contact has been prolonged, obtain medical attention. Wash clothing before reuse.

5.6 UNUSUAL FIRE AND EXPLOSION HAZARDS

See Section 8.3 - Engineering Controls

This material may produce a floating fire hazard in extreme fire conditions.

5.7 HAZARDOUS COMBUSTION PRODUCTS

Burning can produce the following products: Carbon monoxide and/or carbon dioxide. Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant.

6. ACCIDENTAL RELEASE MEASURES

Steps to be taken if Material is Released or Spilled:
Small spills can be flushed with large amounts of water; larger spills should be collected for disposal.

Personal Precautions: Wear suitable protective equipment. See Section 8.2 - Personal Protection.

7. HANDLING AND STORAGE

7.1 HANDLING

General Handling
Do not breathe vapor.
Do not swallow.
Do not get in eyes, on skin, on clothing.
Accidental contact should be washed away immediately.
Keep away from heat and flame.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

In laboratory animal studies, birth defects and adverse effects on pregnancy have been observed.
* MAXIMUM PERSONAL EXPOSURE LIMIT IN AIR 0.2 PPM (UCC)(8 HOUR TIME WEIGHTED AVERAGE).
* MAXIMUM 15 MINUTE EXCURSION LEVEL 0.4 PPM (UCC)(NO MORE THAN 4 SUCH EXCURSIONS DAILY WITH MINIMUM SEPARATION OF 1 HOUR).
* Avoid all skin contact.

FOR INDUSTRY USE ONLY.

Ventilation

Other Protective Equipment: Chemical apron
Eye Bath, Safety Shower

8.3 ENGINEERING CONTROLS

PROCESS HAZARD: Sudden release of hot organic chemical vapors or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into hot equipment under a vacuum, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Any use of this product in elevated-temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions. Further information is available in a technical bulletin entitled "Ignition Hazards of Organic Chemical Vapors."

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Appearance: Transparent colorless

pH: *Not currently available.*

Solubility in Water (by weight): *20 °C* **100 %**

Odor: Mild

Flash Point - Closed Cup: *Tag Closed Cup ASTM D 56* **39.4 °C 103 °F**

Flash Point - Open Cup: *Tag Open Cup ASTM D 1310* **43.3 °C 110 °F**

Percent Volatiles: 100 Wt%

Molecular Weight: 76.1 g/mol

Boiling Point (760 mmHg): 124.5 °C 256.1 °F

Freezing Point: -85 °C -121 °F

Specific Gravity (H2O = 1): 0.965 *20 °C / 20 °C*

Peroral: rat LD50 male 3.13 (2.67 - 3.66) ml/kg

Major Signs: sluggishness, unsteady gait, unkempt appearance
Gross Pathology: lungs and intestines discolored

Percutaneous: rabbit LD50 24 hr occluded female 0.891 (0.415 - 1.91) ml/kg

Major Signs: sluggishness, prostration, diarrhea
Gross Pathology: lungs and liver discolored

Percutaneous: rabbit LD50 24 hr occluded male 1.00 (0.589 - 1.70) ml/kg

Major Signs: sluggishness, prostration, diarrhea
Gross Pathology: lungs and liver discolored

Inhalation: dynamic generation of substantially saturated vapor Exposure Time 3 h rat female

Kill Rate: 0/5
Major Signs: labored breathing, decreased activity, ataxia, unkempt appearance, kyphosis
Gross Pathology: petechial hemorrhage throughout pancreas; stomach and intestines gas-filled

Inhalation: dynamic generation of substantially saturated vapor Exposure Time 6 h rat female

Kill Rate: 5/5
Major Signs: labored breathing, decreased activity, ataxia, unkempt appearance, kyphosis
Gross Pathology: petechial hemorrhage throughout pancreas; stomach and intestines gas-filled

Inhalation: dynamic generation of substantially saturated vapor Exposure Time 3 h rat male

Kill Rate: 0/5
Major Signs: labored breathing, decreased activity, ataxia, unkempt appearance, kyphosis
Gross Pathology: petechial hemorrhage throughout pancreas; stomach and intestines gas-filled

Inhalation: dynamic generation of substantially saturated vapor Exposure Time 6 h rat male

Kill Rate: 3/5

12. ECOLOGICAL INFORMATION

12.1 ENVIRONMENTAL FATE

BOD (% Oxygen consumption)

	Day 5	Day 10	Day 15	Day 20	Day 30
	30 %	62 %		88 %	

12.2 ECOTOXICITY

Ecotoxicity to Micro-organisms: Bacterial/NA IC50 > 10000 mg/l
Ecotoxicity to Aquatic Invertebrates: Daphnia LC50 48 h > 10000 mg/l
Ecotoxicity to Fish: Fathead Minnow LC50 96 h > 5400 mg/l

12.3 FURTHER INFORMATION

THOD (measured) 1.64 mg/mg

THOD (calculated) 1.68 mg/mg

Octanol/Water Partition Coefficient - Measured: -0.77

13. DISPOSAL CONSIDERATIONS

13.1 WASTE DISPOSAL METHOD

Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations. Dispose in accordance with all applicable Federal, State, Provincial, and local environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

13.2 DISPOSAL CONSIDERATIONS

See Section 13.1

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III SECTIONS 302 AND 304

The following components of this product are listed as extremely hazardous substances in 40 CFR Part 355 and are present at levels which could require reporting and emergency planning:

None.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III SECTION 313

The following components of this product are listed as toxic chemicals in 40 CFR 372.65 and are present at levels which could require reporting and customer notification under Section 313 and 40 CFR Part 372:

Component	CAS #	Amount
Ethylene glycol monomethyl ether	109-86-4	<= 100.0000%

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III SECTIONS 311 AND 312

Delayed Hazard : Yes
Fire Hazard : Yes
Immediate Health Hazard : Yes
Reactive Hazard : No
Sudden Release of Pressure Hazard : No

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.

15.2 STATE/LOCAL

PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT)

This product is subject to the Worker and Community Right-to-Know Act. The following components of this product are at levels which could require identification in the MSDS:

Component	CAS #	Amount
Ethylene glycol monomethyl ether	109-86-4	<= 100.0000%

MASSACHUSETTS (HAZARDOUS SUBSTANCES DISCLOSURE BY EMPLOYERS)

The following components of this product appear on the Massachusetts Substance List and are present at levels which could require identification in the MSDS:

NFPA ratings for this product are: H - 2 F - 2 S - 0

These ratings are part of specific hazard communications program(s) and should be disregarded where individuals are not trained in the use of these hazard rating systems. You should be familiar with the hazard communication applicable to your workplace.

16.3 RECOMMENDED USES AND RESTRICTIONS

FOR INDUSTRY USE ONLY

NOT FOR USE IN PHOTORESIST MIXTURES USED IN SEMICONDUCTOR FABRICATION PROCESSES.
NOT FOR USE IN CONSUMER PRODUCTS.
NOT FOR USE IN PESTICIDE FORMULATION.

16.4 REVISION

Version: 1.
Revision: 08/22/1998
Most recent revision(s) are highlighted throughout this document.

The opinions expressed herein are those of qualified experts within Union Carbide. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of the use of the product are not under the control of Union Carbide, it is the user's obligation to determine conditions of safe use of the product.

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 10/16/2006
Date Updated: 03/07/2006
Version 1.11

Section 1 - Product and Company Information

Product Name	METHYLCYCLOHEXANE
Product Number	66300
Brand	FLUKA
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
METHYLCYCLOHEXANE	108-87-2	No

Formula	C7H14
Synonyms	Cyclohexylmethane * Hexahydrotoluene * Methylcyclohexane (ACGIH:OSHA) * Metylocykloheksan (Polish) * Sextone B * Toluene hexahydride * Toluene, hexahydro- * Hexahydrotoluene
RTECS Number:	GV6125000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Harmful. Dangerous for the environment.
Irritating to skin. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness.

HMIS RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 3
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
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS
Flammable Hazards: Yes

EXPLOSION HAZARDS
Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

FLASH POINT
24.8 °F - 4.0 °C Method: closed cup

EXPLOSION LIMITS
Lower: 1.1 % Upper: 6.7 %

AUTOIGNITION TEMP
283 °C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

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Section 7 - Handling and Storage

HANDLING

User Exposure: Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

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. Wash contaminated clothing before reuse.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	400 PPM
USA	MSHA Standard-air	TWA	500 PPM (2000 MG/M3)
USA	OSHA.	PEL	8H TWA 500 PPM (2000 MG/M3)
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	400 PPM

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	1600 MG/M3
Poland		NDSCh	3000 MG/M3
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Liquid Color: Colorless

Property	Value	At Temperature or Pressure
Molecular Weight	98.19 AMU	
pH	N/A	
BP/BP Range	101 °C	
MP/MP Range	- 126.0 °C	
Freezing Point	N/A	
Vapor Pressure	37 mmHg	20 °C
Vapor Density	3.4 g/l	
Saturated Vapor Conc.	N/A	

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SG/Density	0.77 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	24.8 °F - 4.0 °C Method: closed cup
Explosion Limits	Lower: 1.1 % Upper: 6.7 %
Flammability	N/A
Autoignition Temp	283 °C
Refractive Index	1.422
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: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

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: May cause eye irritation.
Inhalation: Harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
Prolonged exposure can cause: Narcotic effect.

TOXICITY DATA

Oral
Mouse
2250 mg/kg
LD50

Inhalation
Mouse
41,500 mg/m3
LC50

Inhalation

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Rabbit
15,227 ppm
LC50
Remarks: Gastrointestinal:Changes in structure or function of salivary glands. Behavioral:Convulsions or effect on seizure threshold. Behavioral:General anesthetic.

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. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Methylcyclohexane
UN#: 2296
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Methylcyclohexane
IATA UN Number: 2296
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: F-Xn-N
Indication of Danger: Highly Flammable. Harmful. Dangerous for the environment.
R: 11-38-51/53-65-67
Risk Statements: Highly flammable. Irritating to skin. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness.
S: 9-16-33-61-62
Safety Statements: Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. Take precautionary measures against static discharges. Avoid release to the environment. Refer to special instructions/safety data sheets. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Flammable (USA) Highly Flammable (EU). Harmful. Dangerous for the environment.
Risk Statements: Irritating to skin. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness.

EPAPA005001281

Safety Statements: Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. Take precautionary measures against static discharges. Avoid release to the environment. Refer to special instructions/safety data sheets. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No
TSCA INVENTORY ITEM: Yes

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: Yes
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.
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EPAPA005001282

Material Safety Data Sheet

Catalog Number: 215385
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 215385

Product name: METHYLCYCLOPENTANE

Synonyms: Cyclopentane, methyl
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
METHYLCYCLOPENTANE	96-37-7	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Flammable liquid, May cause irritation to the eyes, skin and respiratory system.

Category of Danger:
Highly flammable , Irritant

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
May be harmful if inhaled.
Ingestion: Ingestion causes irritation of upper respiratory system and gastrointestinal disturbance.
May be harmful if swallowed.
Skin contact: Irritating to skin.
Eye contact: Avoid contact with eyes

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard Highly flammable
May Cause Eye, Skin and Respiratory Tract irritation.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.

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Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Dry chemical, Carbon dioxide (CO2), Foam, Water may be ineffective.
Specific hazards:	Flammable liquid. Vapors are heavier than air and may travel to a source of ignition and flash back. Combustion products may produce irritants and toxic gases.
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	-29 deg C
Autoignition temperature:	329 deg C
Flammable limits in air - lower (%):	1.2
Flammable limits in air - upper (%):	8.35

NFPA rating:

NFPA Health:	2
NFPA Flammability:	3
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE
STORE UNDER NITROGEN
AIR REACTIVE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Incompatible products:	Air reactive

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

EPAPA005001284

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless; sweetish, gasoline-like odor
Physical state:	Liquid
Formula:	C6H12
Molecular weight:	84.18
Melting point/range:	-142 deg C
Boiling point/range:	72 deg C
Density:	0.749 g/ml
Vapor pressure:	100 mm Hg at 17.9 deg C; 760 mm Hg at 71.8 deg C
Evaporation rate:	No data available
Vapor density:	2.9 (air = 1)
Solubility (in water):	Insoluble
Flash point:	-29 deg C
Autoignition temperature:	329 deg C

10. STABILITY AND REACTIVITY

Stability:	Sensitive to air.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Forms explosive mixture with air. caustics aliphatic amines Strong acids Isocyanates Reaction with oxidizers may be violent.
Conditions to avoid:	In air

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
METHYLCYCLOPENTANE	GY4640000	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

Components	NIOSH - Health Effects	NIOSH - Target Organs
METHYLCYCLOPENTANE	general anesthetic; convulsions, seizure	Lungs, Thorax

12. ECOLOGICAL INFORMATION

Mobility: No data available

EPAPA005001285

Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
METHYLCYCLOPENTANE	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
METHYLCYCLOPENTANE	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
METHYLCYCLOPENTANE	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
METHYLCYCLOPENTANE	Not Listed	Not Listed	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
METHYLCYCLOPENTANE	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: 2298

DOT:

Proper shipping name: Methylcyclopentane
IATA Hazard Label(s): Flammable Liquid
Hazard Class 3 - Flammable liquid
Packing group: II

Emergency Response Guide Number (ERG): 128

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
METHYLCYCLOPENTANE	Not Listed

TDG (Canada):

EPAPA005001286

WHMIS hazard class: B2 flammable liquids

IMDG/IMO

Proper shipping name: Methylcyclopentane

IMDG - Hazard Classifications IMDG class or division = 3
IMDG - Regulated Substances UN2298

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
METHYLCYCLOPENTANE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
METHYLCYCLOPENTANE	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	202-503-2
Korean KECL:	KE-23724
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
METHYLCYCLOPENTANE	Not Listed	[present]	sn 1245	[present]

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
METHYLCYCLOPENTANE	Not Listed	Flammable	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
METHYLCYCLOPENTANE	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

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State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

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METHYLDIETHANOLAMINE

Material Safety Data Sheet

Arkema Inc.

1 PRODUCT AND COMPANY IDENTIFICATION

Thio and Fine Chemicals
Arkema Inc.
2000 Market Street
Philadelphia, PA 19103

EMERGENCY PHONE NUMBERS:
Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
Medical: Rocky Mountain Poison Control Center
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Customer Service	1-800-628-4453	8:30 to 5:30 EST

Product Name	METHYLDIETHANOLAMINE
Product Synonym(s)	MDEA
Chemical Family	Alkyl Alkanolamine
Chemical Formula	CH3N(C2H4OH)2
Chemical Name	Ethanol, 2,2'-(Methylimino) bis-
EPA Reg Num	
Product Use	

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical Wt. %	OSHA
Methyldiethanolamine	105-59-9	99%	Y
Water	7732-18-5	0.3%	N

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

The components of this product are all on the TSCA Inventory list.

3 HAZARDS IDENTIFICATION

Emergency Overview
Pale straw liquid with amine odor

WARNING!
CAUSES EYE IRRITATION.

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on single exposure animal tests, it is considered to be slightly toxic if swallowed, practically non-toxic if absorbed through skin, severely irritating to eyes and practically non-irritating to skin.

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4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention.

IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

IF SWALLOWED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

5 FIRE FIGHTING MEASURES

Fire and Explosive Properties

Auto-Ignition Temperature	770 F (410 C)		
Flash Point	240 F	Flash Point Method	PMCC
Flammable Limits- Upper	8.8		
Lower	1.4		

Extinguishing Media

Use water spray, carbon dioxide, foam or dry chemical.

Fire Fighting Instructions

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

Fire and Explosion Hazards

When burned, the following hazardous products of combustion can occur:
Oxides of carbon and nitrogen

6 ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Small spills may be flushed away with large volume of water. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7 HANDLING AND STORAGE

Handling

Avoid contact with eyes.
Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Storage

This material is not hazardous under normal storage conditions; however, material should be stored in

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7 HANDLING AND STORAGE

closed containers, in a secure area to prevent container damage and subsequent spillage.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures. Provide ventilation if necessary to minimize exposure. Dilution ventilation is acceptable, but local mechanical exhaust ventilation preferred, if practical, at sources of air contamination such as open process equipment.

Eye / Face Protection

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment immediately available.

Skin Protection

Minimize skin contamination by following good industrial hygiene practice. Wearing rubber gloves is recommended. Wash hands and contaminated skin thoroughly after handling.

Respiratory Protection

Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. If exposures cannot be kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients

The components of this product have no established Airborne Exposure Guidelines

-Only those components with exposure limits are printed in this section.
-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.
-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.
-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

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9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Pale straw liquid with amine odor
pH	NE
Specific Gravity	1.05 @ 20 C
Vapor Pressure	<0.01 mmHg @ 20 C
Vapor Density	4
Melting Point	NA
Freezing Point	-21 C (-5.8 F)
Boiling Point	240-255 C (464-491 F)
Solubility In Water	Complete
Evaporation Rate	NE
Percent Volatile	100
Molecular Weight	119.2

10 STABILITY AND REACTIVITY

Stability

This material is chemically stable under normal and anticipated storage and handling conditions.

Incompatibility

Avoid contact with strong acids, strong alkalis, and strong oxidizers.

Hazardous Decomposition Products

Thermal decomposition giving off toxic and corrosive products: ammonia, carbon dioxide, nitrogen dioxides.

11 TOXICOLOGICAL INFORMATION

Toxicological Information

Data on this material and/or its components are summarized below.

Single exposure (acute) studies indicate:
Oral - Slightly Toxic to Rats (LD50 4,780 mg/kg)
Dermal - Practically Non-toxic to Rabbits (LD50 6,300 mg/kg)
Inhalation - No deaths in rats following exposure to saturated vapor for 8-hours
Eye Irritation - Severely Irritating to Rabbits (59/110)
Skin Irritation - Practically Non-irritating to Rabbits (4-hr exposure, 0.2/8.0)
No skin allergy was observed in guinea pigs following repeated exposure. Severe irritation, but no systemic effects, were observed following repeated application to the skin of rats. No birth defects were observed in the offspring of rats following application to the skin during pregnancy, even a doses which produced adverse effects on the mothers. No genetic changes were observed in tests using bacteria or animals.

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

No data are available.

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12 ECOLOGICAL INFORMATION

Chemical Fate Information

No data are available.

13 DISPOSAL CONSIDERATIONS

Waste Disposal

Incineration is the recommended method for disposal observing all local, state and federal regulations. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14 TRANSPORT INFORMATION

DOT Name	Not Regulated by DOT
DOT Technical Name	
DOT Hazard Class	
UN Number	
DOT Packing Group	PG
RQ	

15 REGULATORY INFORMATION

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	Y	Fire	N
Delayed (Chronic) Health	N	Reactive	N
		Sudden Release of Pressure	N

The components of this product are all on the TSCA Inventory list.

Ingredient Related Regulatory Information:

SARA Reportable Quantities	CERCLA RQ	SARA TPQ
Water	NE	
Methyldiethanolamine	NE	

Chemical Weapons Convention

Methyldiethanolamine

16 OTHER INFORMATION

EPAPA005001293

Revision Information

Revision Date	11 OCT 2004	Revision Number 7
Supercedes Revision Dated	08-APR-2003	

Revision Summary
ATOFINA Chemicals, Inc. has changed its name to Arkema Inc.

Key
NE= Not Established NA= Not Applicable (R) = Registered Trademark

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UNIVAR

Material Safety Data Sheet

LA2161
Methyl Ethyl Ketone

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Id: LA2161
Product Name: Methyl Ethyl Ketone
Synonyms: None
Chemical Family: Ketone
Application: Solvent, diluent, chemical feedstock, or fuel.

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: 01 May 2007
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:
Methyl Ethyl Ketone 78-93-3	100	Oral LD50 (Rat) 2600 mg/kg Inhalation LC50 (Mouse) 32 g/m^3 Dermal LD50 (Rabbit) 6400 mg/kg

Note: No additional remark.

3. HAZARDS IDENTIFICATION

Potential Acute Health Effects:
Eye Contact: Causes eye irritation. Symptoms of exposure may include: a burning sensation, redness, swelling and blurred vision.
Skin Contact: May cause moderate skin irritation. Burning sensation may result. Repeated or prolonged contact may cause defatting and drying of skin which may result in skin irritation and dermatitis.
Inhalation: Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing and difficulty breathing. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath and fever. High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.

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3. HAZARDS IDENTIFICATION

Ingestion: May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression. Aspiration hazard! Small amounts aspirated into the lungs during ingestion or vomiting may cause lung injury, possibly leading to death. Symptoms of aspiration into the lungs include coughing, gasping, choking, shortness of breath, bluish discolored skin, rapid breathing and heart rate. Chemical pneumonitis from aspiration may result in fever. Pulmonary edema or bleeding, drowsiness, confusion, coma and seizures may occur in more serious cases. Symptoms may develop immediately or as late as 24 hours after the exposure, depending on how much chemical entered the lungs.

4. FIRST AID MEASURES

Eye Contact: Flush eyes with gently flowing water for at least 15 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.
Skin Contact: Remove contamined clothing, including shoes, after flushing has begun. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention.
Inhalation: If symptoms are experienced, remove source of contamination or move victim to fresh air. If symptoms persist, get medical attention. If the affected person is not breathing, apply artificial respiration. If breathing is difficult, give oxygen. In situations where administering oxygen is appropriate, first aiders must be trained in the safe use and handling of oxygen. It is preferable to administer oxygen under a doctor's supervision or advice. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation (CPR) immediately. Immediate medical assistance is required.
Ingestion: Seek immediate medical attention. Do NOT induce vomiting. Never give anything by mouth to an unconscious or convulsing person. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Administer artificial respiration if breathing has stopped. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation (CPR) immediately.
Notes to Physician: Treatment based on sound judgment of physician and individual reactions of patient.

5. FIRE FIGHTING MEASURES

Flash Point: -9 to -4 °C / 16-25 °F
Flash Point Method: Closed cup.
Autoignition Temperature: 404-515 °C / 759-959 °F
Flammable Limits in Air (%): Lower: 1.8 Upper: 11.5
Extinguishing Media: Use DRY chemicals, CO2, alcohol foam or water spray.
Special Exposure Hazards: Flammable Liquid. Isolate and restrict area access. Stop leak only if safe to do so. Move containers from fire area if you can do it without risk. Fight fire from a safe distance and from a protected location. Use fine water spray or fog to control fire spread and cool adjacent structures or containers. This material may produce a floating fire hazard in extreme fire conditions. Vapors are heavier than air and may accumulate in low areas. Vapors may travel along the ground to be ignited at distant locations. Do not allow runoff to enter waterways.
Hazardous Decomposition/Combustion Materials (under fire conditions): A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.
Special Protective Equipment: Wear protective clothing and self-contained breathing apparatus. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA is optional.
NFPA RATINGS FOR THIS PRODUCT ARE: HEALTH 1, FLAMMABILITY 3, INSTABILITY 0
HMIS RATINGS FOR THIS PRODUCT ARE: HEALTH 2, FLAMMABILITY 3, REACTIVITY 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures: Wear appropriate protective equipment.
Environmental Precautionary Measures: Prevent entry into sewers or streams, dike if needed. Consult local authorities.
Procedure for Clean Up: Flammable liquid. Isolate hazard area and restrict access. Stop leak only if safe to do so. Remove ignition sources and work with non-sparking tools. Small spills: soak up with absorbent material and scoop into containers. Large spills : prevent contamination of waterways. Dike and pump into suitable containers. Clean up residual with absorbent material, place in appropriate container and flush with water.

7. HANDLING AND STORAGE

Handling: Flammable. For industrial use only. Handle and open containers with care. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid inhalation of chemical. DO NOT handle or store near an open flame, heat, or other sources of ignition. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. DO NOT pressurize, cut, heat, or weld containers. Empty containers may contain hazardous product residues. Keep the containers closed when not in use. Protect against physical damage. Use appropriate personnel protective equipment. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 10 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Extinguish any naked flames.
Storage: Store in a cool, dry, well ventilated area, away from heat and ignition sources. Keep containers tightly closed. Store out of direct sunlight and on an impermeable floor.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

Local exhaust ventilation as necessary to maintain exposures to within applicable limits. Use explosion proof equipment.
Respiratory Protection: If exposure exceeds occupational exposure limits, use an appropriate NIOSH approved respirator. In case of spill or leak resulting in unknown concentration, use a NIOSH approved supplied air respirator.
Gloves:

Impervious gloves. Butyl rubber gloves. Polyvinyl alcohol 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 goggles; also wear a face shield if splashing hazard exists.
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
Methyl Ethyl Ketone	= 200 ppm TWA = 300 ppm STEL	200 ppm TWA 590 mg/m^3 TWA 300 ppm STEL 885 mg/m^3 STEL	3000 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid.
Colour: Clear
Odour: Sweet Ketone
pH Not Available.
Specific Gravity: 0.804-0.806
Boiling Point: 79 - 80.5 °C / 174-176.9 °F
Freezing/Melting Point: -86 °C / -123 °F
Vapour Pressure: 9500 Pa @ 20°C
Vapour Density: 2.4 @ 20°C
% Volatile by Volume: 100
Evaporation Rate: 3.7
Solubility: Completely miscible.
VOCs: 66.6%
Viscosity: 0.52 cS
Molecular Weight: Not Available.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.
Hazardous Polymerization: Will not occur.
Conditions to Avoid: Avoid excessive heat, open flames and all ignition sources.
Materials to Avoid: Oxidizing agents. Strong alkalis. Strong bases. Reducing agents. Amines. Ammonia. Aldehydes. Halogens. Hydrogen peroxide.

10. STABILITY AND REACTIVITY

Hazardous Decomposition Products: None
Additional Information:

No additional remark.

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure

Ingestion: May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression. Aspiration hazard! Small amounts aspirated into the lungs during ingestion or vomiting may cause lung injury, possibly leading to death. Symptoms of aspiration into the lungs include coughing, gasping, choking, shortness of breath, bluish discolored skin, rapid breathing and heart rate. Chemical pneumonitis from aspiration may result in fever. Pulmonary edema or bleeding, drowsiness, confusion, coma and seizures may occur in more serious cases. Symptoms may develop immediately or as late as 24 hours after the exposure, depending on how much chemical entered the lungs.
Skin Contact: May cause moderate skin irritation. Burning sensation may result. Repeated or prolonged contact may cause defatting and drying of skin which may result in skin irritation and dermatitis.
Inhalation: Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing and difficulty breathing. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath and fever. High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.
Eye Contact: Causes eye irritation. Symptoms of exposure may include: a burning sensation, redness, swelling and blurred vision.

Additional Information: Methyl Ethyl Ketone (MEK) is expected to cause no or mild skin irritation. Repeated or prolonged contact can produce dermatitis (red, dry, itchy skin) and whitening of the skin. Animal evidence suggests that MEK is a moderate to severe eye irritant. Brief exposures to MEK vapours produced slight nose and throat irritation. Higher exposures are expected to cause central nervous system depression with symptoms such as headache, nausea, dizziness, drowsiness, and confusion. Extremely high concentrations may cause loss of consciousness and possibly death. Ingestion of MEK is expected to cause central nervous system depression with symptoms such as headache, nausea, dizziness, drowsiness, and confusion. Animal evidence suggests that MEK can be aspirated (inhaled) into the lungs during ingestion or vomiting. Aspiration of even a small amount of liquid could result in a life threatening accumulation of fluid in the lungs. Severe lung damage (edema), respiratory failure, cardiac arrest and death may result. Animal studies have confirmed synergism between MEK and ethyl n-butyl ketone, methyl n-butyl ketone, n-hexane, carbon tetrachloride, 2,5- hexanedione and chloroform. Principal target organs involved in toxicological interactions are the nervous system and liver, although the lung has also been implicated.

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
Methyl Ethyl Ketone	Not listed.	Not listed.

Carcinogenicity Comment: No additional information available.

Reproductive Toxicity/ Teratogenicity/ Embryotoxicity/ Mutagenicity: Methyl ethyl ketone - three animal studies have shown fetotoxicity (skeletal anomalies) at doses which did not produce any or only very slight maternal toxicity.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Methyl Ethyl Ketone	LC50 (Lepomis macrochirus) 1690 mg/L LC50 (Pimephales promelas) 3220 mg/L	Not Available.	Not Available.

Other Information:

Environmental Fate: Biodegradation: Extensive data demonstrate that Methyl Ethyl Ketone (MEK) is readily biodegradable. Determinations in freshwater and seawater demonstrated that the BOD was a high percentage of the theoretical oxygen demand. Studies on activated sludge showed that MEK is easily degraded and is not toxic to sludge microorganisms in concentrations up to 800 ug/liter. Photodegradation - Although MEK is less reactive in smog than many other organic chemicals, it does undergo significant photodecomposition probably because of a combination of direct photolysis and OH radical reactions. In the presence of 5 ppm NO, and with 35-40% relative humidity and 10 ppm MEK, a photodecomposition half-life of 9.8 hours was found. The half-life of MEK calculated in urban conditions is likely to be about 5.5 hours.

Bioaccumulation: No direct information is available on the ability of MEK to accumulate in biological material. Its high water solubility, rapid degradation by aquatic bacteria, and low octanol-water partition coefficient of 0.26 suggest that it is unlikely to concentrate in aquatic species. Metabolic studies in man demonstrate that concentrations likely to be present in the environment will not lead to accumulation in human tissues.

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: METHYL ETHYL KETONE
DOT Hazardous Class 3
DOT UN Number: UN1193
DOT Packing Group: II
DOT Reportable Quantity (lbs): 5000
Note: No additional remark.
Marine Pollutant: No.

TDG (Canada):
TDG Proper Shipping Name: METHYL ETHYL KETONE
Hazard Class: 3
UN Number: UN1193
Packing Group: II
Note: No additional remark.
Marine Pollutant: No.

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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:
Methyl Ethyl Ketone	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:
B2 FLAMMABLE LIQUIDS
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:
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*****END OF MSDS*****

EPAPA005001301

Material Safety Data Sheet

Catalog Number: 203505
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 203505

Product name: 3-METHYLHEXANE

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
3-METHYLHEXANE	589-34-4	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed., Flammable, Harmful to flora, fauna, soil organisms and aquatic organisms.

Category of Danger:
Flammable , Dangerous for the environment , Harmful

Principle routes of exposure: Skin
Inhalation: Harmful by inhalation.
Ingestion: Harmful if swallowed.
Skin contact: Harmful in contact with skin.
Eye contact: Risk of serious damage to eyes

Statements of hazard HARMFUL IF SWALLOWED. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR INHALED.
Flammable
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Precautions - ANSI Label Do not breathe vapors or spray mist Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.

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Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or `alcohol` foam.
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Ground and bond containers when transferring material

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: If splashes are likely to occur, wear: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

EPAPA005001303

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Liquid
Formula:	C7H16
Melting point/range:	No data available at this time.
Boiling point/range:	No Data available at this time.
Density:	No data available
Vapor pressure:	No data available
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	No data available
Flash point:	Not determined
Autoignition temperature:	*Not determined*

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
3-METHYLHEXANE	Not Available	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
3-METHYLHEXANE	Not Listed	Not Listed	Not Listed

EPAPA005001304

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
3-METHYLHEXANE	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
3-METHYLHEXANE	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
3-METHYLHEXANE	Not Listed	Not Listed	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
3-METHYLHEXANE	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Ground and bond containers when transferring material

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
3-METHYLHEXANE	Not Listed

TDG (Canada):

WHMIS hazard class: D2b toxic materials

:

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
3-METHYLHEXANE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
3-METHYLHEXANE	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Not Listed
Canada NDSL Inventory List -	C7H16
Inventory - China:	Present
EU EINECS List -	209-643-3; C7H16
Inventory - Japan:	2-7
Korean KECL:	KE-24219
Philippines PICCS:	Present

U.S. regulations:

Components	**California Proposition 65 -**	**Massachusetts Right to Know List:**	**New Jersey Right to Know List:**	**Pennsylvania Right to Know List:**
3-METHYLHEXANE	Not Listed	[present]	Not Listed	[present]

Components	**Florida substance List:**	**Rhode Island Right to Know List:**	**Illinois - Toxic Air Contaminants**	**Connecticut - Hazardous Air Pollutants**
3-METHYLHEXANE	[present]	Not Listed	Not Listed	Not Listed

Components	**SARA 313 Emission reporting/Toxic Release of Chemicals**	**CERCLA/SARA - Section 302 Extremely Haz**	**NTP:**	**IARC:**
3-METHYLHEXANE	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001306

pharmco-AAPER
SUBSIDIARIES OF COMMERCIAL ALCOHOLS, INC.
The Power of Three®

An ISO 9001:2000 Certified Company

Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300 or 202-483-7616

MATERIAL SAFETY DATA SHEETS

Part Number/Trade Name: METHYL ISOAMYL KETONE, 5-METHYL 2-HEXANON
This MSDS is valid for all grades and catalog numbers

General Information

Company's Name: PHARMCO PRODUCTS, INC.
Company's Street: 58 VALE RD.
Company's City: BROOKFIELD
Company's State: CT
Company's Zip Code: 06804
Company's Emerg Ph #: (800) 424-9300 Chemtrec
Company's Info Ph #: (203) 740-3471
Date MSDS Revised: Nishant-8/23/99

Safety Data Review Date: 8/23/99
Preparer's Company: PHARMCO PRODUCTS, INC.
Preparer's St Or P. O. Box: 58 VALE RD.
Preparer's City: BROOKFIELD
Preparer's State: CT
Preparer's Zip Code: 06804

Ingredients/Identity Information

Ingredient: METHYL ISOAMYL KETONE, MIAK, 5-METHYL-2-HEXANONE
Ingredient Sequence Number: 01
Percent: 100

NIOSH (RTECS) Number: MP3850000
CAS Number: 110-12-3
ACGIH TLV: 234 MG/CUM
Other Recommended Limit: 50 PPM

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS LIQUID W/A SHARP, CHARACTERISTIC KETONE ODOR.
Boiling Point: 292.82F
Melting Point: -101.02F
Vapor Pressure (MM Hg/70 F): 4.5
Vapor Density (Air=1): 3.9
Specific Gravity: 0.888
Evaporation Rate And Ref: (BU AC=1): 0.5
Solubility In Water: 0.54%
Percent Volatiles By Volume: 100

Fire and Explosion Hazard Data

Flash Point: 96.8F
Flash Point Method: TCC
Lower Explosive Limit: 1
Upper Explosive Limit: 8.2
Extinguishing Media: CO2, DRY CHEMICAL, FOAM
Special Fire Fighting Proc: WEAR FULL PROTECTIVE CLOTHING & SELF CONTAINED BREATHING APPARATUS. KEEP FIRE EXPOSED CONTAINERS COOL W/WATER SPRAY.
Unusual Fire And Expl Hazrds: FLAMMABLE. HEAT WILL BUILD PRESSURE & MAY RUPTURE CLOSED STORAGE CONTAINERS. AUTO-IGNITION TEMP: 375.8F

EPAPA005001307

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HEAT, SPARKS, OPEN FLAME, OPEN CONTAINERS, POOR VENTILATION & DIRECT SUNLIGHT.
Materials To Avoid: STRONG OXIDIZING AGENTS, STRONG ACIDS & BASES.
Hazardous Decomp Products: CO & OTHER TOXIC VAPORS.
Hazardous Poly Occur: NO

Health Hazard Data

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INHALATION: IRRITATION TO THE RESPIRATORY TRACT. EYES: IRRITATION. SKIN: IRRITATION/DERMATITIS. INGESTIONGASTROINTESTINAL TRACT IRRITATION. PRODUCT IS A CNS DEPRESSANT.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION, NAUSEA, INTOXICATION, HEADACHE, DIZZINESS, DEFATTING, VOMITING, DIARRHEA
Med Cond Aggravated By Exp: INDIVIDUALS SUSCEPTIBLE TO DERMATITIS.
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. ADMINISTER CPR FLUSH THOROUGHLY FOR 15 MINS. WASH W/SOAP & WATER. INGESTION: NEVER INDUCE VOMITING/GIVE ANYTHING BY MOUTH IF UNCONSCIOUS/HAVING CONVULSIONS. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: PROTECT FROM IGNITION. WEAR PROTECTIVE CLOTHING & USE APPROVED RESPIRATOR EQUIPMENT. ABSORB MATERIAL IN AN ABSORBENT RECOMMENDED FOR SOLVENT SPILLS & REMOVE TO A SAFE LOCATION FOR DISPOSAL BY APPROVED METHODS.
Waste Disposal Method: DISPOSE OF AS AN EPA HAZARDOUS WASTE IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS. FLAMMABLE LIQUID UN1993. HAZARDOUS WASTE NO: D001 (IGNITABLE).
Precautions-Handling/Storing: PROTECT FROM EXTREME TEMPS & DIRECT SUNLIGHT. STORE IN AN ACCEPTABLY PROTECTED & SECURE FLAMMABLE LIQUID STORAGE ROOM.
Other Precautions: GROUND & BOND METAL CONTAINERS TO MINIMIZE STATIC SPARKS.

Control Measures

Respiratory Protection: USE APPROVED RESPIRATOR EQUIPMENT (AIR-PURIFYING, AIR-SUPPLIED/SELF CONTAINED BREATHING APPARATUS).
Ventilation: LOCAL/GENERAL DEPENDING ON THE CONDITIONS OF USE, QUANTITY OF MATERIAL & OTHER OPERATING PARAMETERS.
Protective Gloves: NEOPRENE/RUBBER
Eye Protection: SAFETY GLASSES, GOGGLES/FACE SHIELD.
Other Protective Equipment: CHEMICAL RESISTANT CLOTHING, EYE WASH FOUNTAINS & SAFETY SHOWERS
Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. REMOVE/DISCARD CONTAMINATED SHOES.

Transportation Data

EPAPA005001308

DOT: 5-Methyl-2-hexanone, 3, UN 2302, PG III

Disposal Data

Refer to applicable regional, state and federal codes.

Label Data

Label Required: YES
Label Status: G
Common Name: METHYL ISOAMYL KETONE
Special Hazard Precautions: INHALATION: IRRITATION TO THE RESPIRATORY TRACT. EYES: IRRITATION. SKIN: IRRITATION/DERMATITIS. INGESTIONGASTROINTESTINAL TRACT IRRITATION. PRODUCT IS A CNS DEPRESSANT. IRRITATION, NAUSEA, INTOXICATION, HEADACHE, DIZZINESS, DEFATTING, VOMITING, DIARRHEA

General Information

Ingredients/Identity Information

Ingredient: METHYL ISOAMYL KETONE, MIAK, 5-METHYL-2-HEXANONE
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: MP3850000
CAS Number: 110-12-3
ACGIH TLV: 234 MG/CUM
Other Recommended Limit: 50 PPM

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS LIQUID W/A SHARP, CHARACTERISTIC KETONE ODOR.
Boiling Point: 292.82F
Melting Point: -101.02F
Vapor Pressure (MM Hg/70 F): 4.5
Vapor Density (Air=1): 3.9
Specific Gravity: 0.888
Evaporation Rate And Ref: (BU AC=1): 0.5
Solubility In Water: 0.54%
Percent Volatiles By Volume: 100

Fire and Explosion Hazard Data

Flash Point: 96.8F
Flash Point Method: TCC
Lower Explosive Limit: 1
Upper Explosive Limit: 8.2
Extinguishing Media: CO2, DRY CHEMICAL, FOAM
Special Fire Fighting Proc: WEAR FULL PROTECTIVE CLOTHING & SELF CONTAINED BREATHING APPARATUS. KEEP FIRE EXPOSED CONTAINERS COOL W/WATER SPRAY.
Unusual Fire And Expl Hazrds: FLAMMABLE. HEAT WILL BUILD PRESSURE & MAY RUPTURE CLOSED STORAGE CONTAINERS. AUTO-IGNITION TEMP: 375.8F

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HEAT, SPARKS, OPEN FLAME, OPEN CONTAINERS, POOR VENTILATION & DIRECT SUNLIGHT.
Materials To Avoid: STRONG OXIDIZING AGENTS, STRONG ACIDS & BASES.
Hazardous Decomp Products: CO & OTHER TOXIC VAPORS.

EPAPA005001309

Hazardous Poly Occur: NO

Health Hazard Data

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: INHALATION: IRRITATION TO THE RESPIRATORY TRACT. EYES: IRRITATION. SKIN: IRRITATION/DERMATITIS. INGESTIONGASTROINTESTINAL TRACT IRRITATION. PRODUCT IS A CNS DEPRESSANT.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION, NAUSEA, INTOXICATION, HEADACHE, DIZZINESS, DEFATTING, VOMITING, DIARRHEA
Med Cond Aggravated By Exp: INDIVIDUALS SUSCEPTIBLE TO DERMATITIS.
Emergency/First Aid Proc: INHALATION: REMOVE TO FRESH AIR. ADMINISTER CPR FLUSH THOROUGHLY FOR 15 MINS. WASH W/SOAP & WATER. INGESTION: NEVER INDUCE VOMITING/GIVE ANYTHING BY MOUTH IF UNCONSCIOUS/HAVING CONVULSIONS. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: PROTECT FROM IGNITION. WEAR PROTECTIVE CLOTHING & USE APPROVED RESPIRATOR EQUIPMENT. ABSORB MATERIAL IN AN ABSORBENT RECOMMENDED FOR SOLVENT SPILLS & REMOVE TO A SAFE LOCATION FOR DISPOSAL BY APPROVED METHODS.
Waste Disposal Method: DISPOSE OF AS AN EPA HAZARDOUS WASTE IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS. FLAMMABLE LIQUID UN1993. HAZARDOUS WASTE NO: D001 (IGNITABLE).
Precautions-Handling/Storing: PROTECT FROM EXTREME TEMPS & DIRECT SUNLIGHT. STORE IN AN ACCEPTABLY PROTECTED & SECURE FLAMMABLE LIQUID STORAGE ROOM.
Other Precautions: GROUND & BOND METAL CONTAINERS TO MINIMIZE STATIC SPARKS.

Control Measures

Respiratory Protection: USE APPROVED RESPIRATOR EQUIPMENT (AIR-PURIFYING, AIR-SUPPLIED/SELF CONTAINED BREATHING APPARATUS).
Ventilation: LOCAL/GENERAL DEPENDING ON THE CONDITIONS OF USE, QUANTITY OF MATERIAL & OTHER OPERATING PARAMETERS.
Protective Gloves: NEOPRENE/RUBBER
Eye Protection: SAFETY GLASSES, GOGGLES/FACE SHIELD.
Other Protective Equipment: CHEMICAL RESISTANT CLOTHING, EYE WASH FOUNTAINS & SAFETY SHOWERS
Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. REMOVE/DISCARD CONTAMINATED SHOES.

Transportation Data

Disposal Data

Label Data

EPAPA005001310

Common Name: METHYL ISOAMYL KETONE
Special Hazard Precautions: INHALATION: IRRITATION TO THE RESPIRATORY TRACT. EYES: IRRITATION. SKIN: IRRITATION/DERMATITIS. INGESTIONGASTROINTESTINAL TRACT IRRITATION. PRODUCT IS A CNS DEPRESSANT. IRRITATION, NAUSEA, INTOXICATION, HEADACHE, DIZZINESS, DEFATTING, VOMITING, DIARRHEA

==========

The information contained herein is based on data considered to be accurate. However, no warranty is expressed regarding the accuracy of these data or the results to be obtained from the use thereof. It is the user's obligation to determine the conditions of safe use of the product.

EPAPA005001311

Fisher Scientific
CANADA
A Fisher Scientific International Company

MATERIAL SAFETY DATA SHEET

Section 1 - Chemical Product and Company Identification

MSDS Name: Methyl Isobutyl Ketone

Catalog Numbers: M213-1, M213-20, M213-200, M213-4, NC9652550, XX213200LI

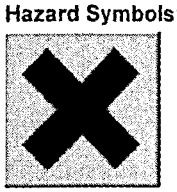
Synonyms: Isobutyl methyl ketone; Methyl isobutyl ketone; Hexone; Isopropylacetone; MIBK; 4-Methyl-2-pentanone.

Company Identification:	Fisher Scientific One Reagent Lane Fair Lawn, NJ 07410
For information in the US, call:	201-796-7100
Emergency Number US:	201-796-7100
CHEMTREC Phone Number, US:	800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#:	108-10-1
Chemical Name:	Methyl isobutyl ketone
%:	>98.5
EINECS#:	203-550-1

Hazard Symbols: XN F



Risk Phrases: 11 20 36/37 66

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Warning! Flammable liquid and vapor. May cause central nervous system depression. May cause liver damage. May form explosive peroxides. Prolonged or repeated contact may dry the skin and cause irritation. This material has been reported to be susceptible to autoxidation and therefore should be classified as peroxidizable. Causes eye and respiratory tract irritation. Target Organs: Central nervous system, liver, respiratory system, eyes, skin.

Potential Health Effects

Eye: Contact produces irritation, tearing, and burning pain. Vapors cause eye irritation.

Skin: Prolonged and/or repeated contact may cause irritation and/or dermatitis. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.

Ingestion: May cause effects similar to those for inhalation exposure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.

Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. Causes respiratory tract irritation. Exposure produces central nervous system depression. May cause liver abnormalities.

Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis. This material has caused kidney effects in male rats which are not considered relevant to humans.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

Extinguishing Media: Water may be ineffective. In case of fire, use carbon dioxide, dry chemical powder or appropriate foam.

Autoignition Temperature: 448 deg C (838.40 deg F)

Flash Point: 14 deg C (57.20 deg F)

Explosion Limits: Lower: 1.2% @ 93°C

Explosion Limits: Upper: 8.0% @ 93°C

NFPA Rating: health: 2; flammability: 3; instability: 0;

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing vapor or mist.

Storage: Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. All peroxidizable substances should be stored away from heat and light and be protected from ignition sources.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Methyl isobutyl ketone	50 ppm; 75 ppm STEL	50 ppm TWA; 205 mg/m3 TWA 500 ppm IDLH	100 ppm TWA; 410 mg/m3 TWA

OSHA Vacated PELs: Methyl isobutyl ketone: 50 ppm TWA; 205 mg/m3 TWA

Engineering Controls:

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Color: clear, colorless

Odor: Sweet, camphor-like.

pH: Not available

Vapor Pressure: 19.9 mm Hg @ 25 deg C

Vapor Density: 3.45 (air=1)

Evaporation Rate: 1.6 (butyl acetate=1)

Viscosity: 0.61 cps @ 20 deg C

Boiling Point: 117 deg C @ 760 mmHg (242.60°F)

Freezing/Melting Point: -84 deg C (-119.20°F)
Decomposition Temperature: Not available
Solubility in water: Moderately Soluble
Specific Gravity/Density: 0.80 g/cm3
Molecular Formula: C6H12O
Molecular Weight: 100.16

Section 10 - Stability and Reactivity

Chemical Stability: Under normal storage conditions, peroxidizable compounds can form and accumulate peroxides which may explode when subjected to heat or shock. This material is most hazardous when peroxide levels are concentrated by distillation or evaporation.

Conditions to Avoid: Ignition sources, excess heat, confined spaces.

Incompatibilities with Other Materials Strong oxidizing agents, strong reducing agents, strong bases.

Hazardous Decomposition Products Carbon monoxide, carbon dioxide.

Hazardous Polymerization Will not occur.

Section 11 - Toxicological Information

RTECS#: CAS# 108-10-1: SA9275000

LD50/LC50: RTECS:
CAS# 108-10-1: Draize test, rabbit, eye: 40 mg Severe;
Draize test, rabbit, eye: 100 uL/24H Moderate;
Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, mouse: LC50 = 23300 mg/m3;
Inhalation, mouse: LC50 = 23300 mg/m3;
Inhalation, rat: LC50 = 100 gm/m3;
Oral, mouse: LD50 = 1900 mg/kg;
Oral, mouse: LD50 = 2850 mg/kg;
Oral, rat: LD50 = 2080 mg/kg;
Oral, rat: LD50 = 4600 mg/kg;

Carcinogenicity: Methyl isobutyl ketone - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: LC50 = 505 mg/L; 96 Hr.; Flow through; 25 degrees C, pH 7.5
Fish: Goldfish: LC50 = 460 mg/L; 24 Hr.; Unspecified
Water flea Daphnia: EC50 = 4280.0 mg/L; 24 Hr.; Unspecified
Algae: EC50 = 400 mg/L; 96 Hr.; Unspecified
Bacteria: Phytobacterium phosphoreum: EC50 = 79.6 mg/L; 5 minutes; Microtox test

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

US DOT
Shipping Name: METHYL ISOBUTYL KETONE
Hazard Class: 3
UN Number: UN1245
Packing Group: II
Canada TDG
Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

USA RQ: CAS# 108-10-1: 5000 lb final RQ; 2270 kg final RQ

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN F

Risk Phrases:

R 11 Highly flammable.

R 20 Harmful by inhalation.

R 36/37 Irritating to eyes and respiratory system.

R 66 Repeated exposure may cause skin dryness or cracking.

Safety Phrases:

S 9 Keep container in a well-ventilated place.

S 16 Keep away from sources of ignition - No smoking.

S 29 Do not empty into drains.

WGK (Water Danger/Protection)

CAS# 108-10-1: 1

Canada

CAS# 108-10-1 is listed on Canada's DSL List

Canadian WHMIS Classifications: B2

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 108-10-1 is listed on Canada's Ingredient Disclosure List

US Federal

TSCA

CAS# 108-10-1 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 5/19/1999

Revision #7 Date 6/06/2006

Revisions were made in Sections: 9

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility 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 the company 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 the company has been advised of the possibility of such damages.

Material Safety Data Sheet

Catalog Number: 215455
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 215455

Product name: 2-METHYLPENTANE

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
2-METHYLPENTANE	107-83-5	90 - 100%	500 ppm TWA	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed., Flammable, Harmful to flora, fauna, soil organisms and aquatic organisms.

Category of Danger:
Flammable , Dangerous for the environment , Harmful

Principle routes of exposure: Skin
Inhalation: Harmful by inhalation.
Ingestion: Harmful if swallowed.
Skin contact: Harmful in contact with skin.
Eye contact: Risk of serious damage to eyes

Statements of hazard HARMFUL IF SWALLOWED. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR INHALED.
Flammable
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Precautions - ANSI Label Do not breathe vapors or spray mist Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.

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Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam, Use dry chemical, CO2, water spray or `alcohol` foam.
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	264 °C (507 °F)

NFPA rating:

NFPA Health:	1
NFPA Flammability:	3
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Ground and bond containers when transferring material

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: If splashes are likely to occur, wear: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless; faint petroleum odor
Physical state:	Liquid
Formula:	C6-H14
Molecular weight:	86.18
Melting point/range:	-153 °C
Boiling point/range:	60 °C
Density:	0.65 at 20 °C (water = 1)
Vapor pressure:	400 mm Hg at 41 °C
Evaporation rate:	Specific data not available - rapid
Vapor density:	2.97 (air = 1)
Solubility (in water):	Insoluble
Flash point:	Not determined
Autoignition temperature:	264 °C (507 °F)

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.

Materials to avoid: -

Forms explosive mixture with air. Reacts vigorously with strong oxidizers. May accumulate static electrical charges, and may cause ignition of its vapors.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
2-METHYLPENTANE	SA2985000	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

Components	NIOSH - Health Effects	NIOSH - Target Organs
2-METHYLPENTANE		eyes, skin, respiratory system, CNS

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

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Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
2-METHYLPENTANE	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
2-METHYLPENTANE	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
2-METHYLPENTANE	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
2-METHYLPENTANE	Not Listed	indicator 0; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
2-METHYLPENTANE	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Ground and bond containers when transferring material

14. TRANSPORT INFORMATION

UN/Id No: 1208

DOT:

Proper shipping name: Hexanes
IATA Hazard Label(s): Flammable Liquid
Hazard Class 3 - Flammable liquid
Packing group: II

Emergency Response Guide Number (ERG): 128

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
2-METHYLPENTANE	Not Listed

TDG (Canada):

WHMIS hazard class: B2 flammable liquids

IMDG/IMO

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Proper shipping name:	Hexanes
IMDG - Hazard Classifications	IMDG class or division = 3
IMDG - Regulated Substances	UN1208

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
2-METHYLPENTANE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
2-METHYLPENTANE	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	203-523-4; C6H14
Inventory - Japan:	2-5; 2-6
Korean KECL:	KE-24699
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
2-METHYLPENTANE	Not Listed	[present]	Not Listed	[present]

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
2-METHYLPENTANE	[present]	Not Listed	Not Listed	36,000 ug/m^3 HLV; 10 ppmv HLV

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
2-METHYLPENTANE	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

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16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001321

Brenntag Canada Inc.

BRENNTAG

MATERIAL SAFETY DATA SHEET

METHYL N-PROPYL KETONE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Rd.
Toronto, ON
M8Z 2G6
(416) 259-8231

Website: http:\\www.brenntag.ca

WHMIS#: 00065131
Index: HCI4271/06C
Effective Date: 2006 July 13
Date of Revision: 2006 July 13

EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)

Toronto, ON (416) 226-6117	Montreal, QC (514) 861-1211	Winnipeg, MB (204) 943-8827
Edmonton, AB (780) 424-1754	Calgary, AB (403) 263-8660	Vancouver, BC (604) 685-5036

PRODUCT IDENTIFICATION

Product Name:	Methyl n-Propyl Ketone.
Chemical Name:	2-Pentanone.
Synonyms:	MPK ; Ethyl Acetone.
Chemical Family:	Ketones.
Molecular Formula:	Not applicable.
Product Use:	Flavoring. Industrial solvent, cleaner, degreaser. Chemical intermediate.

WHMIS Classification / Symbol:

B-2: Flammable Liquid
D-2B: Toxic (skin and eye irritant)

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV*	*% Concentration*
Methyl propyl ketone	107-87-9	200 ppm	95 - 100
Methyl isobutyl ketone	108-10-1	50 ppm	3 - 7

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful if inhaled, absorbed through skin, or swallowed. Causes skin and eye irritation. Mists or sprays are irritating to eyes and respiratory tract. High vapour concentrations may cause drowsiness. See "Other Health Effects" Section. Flammable liquid and vapour. May cause flash fire or explosion. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation: Contact with mist or spray may cause irritation of mucous membranes, coughing and difficulty in breathing. High concentrations of vapour cause irritation of the respiratory tract, experienced as a nasal discomfort and discharge, with chest pain and coughing. May cause coughing and sneezing and sore throat. See "Other Health Effects" Section.

'n Contact: Brief contact causes irritation (itching, local redness or possible swelling). May cause defatting, drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis.

Skin Absorption:	May be absorbed through intact skin.
Eye Contact:	This product causes irritation, redness and pain. Vapours from this product are irritating to the eyes.
Ingestion:	This product causes irritation, a burning sensation of the mouth and throat and abdominal pain.
Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. Intentional misuse of organic solvents (eg. "glue sniffing") over prolonged periods of time may be habit forming and lead to behavioural changes. May cause central nervous system (CNS) depression, kidney and liver effects. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure.

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical attention IMMEDIATELY.
Skin Contact:	Start flushing while removing contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, repeat flushing and obtain medical attention.
Eye Contact:	Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.
Note to Physicians:	This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Medical conditions that may be aggravated by exposure to this product include neurological and cardiovascular disorders, diseases of the skin, eyes or respiratory tract, preexisting liver and kidney disorders.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	*Autoignition Temperature (°C)*	Flammability Limits in Air (%): *LEL*	*UEL*
7.7 (3)	449 (3,4)	1.5. (3)	8. (3,4)

Flammability Class (WHMIS):	B-2: Flammable Liquid
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include peroxides, oxides of carbon and irritating gases.
Unusual Fire or Explosion Hazards:	Vapours from this product are heavier than air, and may "travel" to a source of ignition (eg. pilot lights, heaters, electric motors) some distance away, and then "flash back" to the point of product discharge causing an explosion and fire. Vapours may form explosive mixtures with air. Closed containers exposed to heat may explode. Spilled material may cause floors and contact surfaces to become slippery. Enforce NO SMOKING rules in area of use.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Expected to be sensitive to static discharge when vapours are present between the lower and upper explosive limits.

EXTINGUISHING MEDIA

Fire Extinguishing Media:	Foam. Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog. This material may produce a floating fire hazard in extreme fire conditions.
FIRE FIGHTING INSTRUCTIONS	
Instructions to the Fire Fighters:	Use water spray to cool fire-exposed containers or structures. Use water spray to disperse vapours; re-ignition is possible. Isolate materials that are not involved in the fire and protect personnel. Cool containers with flooding quantities of water until well after the fire is out.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Wear protective clothing. Recover spilled material on non-combustible absorbents, such as sand or vermiculite, and place in covered containers for disposal. Eliminate all sources of ignition. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices:	Ground and bond equipment and containers to prevent a static charge buildup. Use spark-resistant tools and avoid "splash-filling" of containers. Use normal "good" industrial hygiene and housekeeping practices. Containers exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn. Vent container frequently, and more often in warm weather, to relieve pressure.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing vapours or mists. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Store wiping rags and similar material in metal cans with tight fitting lids. Do not use cutting or welding torches on empty drums that contained this material/product.

STORAGE

Storage Temperature (°C):	See below.
Ventilation Requirements:	Ventilation should be explosion proof.
Storage Requirements:	Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40° C. Protect from direct sunlight. Protect against physical damage.
Special Materials to be Used for Packaging or Containers:	Attacks some types of rubber, plastics and coatings. Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	Local exhaust ventilation required. Ventilation should be explosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue. Use the "buddy" system. The second person should be in view and trained and equipped to execute a rescue. (4)

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection:	Safety glasses with side shields are recommended to prevent eye contact. Use full face-shield or chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.
Skin Protection:	Gloves and protective clothing made from butyl rubber (4) should be impervious under conditions of use. Attacks some types of rubber, plastics and coatings. Do not use gloves or protective clothing made from natural rubber, nitrile rubber, PVC or viton. Prior to use, user should confirm impermeability. Discard contaminated gloves.
Respiratory Protection:	No specific guidelines available. Do not use compressed oxygen in hydrocarbon atmospheres. A NIOSH/MSHA-approved air-purifying respirator equipped with organic vapour cartridges for concentrations up to 500 ppm (Methyl Isobutyl Ketone). An air-supplied respirator if concentrations are higher or unknown. Immediately Dangerous to Life and Health (IDLH) value: 1, 500 ppm. 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 equipment. In the event of failure of respiratory protective equipment, every effort should be made to exit immediately. (4) If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (4)
Other Personal Protective Equipment:	Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact. Clothing and footwear that is fire retardant and dissipates static electrical charges should be worn when handling flammable materials. Natural fibers (cotton, wool, leather and linen) should be selected in favour of synthetic materials (rayon, nylon and polyester).

EXPOSURE GUIDELINES

SUBSTANCE	*ACGIH TLV*	*OSHA PEL*		*NIOSH REL*	
	(STEL)	*(TWA)*	*(STEL)*	*(TWA)*	*(STEL)*
Methyl propyl ketone	250 ppm	200 ppm	---	150 ppm	---
Methyl isobutyl ketone	75 ppm	100 ppm	---	50 ppm	75 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Liquid.
Appearance:	Clear, colourless liquid.
Odour:	Pleasant, sweet ketone-odour.
Odour Threshold (ppm):	11 - 15.
Boiling Range (°C):	100.5 - 105.
Melting/Freezing Point (°C):	-77.8
Vapour Pressure (mm Hg at 20° C):	27
Vapour Density (Air = 1.0):	3.0
Relative Density (g/cc):	0.81.
Bulk Density:	810.
Viscosity:	0.5 cPs.
Evaporation Rate (Butyl Acetate = 1.0):	2.3.
Solubility:	Partially soluble in water.
% Volatile by Volume:	100
pH:	Neutral
Coefficient of Water/Oil Distribution:	Not available.
Volatile Organic Compounds (VOC):	807 g/L. (3)

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Stable.
Under Fire Conditions:	Flammable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition.
Materials to Avoid:	Violently reactive with: reducing agents, Strong oxidizers, alkalis and chlorinated solvents. Product can react explosively with Barium Carbonate. Perchlorates. Peroxides. Nitrates. Strong bases. Caustics. Lewis or mineral acids. Aldehydes. Halogens. Amines. Ammonia. Attacks some types of rubber, plastics and coatings.
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include peroxides, oxides of carbon and irritating gases.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	*LD50 (Oral, Rat)*	*LD50 (Dermal, Rabbit)*	*LC50 (Inhalation, Rat, 4h)*
Methyl propyl ketone	1 600 mg/kg (1)	6 500 mg/kg (1)	---
Methyl isobutyl ketone	2,080 - 4,600 mg/kg (1,3)	> 20,000 mg/kg (3)	2,000 - 5,700 ppm (1,3)

Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.
Reproductive Data:	Not available. No adverse reproductive effects are anticipated.
Mutagenicity Data:	Not available. No adverse mutagenic effects are anticipated.
Teratogenicity Data:	This product may cause teratogenic / embryotoxic effects based on studies in laboratory animals, but only at high, generally toxic doses. (4)
Respiratory / Skin Sensitization Data:	None known.
Synergistic Materials:	Methyl Ethyl Ketone (MEK), Methyl Isobutyl ketone (MIBK) and lead acetate are known to enhance the neurotoxicity of n-hexane or methyl-n-butyl ketone. (3,4) MEK by itself does not cause peripheral neuropathy. Pulmonary lesions in rats were also reported to be enhanced by co-exposure to MEK. Both toluene and xylene prevent testicular atrophy by n-hexane. (4) In animal studies, MEK and MIBK has been shown to potentiate the liver and kidney toxicity of haloalkanes, such as chloroform, carbon tetrachloride and 1,2-dichlorobenzene. (3) Combined exposure to MEK and MIBK caused increased behavioural responses in baboons. (4)
Other Studies Relevant to Material:	Application of in excess of a 15 % solution of Methyl propyl ketone caused severe eye injury in rabbits. (4) Slight edema and erythma reported after repeated application to the backs of guinea pigs. Reports from rat studies indicate slight reduction in weight gain and slight hepatocyte enlargement due to overexposure by ingestion and inhalation. (3) In tests with laboratory animals, Methyl Isobutyl Ketone produced evidence of embryofoetal toxicity at exposure levels which were toxic to mothers, but no evidence was obtained for teratogenicity, or for embryofoetal toxicity at levels which did not affect the mothers. (3) Results from five mutagenicity assays with different genetic endpoints indicate that Methyl Isobutyl Ketone does not produce activity typical of that of chemical mutagens. (3)

12. ECOLOGICAL INFORMATION

Ecotoxicity:	May be harmful to aquatic life. Methyl n-Propyl Ketone: 96-hour LC50 (Fathead Minnow) = Above 1 mL/L (3) 96-hour LC50 (Daphnid) = Above 1 mL/L (3) 96-hour LC50 (Snail) = Above 1 mL/L (3)
Environmental Fate:	This product is biodegradable. Methyl n-Propyl Ketone is estimated to have a low potential to bioconcentrate. (3) This product has high mobility in soil. Volatalizes rapidly. (4) Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	None required.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue (liquid and/or vapour) and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not expose such containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death. Do not dispose of package until thoroughly washed out.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

METHYL PROPYL KETONE, Class 3, UN1249, PG II.

Label(s): Flammable Liquids. Placard: Flammable Liquids.

ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

METHYL PROPYL KETONE, Class 3, UN1249, PG II.

Label(s): Flammable Liquid. Placard: Flammable Liquid.

CERCLA-RQ: 50 000 lbs / 22700 kg Exemptions: None known.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All constituents of this product are included on the DSL.

CEPA - NPRI: Methyl Isobutyl Ketone.

Controlled Products Regulations Classification (WHMIS):

B-2: Flammable Liquid

D-2B: Toxic (skin and eye irritant)

USA

Environmental Protection Act: All constituents of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Flammable Liquid, Skin and Eye Irritant.

NFPA: 2 Health, 3 Fire, 0 Reactivity (3)

HMIS: Health, Fire, Reactivity ()

INTERNATIONAL

This product or its components are on the European inventory of existing commercial chemicals (EINECS).

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s)
4. CHEMINFO, through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2005, American Conference of Governmental Industrial Hygienists, Cincinnati, 2005.
6. Regulatory Affairs Group, Brenntag Canada Inc.

7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.

8. NFPA 325M Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1994 Edition, Quincy, MA, 1994.

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

British Columbia: 20333-102B Avenue, Langley, BC, V1M 3H1
Phone: (604) 513-9009 Facsimile: (604) 513-9010

Alberta: 6628 - 45 th. Street, Leduc, AB, T9E 7C9
Phone: (780) 986-4544 Facsimile: (780) 986-1070

Manitoba: 681 Plinquet Street, Winnipeg, MB, R2J 2X2
Phone: (204) 233-3416 Facsimile: (204) 233-7005

Ontario: 43 Jutland Road, Toronto, ON, M8Z 2G6
Phone: (416) 259-8231 Facsimile: (416) 259-6175

Quebec: 2900 Jean Baptiste Des., Lachine, PQ, H8T 1C8
Phone: (514) 636-9230 Facsimile: (514) 636-0877

Atlantic: A-105 Akerley Boulevard, Dartmouth, NS, B3B 1R7
Phone: (902) 468-9690 Facsimile: (902) 468-3085

Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.

pharmco-AAPER
SUBSIDIARIES OF COMMERCIAL ALCOHOLS, INC.
The Power of Three[3]

An ISO 9001:2000 Certified Company

Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300 or 202-483-7616

MATERIAL SAFETY DATA SHEETS

Part Number/Trade Name: Methyl Isobutyl Ketone/MIBK
This MSDS is valid for all grades that start with catalog number 355

General Information

Company's Name: PHARMCO PRODUCTS, INC.
Company's Street: 58 VALE RD.
Company's City: BROOKFIELD
Company's State: CT
Company's Zip Code: 06804
Company's Emerg Ph #: (203) 740-3471
Company's Info Ph #: (203) 740-3471
Date MSDS Revised: 4/5/00

Safety Data Review Date: 4/5/00
Preparer's Company: PHARMCO PRODUCTS, INC.
Preparer's St Or P. O. Box: 58 VALE RD.
Preparer's City: BROOKFIELD
Preparer's State: CT
Preparer's Zip Code: 06804

Ingredients/Identity Information

Ingredient: Methyl Isobutyl Ketone
Synonyms: 2-Pentanone, 4-methyl-; Hexone; MIBK; Isopropylacetone
Percent: 90-100%

Hazardous: Yes
CAS Number: 108-10-1
Molecular Weight: 100.16
Chemical Formula: $CH_3COCH_2CH(CH_3)^2$

Physical/Chemical Characteristics

Appearance: Clear, colorless liquid
Odor: Slight camphor odor
Boiling Point: 117C (243oF)
Melting Point: -85C (-121oF)
PH: No information found
Vapor Pressure (mmHg): 16 @ 20C (68oF)
Vapor Density (Air=1): 3.5
Specific Gravity: 0.80 @ 20C
Evaporation Rate (BuAc=1): 5.6 (Ether=1)
Solubility In Water: Moderately soluble in water (1-10%).
Percent Volatiles By Volume@ 21C (70oF): 100

Fire and Explosion Hazard Data

DANGER! HARMFUL OR FATAL IF SWALLOWED. FLAMMABLE LIQUID AND VAPOR. MAY FORM EXPLOSIVE PEROXIDES IN AIR. HARMFUL IF INHALED. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES IRRITATION TO SKIN, EYES AND RESPRIATORY TRACT.
Flash Point: 18C (64°F)CC
Autoignition temperature: 448C (838°F)
Lower Explosive Limit: 1.2
Upper Explosive Limit: 8.0
Explosion: Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitivity to mechanical impact: Yes, if peroxides are formed. Sensitive to static discharge.
Extinguishing Media: Dry chemical, foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixture, protect personnel attempting to stop leak and disperse vapors.
Special Fire Fighting Proc: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.
Health Rating: 2 – Moderate
Flammability Rating: 3 – Severe (Flammable)
Reactivity Rating: 1 – Slight
Contact Rating: 1 – Slight
Lab Protective Equipment: Goggles; Lab Coat; Vent Hood; Proper Gloves; Class B Extinguisher
Storage Color Code: Red (Flammable)

Reactivity Data

Stability: Stable under ordinary conditions of use and storage. May form explosive peroxides in air.
Materials To Avoid: Aldehydes, Nitric Acid, Perchloric Acid, Strong Oxidizers. Violent reaction with Potassium-tert-butoxide.
Hazardous Decomp Products: Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Poly Occur: Will not occur.
Conditions To Avoid (Poly): Heat, flame, ignition sources, air, incompatibles.

Health Hazard Data

Route Of Entry - Inhalation: Causes irritation to the nose and throat. Concentrations above the TLV may cause headache, dizziness, nausea, shortness of breath, and vomiting. Higher concentrations may cause central nervous system depression and unconsciousness.
Route Of Entry - Skin: Causes irritation to skin. Symptoms include redness, itching, and pain.
Route Of Entry – Eyes: Vapors can irritate the eyes. Splashes cause severe pain and irritation.
Route Of Entry - Ingestion: May produce abdominal pain, nausea. Aspiration into lungs can produce severe lung damage and is a medical emergency. Other symptoms expected to parallel inhalation.
Health Hazard Acute And Chronic: Prolonged skin contact may defat the skin and produce dermatitis. Based on animal studies, chronic exposure may affect liver and kidneys.
Med Cond Aggravated By Exp: Persons with pre-existing skin disorders, eye problems, impaired respiratory function or central nervous system conditions may be more susceptible to the effects of this substance.
Emergency/First Aid Proceedures:
Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion: Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact: Immediately flush skin with plenty of soap and water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected

personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as sawdust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and flush spills away from exposures. US Regulations (CERCLA) require 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.

Precautions-Handling/Storing: Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Before using bulk quantities of this material. Test for presence of explosive peroxides. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for other product.

Control Measures

Respiratory Protection (NIOSH Approved): If the exposure limit is exceeded, a full face-piece respirator with organic vapor cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face-piece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Ventilation: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Skin Protection: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Polyvinyl alcohol (PVA) is a recommended material for personal protective equipment.

Eye Protection: Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Airborne Exposure Limits:

-OSHA Permissible Exposure Limit (PEL): 100ppm (TWA)

-ACGIH Threshold Limit Value (TLV): 50 ppm (TWA), 75 ppm (STEL)

Toxicological Information

Oral rat LD50: 2080 mg/kg; Skin rabbit > 20 mL/kg; irritation eye rabbit, Standard Draize, 40 mg severe; investigated as a reproductive effector.

Cancer Lists

Ingredient	NTP Carcinogen Known	Anticipated	IARC Category
Methyl Isobutyl Ketone (108-10-1)	No	No	None

Ecological Information

Environmental Fate: When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may evaporate to a moderate extent. This material has an estimated bio-concentration factor (BCF) of less then 100. This material is not expected to significantly bio-accumulate. When released into the air, this material is expected to be readily degraded by photolysis. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity: This material is not expected to be toxic to terrestrial life. The LC50/96-hour values for fish are over 100 mg/1.

Transportation Data

Domestic (Land, D.O.T.)
Proper Shipping Name: METHYL ISOBUTYL KETONE
Hazard Class: 3
UN/NA: UN1245
Packing Group: II
Information reported for product/size: 20 L

International (Water, I.M.O.)
Proper Shipping Name: METHYL ISOBUTYL KETONE
Hazard Class: 3.2
UN/NA: UN1245
Packing Group: II
Information reported for product/size: 20L

Regulatory Information

Chemical Inventory Status – Part 1

Ingredient	TSCA	EC	Japan	Australia
Methyl Isobutyl Ketone (108-10-1)	Yes	Yes	Yes	Yes

Chemical Inventory Status – Part 2

Ingredient	Korea	DSL	NDSL	Phil.
Methyl Isobutyl Ketone (108-10-1)	Yes	Yes	No	Yes

Federal, State & International Regulations – Part 1

Ingredient	RQ	TPQ	LIST	Chemical Catg.
Methyl Isobutyl Ketone (108-10-1)	No	No	Yes	No

Federal, State & International Regulations – Part 2

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8 (d)	
Methyl Isobutyl Ketone (108-10-1)	5000	U161		No

Chemical Weapons Convention: No **TSCA 12 (b):** Yes **CDTA:** Yes
SARA 311/312: Acute: Yes **Chronic:** Yes **Fire:** Yes **Pressure:** No
Reactivity: Yes **(Pure/Liquid)**
Australian Hazchem Code: 3 [Y] E
Poison Schedule: S5
WHMIS: This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Disposal Data

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

Label Data

Common Name: Methyl Isobutyl Ketone
Label Hazard Warning: DANGER! HARMFUL OR FATAL IF SWALLOWED. FLAMMABLE LIQUID AND VAPOR. MAY FORM EXPLOSIVE PEROXIDES IN AIR. HARMFUL IF INHALED. AFFECTS

CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions: Keep away from heat, sparks and flame. Avoid contact with eyes, skin and clothing. Avoid breathing vapor. Keep container tightly closed. Use only with adequate ventilation. Wash thoroughly after handling.
Label First Aid: Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention.
Product Use: Laboratory Reagent.
Acute Health Hazard: 3
Fire Hazard: 3
Reactivity Hazard: 1
Protect Eye: Yes
Protect Skin: Yes
Protect Respiratory: YES

The information contained herein is based on data considered to be accurate. However, no warranty is expressed regarding the accuracy of these data or the results to be obtained from the use thereof. It is the user's obligation to determine the conditions of safe use of the product.

--Rev 2.1, 12/05, DH

SPECTRUM®

GARDENA, CA
NEW BRUNSWICK, NJ

Material Safety Data Sheet

NFPA	HMIS	Personal Protective Equipment
	Health Hazard 0 Fire Hazard 2 Reactivity 0	 See Section 15.

Section 1. Chemical Product and Company Identification

Common Name/ Trade Name	**Mineral spirits**
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 S. SAN PEDRO STREET GARDENA, CA 90248
Commercial Name(s)	Not available.
Synonym	Not available.
Chemical Name	Not available.
Chemical Family	Solvent.
Chemical Formula	Not available.
Supplier	SPECTRUM CHEMICAL MFG. CORP. 14422 S. SAN PEDRO STREET GARDENA, CA 90248

Catalog Number(s).	M1292, XX280
CAS#	64475-85-0
RTECS	WJ8925000
TSCA	TSCA 8(b) inventory: Mineral spirits
CI#	Not applicable.

IN CASE OF EMERGENCY
CHEMTREC (24hr) 800-424-9300

CALL (310) 516-8000

Section 2.Composition and Information on Ingredients

		Exposure Limits			
Name	CAS #	TWA (mg/m^3)	STEL (mg/m^3)	CEIL (mg/m^3)	% by Weight
1) Mineral spirits	64475-85-0				100

Toxicological Data on Ingredients

Mineral spirits
LD50: Not available.
LC50: Not available.

Section 3. Hazards Identification

Potential Acute Health Effects

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects

CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to lungs, the nervous system.
Repeated or prolonged exposure to the substance can produce target organs damage.

Continued on Next Page

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.
Skin Contact	After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.
Serious Skin Contact	Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.
Inhalation	Allow the victim to rest in a well ventilated area. Seek immediate medical attention.
Serious Inhalation	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.
Ingestion	Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.
Serious Ingestion	Not available.

Section 5. Fire and Explosion Data

Flammability of the Product	Flammable.
Auto-Ignition Temperature	245°C (473°F)
Flash Points	CLOSED CUP: 38°C (100.4°F).
Flammable Limits	LOWER: 1%
Products of Combustion	Not available.
Fire Hazards in Presence of Various Substances	Not available.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions	Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Special Remarks on Fire Hazards	Not available.
Special Remarks on Explosion Hazards	Not available.

Section 6. Accidental Release Measures

Small Spill	Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill	Flammable liquid, insoluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal.

Continued on Next Page

Section 7. Handling and Storage

Precautions	Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe gas/fumes/ vapour/spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes
Storage	Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	Not available.

Section 9. Physical and Chemical Properties

Physical state and appearance	Liquid.	**Odor**	Not available.
Molecular Weight	Not available.	**Taste**	Not available.
pH (1% soln/water)	Not applicable.	**Color**	Clear Colorless.
Boiling Point	148°C (298.4°F)		
Melting Point	Not available.		
Critical Temperature	Not available.		
Specific Gravity	0.74 (Water = 1)		
Vapor Pressure	2 mm of Hg (@ 20°C)		
Vapor Density	4.9 (Air = 1)		
Volatility	Not available.		
Odor Threshold	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	Not available.		
Solubility	Insoluble in cold water.		

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	Not available.
Incompatibility with various substances	Not available.

Continued on Next Page

Corrosivity	Not considered to be corrosive for metals and glass.
Special Remarks on Reactivity	Not available.
Special Remarks on Corrosivity	Not available.
Polymerization	No.

Section 11. Toxicological Information

Routes of Entry	Eye contact. Inhalation. Ingestion.
Toxicity to Animals	LD50: Not available. LC50: Not available.
Chronic Effects on Humans	The substance is toxic to lungs, the nervous system.
Other Toxic Effects on Humans	Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).
Special Remarks on Toxicity to Animals	Not available.
Special Remarks on Chronic Effects on Humans	Not available.
Special Remarks on other Toxic Effects on Humans	Not available.

Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Products of Biodegradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	The products of degradation are more toxic.
Special Remarks on the Products of Biodegradation	Not available.

Section 13. Disposal Considerations

Waste Disposal

Section 14. Transport Information

DOT Classification	CLASS 3: Combustible liquid with a flash point greater than 37.8C (100F).
Identification	: Flammable liquids n.o.s. : UN1993 PG: Not available.
Special Provisions for Transport	No DOT, ref 49CFR, 173.150
DOT (Pictograms)	

Continued on Next Page

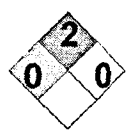
Section 15. Other Regulatory Information and Pictograms

Federal and State Regulations	TSCA 8(b) inventory: Mineral spirits	
California Proposition 65 Warnings		
Other Regulations	OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).	
Other Classifications	WHMIS (Canada)	CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
	DSCL (EEC)	R10- Flammable. R36/38- Irritating to eyes and skin.

HMIS (U.S.A.)

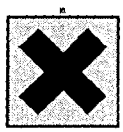
Health Hazard	0
Fire Hazard	2
Reactivity	0
Personal Protection	h

National Fire Protection Association (U.S.A.)



WHMIS (Canada) (Pictograms)

DSCL (Europe) (Pictograms)



TDG (Canada) (Pictograms)

ADR (Europe) (Pictograms)

Protective Equipment

Gloves.

Lab coat.

Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

Continued on Next Page

Section 16. Other Information

MSDS Code	M4100
References	Not available.
Other Special Considerations	Not available.

Validated by Sonia Owen on 8/11/2006.	**Verified by Sonia Owen.** **Printed 9/12/2006.**

CALL (310) 516-8000

Notice to Reader

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Quality Products, Inc. assumes no responsibility for the completeness or accuracy of the information contained herein.

poly Tank
ϕ 6553X

ExxonMobil

600148-00 MOBIL DTE OIL LIGHT
MATERIAL SAFETY DATA BULLETIN

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1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: MOBIL DTE OIL LIGHT
SUPPLIER: EXXONMOBIL OIL CORPORATION
3225 GALLOWS RD.
FAIRFAX, VA 22037

24 - Hour Health and Safety Emergency (call collect): 609-737-4411

24 - Hour Transportation Emergency:
CHEMTREC: 800-424-9300 202-483-7616
LUBES AND FUELS: 281-834-3296

Product and Technical Information:
Lubricants and Specialties: 800-662-4525 800-443-9966
Fuels Products: 800-947-9147
MSDS Fax on Demand: 713-613-3661
MSDS Internet Website: http://www.exxon.com, http://www.mobil.com

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2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAMES AND SYNONYMS: PET. HYDROCARBONS AND ADDITIVES

GLOBALLY REPORTABLE MSDS INGREDIENTS:

None.

See Section 8 for exposure limits (if applicable).

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3. HAZARDS IDENTIFICATION

Under normal conditions of use, this product is not considered hazardous according to regulatory guidelines (See section 15).

EMERGENCY OVERVIEW: Light Amber Liquid. DOT ERG No. : NA

POTENTIAL HEALTH EFFECTS: Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation.

For further health effects/toxicological data, see Section 11.

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4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation occurs, call a physician.

SKIN CONTACT: Wash contact areas with soap and water. Remove and clean oil soaked clothing daily and wash affected area. (See Section 16 - Injection Injury)

INHALATION: Not expected to be a problem. However, if respiratory irritation, dizziness, nausea, or unconsciousness occurs due to excessive vapor or mist exposure, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or mouth-to-mouth resuscitation.

INGESTION: Not expected to be a problem. Seek medical attention if discomfort occurs. Do not induce vomiting.

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5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Carbon dioxide, foam, dry chemical and water fog.

SPECIAL FIRE FIGHTING PROCEDURES: Water or foam may cause frothing. Use water to keep fire exposed containers cool. Water spray may be used to flush spills away from exposure. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters must use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None.

COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.

Flash Point C(F): > 93(200) (ASTM D-93).

Flammable Limits (approx.% vol.in air) - LEL: 0.9%, UEL: 7.0%

NFPA HAZARD ID: Health: 0, Flammability: 1, Reactivity: 0

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6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases as required to appropriate authorities. U.S. Coast Guard and EPA regulations require immediate reporting of spills/releases that could reach any waterway including intermittent dry creeks. Report spill/release to Coast Guard National Response Center toll free number (800)424-8802. In case of accident or road spill notify CHEMTREC (800) 424-9300.

PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:

LAND SPILL: Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping or contain spilled material with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as directed in Section 13.

WATER SPILL: Confine the spill immediately with booms. Warn other ships in the vicinity. Notify port and other relevant authorities. Remove from the surface by skimming or with suitable absorbents. If

permitted by regulatory authorities the use of suitable dispersants should be considered where recommended in local oil spill procedures.

ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.

PERSONAL PRECAUTIONS: See Section 8

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7. HANDLING AND STORAGE

HANDLING: No special precautions are necessary beyond normal good hygiene practices. See Section 8 for additional personal protection advice when handling this product.

STORAGE: Keep containers closed when not in use. Do not store in open or unlabelled containers. Store away from strong oxidizing agents and combustible materials. Do not store near heat, sparks, flame or strong oxidants.

SPECIAL PRECAUTIONS: Prevent small spills and leakages to avoid slip hazard.

EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

When mists/aerosols can occur, the following are recommended: 5 mg/m3 (as oil mist)- ACGIH Threshold Limit Value (TLV), 10 mg/m3 (as oil mist) - ACGIH Short Term Exposure Limit (STEL), 5 mg/m3 (as oil mist) - OSHA Permissible Exposure Limit (PEL)

VENTILATION: If mists are generated, use adequate ventilation, local exhaust or enclosures to control below exposure limits.

RESPIRATORY PROTECTION: If mists are generated, and/or when ventilation is not adequate, wear approved respirator.

EYE PROTECTION: If eye contact is likely, safety glasses with side shields or chemical type goggles should be worn.

SKIN PROTECTION: Not normally required. When splashing or liquid contact can occur frequently, wear oil resistant gloves and/or other protective clothing. Good personal hygiene practices should always be followed.

---

9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet

for specific details.

APPEARANCE: Liquid
COLOR: Light Amber
ODOR: Mild
ODOR THRESHOLD-ppm: NE
pH: NA
BOILING POINT C(F): > 316(600)
MELTING POINT C(F): NA
FLASH POINT C(F): > 93(200) (ASTM D-93)
FLAMMABILITY (solids): NE
AUTO FLAMMABILITY C(F): NA
EXPLOSIVE PROPERTIES: NA
OXIDIZING PROPERTIES: NA
VAPOR PRESSURE-mmHg 20 C: < 0.1
VAPOR DENSITY: > 2.0
EVAPORATION RATE: NE
RELATIVE DENSITY, 15/4 C: 0.869
SOLUBILITY IN WATER: Negligible
PARTITION COEFFICIENT: > 3.5
VISCOSITY AT 40 C, cSt: 32.0
VISCOSITY AT 100 C, cSt: 5.5
POUR POINT C(F): < -6(21)
FREEZING POINT C(F): NE
VOLATILE ORGANIC COMPOUND: NE
DMSO EXTRACT, IP-346 (WT.%): <3, for mineral oil only
NA=NOT APPLICABLE NE=NOT ESTABLISHED D=DECOMPOSES

FOR FURTHER TECHNICAL INFORMATION, CONTACT YOUR MARKETING REPRESENTATIVE

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10. STABILITY AND REACTIVITY

STABILITY (THERMAL, LIGHT, ETC.): Stable.
CONDITIONS TO AVOID: Extreme heat and high energy sources of ignition.
INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizers.
HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.
HAZARDOUS POLYMERIZATION: Will not occur.

---

11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---

ORAL TOXICITY (RATS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
DERMAL TOXICITY (RABBITS): Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.
INHALATION TOXICITY (RATS): Practically non-toxic (LC50: greater than 5 mg/l). ---Based on testing of similar products and/or the components.
EYE IRRITATION (RABBITS): Practically non-irritating. (Draize score: greater than 6 but 15 or less). ---Based on testing of similar products and/or the components.
SKIN IRRITATION (RABBITS): Practically non-irritating. (Primary

Irritation Index: greater than 0.5 but less than 3). ---Based on testing of similar products and/or the components.
OTHER ACUTE TOXICITY DATA: Although an acute inhalation study was not performed with this product, a variety of mineral and synthetic oils, such as those in this product, have been tested. These samples had virtually no effect other than a nonspecific inflammatory response in the lung to the aerosolized mineral oil. The presence of additives in other tested formulations (in approximately the same amounts as in the present formulation) did not alter the observed effects.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

No significant adverse effects were found in studies using repeated dermal applications of similar formulations to the skin of laboratory animals for 13 weeks at doses significantly higher than those expected during normal industrial exposure. The animals were evaluated extensively for effects of exposure (hematology, serum chemistry, urinalysis, organ weights, microscopic examination of tissues etc.).

---REPRODUCTIVE TOXICOLOGY (SUMMARY)---

No teratogenic effects would be expected from dermal exposure, based on laboratory developmental toxicity studies of major components in this formulation and/or materials of similar composition.

---CHRONIC TOXICOLOGY (SUMMARY)---

Repeated and/or prolonged exposure may cause irritation to the skin, eyes or respiratory tract. Overexposure to oil mist may result in oil droplet deposition and/or granuloma formation. For mineral base oils: Base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of severely treated oils showed no evidence of carcinogenic effects. These results are confirmed on a continuing basis using various screening methods such as Modified Ames Test, IP-346, and/or other analytical methods. For synthetic base oils: The base oils in this product have been tested in the Ames assay and other tests of mutagenicity with negative results. These base oils are not expected to be carcinogenic with chronic dermal exposures.

---SENSITIZATION (SUMMARY)---

Not expected to be sensitizing based on tests of this product, components, or similar products.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS:

In the absence of specific environmental data for this product, this assessment is based on information for representative products.

ECOTOXICITY: Available ectoxicity data (LL50 >1000 mg/L) indicates that adverse effects to aquatic organisms are not expected from this product.

MOBILITY: When released into the environment, adsorption to sediment and soil will be the predominant behavior.

PERSISTENCE AND DEGRADABILITY: This product is expected to be inherently biodegradable.

BIOACCUMULATIVE POTENTIAL: Bioaccumulation is unlikely due to the very low water solubility of this product, therefore bioavailability to aquatic organisms is minimal.

---

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning in an enclosed, controlled burner for fuel value. Such burning may be limited pursuant to the Resource Conservation and Recovery Act. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at an appropriate government waste disposal facility. Use of these methods is subject to user compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

RCRA INFORMATION: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity, or reactivity. The unused product is not formulated with substances covered by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

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14. TRANSPORT INFORMATION

USA DOT: NOT REGULATED BY USA DOT.

RID/ADR: NOT REGULATED BY RID/ADR.

IMO: NOT REGULATED BY IMO.

IATA: NOT REGULATED BY IATA.

STATIC ACCUMULATOR (50 picosiemens or less): YES

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15. REGULATORY INFORMATION

US OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this product is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

EU Labeling: Product is not dangerous as defined by the European Union Dangerous Substances/Preparations Directives. EU labeling not required.

Governmental Inventory Status: All components comply with TSCA, EINECS/ELINCS, AICS, and DSL.

U.S. Superfund Amendments and Reauthorization Act (SARA) Title III:
This product contains no "EXTREMELY HAZARDOUS SUBSTANCES".

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

This product contains no chemicals subject to the supplier notification requirements of SARA (313) toxic release program.

THIS PRODUCT HAS BEEN AUTHORIZED BY USDA FOR USE UNDER THE FOLLOWING CATEGORY: This product is acceptable as a lubricant where there is no possibility of food contact (complies with earlier USDA guidelines for H-2 lubricant use).

The following product ingredients are cited on the lists below:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS *
PHOSPHORODITHOIC ACID, O,O-DI C1-14-ALKYL ESTERS, ZINC SALTS (2: 1) (ZDDP) (0.07%)	68649-42-3	22

--- REGULATORY LISTS SEARCHED ---

1=ACGIH ALL	6=IARC 1	11=TSCA 4	16=CA P65 CARC	21=LA RTK
2=ACGIH A1	7=IARC 2A	12=TSCA 5a2	17=CA P65 REPRO	22=MI 293
3=ACGIH A2	8=IARC 2B	13=TSCA 5e	18=CA RTK	23=MN RTK
4=NTP CARC	9=OSHA CARC	14=TSCA 6	19=FL RTK	24=NJ RTK
5=NTP SUS	10=OSHA Z	15=TSCA 12b	20=IL RTK	25=PA RTK
				26=RI RTK

* EPA recently added new chemical substances to its TSCA Section 4 test rules. Please contact the supplier to confirm whether the ingredients in this product currently appear on a TSCA 4 or TSCA 12b list.
Code key:CARC=Carcinogen; SUS=Suspected Carcinogen; REPRO=Reproductive

16. OTHER INFORMATION

USE: LUBRICANT

NOTE: PRODUCTS OF EXXON MOBIL CORPORATION AND ITS AFFILIATED COMPANIES ARE NOT FORMULATED TO CONTAIN PCBS.

Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be

considered:

INJECTION INJURY WARNING: 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 as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

INDUSTRIAL LABEL

Under normal conditions of intended use, this product does not pose a risk to health. Excessive exposure may result in eye, skin or respiratory irritation. Always observe good hygiene measures. First Aid: Wash skin with soap and water. Flush eyes with water. If overcome by fumes or vapor, remove to fresh air. If ingested do not induce vomiting. If symptoms persist seek medical assistance. Read and understand the MSDS before using this product.

****
For Internal Use Only: MHC: 1* 1* 1* 1* 1*, MPPEC: A, TRN: 600148-00, ELIS: 400297, CMCS97: 970294, REQ: US - MARKETING, SAFE USE: L
EHS Approval Date: 11JAN2002
****

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Prepared by: ExxonMobil Oil Corporation
Environmental Health and Safety Department, Clinton, USA

ExxonMobil

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: **MOBIL SYSTEM CLEANER**
Product Description: Base Oil and Additives
Product Code: 201560B0B710, 606897-00, 97AU73
Intended Use: Additive, Cleaning agent

COMPANY IDENTIFICATION

Supplier: **EXXON MOBIL CORPORATION**
3225 GALLOWS RD.
FAIRFAX, VA. 22037 USA

24 Hour Health Emergency	609-737-4411
Transportation Emergency Phone	800-424-9300
ExxonMobil Transportation No.	281-834-3296
MSDS Requests	713-613-3661
Product Technical Information	800-662-4525, 800-947-9147
MSDS Internet Address	http://www.exxon.com, http://www.mobil.com

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*
ALCOHOLS, C9-11, ETHOXYLATED	68439-46-3	10 - 20%
AMINES, N-TALLOW ALKYLTRIMETHYLENEDI-, PROPOXYLATED	68603-75-8	20 - 30%
OLEYL AMINE	112-90-3	1 - 5%
SULFONIC ACIDS, PETROLEUM, CALCIUM SALTS	61789-86-4	10 - 20%

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL HEALTH EFFECTS

Harmful if swallowed. Irritating to respiratory system. Irritating to skin. May cause sensitization by skin contact. Corrosive to eyes. May cause permanent damage. High-pressure injection under skin may cause serious damage.

Target Organs: Lung | Skin | Eye |

ENVIRONMENTAL HAZARDS

Very toxic to aquatic organisms.

NFPA Hazard ID: Health: 3 Flammability: 1 Reactivity: 0

HMIS Hazard ID: Health: 3 Flammability: 1 Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. 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 as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

INGESTION

Give one or two glasses of water if patient is alert and able to swallow. Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Nitrogen oxides, Sulfur oxides, Oxides of carbon, Smoke, Fume, Incomplete combustion products, Aldehydes

FLAMMABILITY PROPERTIES

Flash Point [Method]: >149C (300F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. U.S. regulations require reporting releases of this material to the environment which exceed the reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See Section 3 for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for Personal Protective Equipment.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do it without risk. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. If liquid is too viscous for pumping, scrape it up with shovels into a suitable container for recycle or disposal.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid breathing mists or vapors. Avoid contact with skin. Avoid contact with eyes. Prevent small spills and leakage to avoid slip hazard.

Static Accumulator: This material is a static accumulator.

STORAGE

Do not store in open or unlabelled containers. Keep container closed. Handle containers with care. Open

slowly in order to control possible pressure release. Store in a cool, well-ventilated area.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product: When mists / aerosols can occur, the following are recommended: 5 mg/m³ - ACGIH TLV, 10 mg/m³ - ACGIH STEL, 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded. Eye washes and showers for emergency use.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Work conditions can greatly effect glove durability; inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves.

Eye Protection: Chemical goggles and face shield are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical / oil resistant clothing if contact with material is likely.

Specific Hygiene Measures: 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. Discard contaminated clothing and footwear that cannot be

cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Liquid
Form: Clear
Color: Amber
Odor: Characteristic
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 C): 0.95
Flash Point [Method]: >149C (300F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: N/D
Boiling Point / Range: N/D
Vapor Density (Air = 1): N/D
Vapor Pressure: [N/D at 20 °C]
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Appreciable
Viscosity: 41 cSt (41 mm2/sec) at 40 C
Oxidizing Properties: See Sections 3, 15, 16.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
DMSO Extract (mineral oil only), IP-346: < 3 %wt

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity: No end point data.	Not determined.
Irritation: No end point data.	May be irritating to the respiratory tract. The effects are irreversible. Based on assessment of the components.
Ingestion	
Toxicity: No end point data.	Slightly toxic. Based on assessment of the components.
Skin	
Toxicity: No end point data.	Minimally Toxic. Based on assessment of the components.
Irritation: Data available.	Irritating to the skin. Based on assessment of the components.
Eye	
Irritation: No end point data.	Corrosive to eyes. May cause permanent damage. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

For the product itself:

Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

Contains:

Sulfonates: This product contains sulfonates which have been reported to cause skin sensitization.

Additional information is available by request.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be very toxic to aquatic organisms.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Dispose of waste at an appropriate treatment & disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrositivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

Empty Container Warning PRECAUTIONARY LABEL TEXT: Empty containers may retain residue and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT) : Not Regulated for Land Transport

LAND (TDG) : Not Regulated for Land Transport

SEA (IMDG) : Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA) : Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purpose, this material is classified as hazardous in accordance with OSHA 29CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: AICS, DSL, TSCA

EPCRA: This material contains no extremely hazardous substances.

\RA (311/312) REPORTABLE HAZARD CATEGORIES: Immediate Health.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
PRIMARY ALCOHOLS, MIXTURE	66455-17-2	17

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:
Section 04: First Aid Skin was modified.
Section 11: Eye Irritation Conclusion was modified.
Section 11: Skin Irritation Conclusion was modified.
Section 13: Regulatory Disposal Information was modified.
Section 09: pH was modified.
Section 07: Handling and Storage - Handling was modified.
Section 11: Dermal Irritation Test Data was modified.
Section 06: Accidental Release - Spill Management - Land was modified.
Section 14: Sea (IMDG) - Header was modified.
Section 14: LAND (TDG) - Header was modified.
Section 03: Health Hazards was modified.
Section 02: Component table was modified.
Section 15: List Citation Table - Header was modified.
Section 11: Skin Irritation Conclusion was modified.
Section 11: Other Health Effects Header was modified.
Section 06: Accidental Release Measures - Environmental Precautions was modified.
Section 16: Code to MHCs was modified.
Section 03: Emergency Overview Target Organs was modified.
Section 16: Health Hazards was modified.
Section 16: Precautions was modified.
Section 16: First Aid Skin was modified.
Section 16: Land Spill was modified.
Section 16: Target Organs was modified.
Section 16: NA Contains was modified.
Section 04: First Aid Notes was added.
Section 04: First Aid Notes - Header was added.
Section 15: Chemical Name - Header was added.
Section 15: CAS Number - Header was added.
Section 15: List Citations - Header was added.
Section 15: List Citations Table was added.

Section 14: LAND (DOT) - Default was added.
Section 14: LAND (TDG) Default was added.
Section 14: Sea (IMDG) - Default was added.
Section 14: Air (IATA) - Default was added.
Section 11: Chronic Tox - Product was added.
Section 11: Other Health Effects was added.
Section 14: DOT Technical Name - All was deleted.
Section 14: Proper Shipping Name - Header was deleted.
Section 14: Proper Shipping Name was deleted.
Section 14: Hazard Class & Division - Header was deleted.
Section 14: Hazard Class was deleted.
Section 14: UN Number - Header was deleted.
Section 14: UN Number was deleted.
Section 14: Packing Group - Header was deleted.
Section 14: Packing Group was deleted.
Section 14: Label(s) - Header was deleted.
Section 14: Label(s) was deleted.
Section 14: EMS Number - Header was deleted.
Section 14: EMS Number was deleted.
Section 14: Transport Document Name - Header was deleted.
Section 14: Transport Document Name was deleted.
Section 14: Proper Shipping Name was deleted.
Section 14: Proper Shipping Name - Header was deleted.
Section 14: Hazard Class & Division - Header was deleted.
Section 14: Hazard Class was deleted.
Section 14: UN Number - Header was deleted.
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Section 14: DOT Footnote was deleted.
Section 14: IATA Footnote was deleted.
Section 14: Special Provisions - Header was deleted.
Section 14: Special Provisions was deleted.
Section 14: IMO Technical Name - All was deleted.
Section 14: IATA Technical Name - All was deleted.
Section 14: TDG Technical Name - All was deleted.
Section 14: IMO Technical Name - Close parenthesis was deleted.
Section 14: IATATechnical Name - Close parenthesis was deleted.
Section 14: TDG Technical Name - Close parenthesis was deleted.
Section 14: IMO Technical Name - Open parenthesis was deleted.
Section 14: IATA Technical Name - Open parenthesis was deleted.
Section 14: TDG Technical Name - Open parenthesis was deleted.
Section 14: TDG Footnote was deleted.

PRECAUTIONARY LABEL TEXT:
Contains: PROPOXYLATED DIAMINE, CALCIUM SULFONATE
DANGER!
HEALTH HAZARDS
Harmful if swallowed. Irritating to respiratory system. Irritating to skin. May cause sensitization by skin contact. Corrosive to eyes. May cause permanent damage.
Target Organs: Lung | Skin | Eye |

PRECAUTIONS
Avoid breathing mists or vapors. Avoid contact with skin. Avoid contact with eyes.

FIRST AID
Inhalation: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

Eye: Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

Oral: Give one or two glasses of water if patient is alert and able to swallow. Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. 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 as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

FIRE FIGHTING MEDIA
Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

SPILL/LEAK

Land Spill: Stop leak if you can do it without risk. Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. If liquid is too viscous for pumping, scrape it up with shovels into a suitable container for recycle or disposal.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

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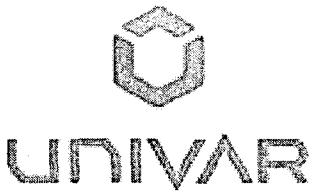

Material Safety Data Sheet

LA1512
Monoethanolamine

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Id: LA1512
Product Name: Monoethanolamine
Synonyms: Ethanolamine; MEA, 2-hydroxyethylamine; B-aminoethyl alcohol
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: 21 March 2005
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:
Monoethanolamine 141-43-5	99-100	Dermal LD50 (Rabbit) 1 mL/kg Oral LD50 (Rat) 1720 mg/kg
Diethanolamine 111-42-2	0.1-1.0	Oral LD50 (Rat) 620 µL/kg Dermal LD50 (Rabbit) 7640 µL/kg

Note: No additional remark.

3. HAZARDS IDENTIFICATION

Potential Acute Health Effects:
Eye Contact: Liquid causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, marked excess redness and swelling of the conjunctiva, and chemical burns of the cornea.
Skin Contact: Causes local discomfort or pain, severe excess redness and swelling, tissue destruction, fissures, ulceration, and possibly bleeding into the injured area. Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material.
Inhalation: May cause irritation of the respiratory tract, experienced as nasal discomfort and discharge, coughing, and possibly accompanied by chest pain. Prolonged exposure may cause injury to the respiratory tract.

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Ingestion: Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury. Causes burns to the mouth, throat and stomach. May cause dizziness, drowsiness, faintness, weakness, collapse, and coma.

4. FIRST AID MEASURES

Eye Contact: Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention. DO NOT remove contact lenses, if worn.
Skin Contact: In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Get medical attention. Remove contaminated shoes and discard.
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. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.
Notes to Physician: No specific antidote. Treatment based on sound judgment of physician and individual reactions of patient. The hazards of this material are due mainly to its severely irritant properties on skin and mucosal surfaces. Due to the irritant nature of the material, the stomach should be evacuated carefully in cases of poisoning by swallowing.

5. FIRE FIGHTING MEASURES

Flash Point: 96 °C / 205 °F
Flash Point Method: Pensky-Martens Closed Cup
Autoignition Temperature: Not Available.
Flammable Limits in Air (%): Not Available.
Extinguishing Media: Use DRY chemicals, CO2, alcohol foam or water spray.
Special Exposure Hazards: Do not direct a solid stream of water or foam into burning molten material; this may cause spattering and spread the fire.
Hazardous Decomposition/Combustion Materials (under fire conditions): Not available.
Special Protective Equipment: Fire fighters should wear full protective clothing, including self-contained breathing equipment.
NFPA RATINGS FOR THIS PRODUCT ARE: HEALTH 3, FLAMMABILITY 1, REACTIVITY 0
HMIS RATINGS FOR THIS PRODUCT ARE: Not Available.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures: *Wear appropriate protective equipment.*
Environmental Precautionary Measures: Prevent entry into sewers or streams, dike if needed. Monoethanolamine is toxic to aquatic life at relatively low concentrations in water.
Procedure for Clean Up: Small spills can be flushed with large amounts of water; larger spills should be collected for disposal.

7. HANDLING AND STORAGE

Handling: Avoid contact with eyes, skin and clothing. Do not swallow. Avoid breathing vapor. Keep the containers closed when not in use. Use with adequate ventilation. Wash thoroughly after handling.
Storage: STABILITY - Monoethanolamine and iron form a complex molecule, trisethanolamino-iron. This material can spontaneously decompose at temperatures between 130° and 160°C, and has been suspected of causing a fire in a nearly empty storage tank containing a 'heel' of MEA in contact with carbon steel steam coils. If steam coil heating is used, low pressure steam in stainless steel coils is preferred. Since this same mechanism may occur in drums, take care when thawing drummed MEA with heating coils and maintain temperature below 130°C.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

PROCESS HAZARD: Sudden release of hot organic chemical vapor or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into hot equipment under a vacuum, may result in ignitions without the pressure of obvious ignition sources. Published "autoignition" or "ignition temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Any use of this product in elevated-temperatures processes should be thoroughly evaluated to establish and maintain safe operating conditions.
General (mechanical) room ventilation is expected to be satisfactory.
Respiratory Protection: Use self-contained breathing apparatus in high vapor concentrations.
Gloves: Polyvinylchloride gloves.
Skin Protection: Chemical apron.
Eyes: Monogoggles.
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
Monoethanolamine	3 ppm TLV-TWA 6 ppm STEL	15 mg/m³ STEL 3 ppm TWA 6 ppm STEL 8 mg/m³ TWA	30 ppm
Diethanolamine	2 mg/m³ TLV-TWA	15 mg/m³ TWA 3 ppm TWA	Not Available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
Colour: Colourless
Odour: Ammoniacal.
pH Not Available.
Specific Gravity: 1.017
Boiling Point: 170 °C / 339 °F
Freezing/Melting Point: 11 °C / 51 °F
Vapour Pressure: 0.2 mmHg
Vapour Density: 2.1
% Volatile by Volume: 100% Wt
Evaporation Rate: 0.02
Solubility: Soluble in water.
VOCs: 1014 g/l
Viscosity: Not Available.
Molecular Weight: Not Available.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.
Hazardous Polymerization: Will not occur.
Conditions to Avoid: Temperatures above 250 °C. May undergo self-sustaining thermal decomposition.
Materials to Avoid: Strong oxidizing agents. Strong bases. Strong acids. Aldehydes. Ketones. Acrylates. Organic anhydrides. Organic halides. Formates. Lactones. Oxalates.
Hazardous Decomposition Products: Oxides of nitrogen. Oxides of carbon.
Additional Information:

No additional remark.

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure

Ingestion: Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury. Causes burns to the mouth, throat and stomach. May cause dizziness, drowsiness, faintness, weakness, collapse, and coma.

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Skin Contact: Causes local discomfort or pain, severe excess redness and swelling, tissue destruction, fissures, ulceration, and possibly bleeding into the injured area. Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material.
Inhalation: May cause irritation of the respiratory tract, experienced as nasal discomfort and discharge, coughing, and possibly accompanied by chest pain. Prolonged exposure may cause injury to the respiratory tract.
Eye Contact: Liquid causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, marked excess redness and swelling of the conjunctiva, and chemical burns of the cornea.

Additional Information: Repeated overexposure may cause liver and kidney effects.
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
Monoethanolamine	Not listed.	Not listed.
Diethanolamine	Group 3	Not listed.

Carcinogenicity Comment: No additional information available.

Reproductive Toxicity/ Teratogenicity/ Embryotoxicity/ Mutagenicity: No human information is available for teratogenicity and embryotoxicity. In one study with pregnant rats, dose-dependent increases in the number of malformed, dead and growth-retarded offspring were found. There were significant design problems with this study. In another study, no embryonal or fetal effects were observed in rats exposed dermally to doses of Monoethanolamine sufficient to cause significant maternal effects. No human reproductive toxicity information is available. Sperm formation was repressed in dogs in an inhalation study.The study design and the small number of dogs used do not allow any conclusions to be drawn. No human or animal mutagenicity studies have been reported. Monoethanolamine gave negative results in bacterial assays (Ames test) in yeast and in cultured mammalian cells.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Monoethanolamine	LC50 (goldfish) 170.0 mg/L LC50 (fathead minnow) 2070 mg/L	Not Available.	Not Available.
Diethanolamine	LC50 (fathead minnow) 4710 mg/L LC50 (goldfish) 800 mg/L	Not Available.	Not Available.

Other Information:
No additional remark.

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: Ethanolamine
DOT Hazardous Class 8
DOT UN Number: UN2491
DOT Packing Group: III

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DOT Reportable Quantity (lbs): Not Applicable.
Note: No additional remark.
Marine Pollutant: No.

ICAO/IATA:
IATA Proper Shipping Name: Ethanolamine
IATA Hazard Class: 8
UN Number: UN2491
Packing Group: III
IATA Label: Corrosive.
IATA Remarks: No additional remark.

IMDG:
IMDG Proper Shipping Name: Ethanolamine
Hazard Class: 8
UN Number: UN2491
Packing Group: III
Marine Pollutant: No.
IMDG Label: Corrosive.
Remarks: No additional remark.

TDG (Canada):
TDG Proper Shipping Name: Ethanolamine
Hazard Class: 8
UN Number: UN2491
Packing Group: III
Note: No additional remark.
Marine Pollutant: No.

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15. REGULATORY INFORMATION

U.S. TSCA Inventory Status: All components of this product are either on theToxic 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:
Monoethanolamine	Not Listed.	Not Listed.	Not Listed.
Diethanolamine	Not Listed.	LISTED	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:
E CORROSIVE MATERIAL

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.

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*****END OF MSDS*****

EPAPA005001364

Material Safety Data Sheet

Catalog Number: 195337
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 195337

Product name: MYRISTYL ALCOHOL

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
MYRISTYL ALCOHOL	112-72-1	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Precautions - ANSI Label Keep away from heat and flame.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: *Do not induce vomiting without medical advice.*
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

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5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards: combustible material
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: ca. 155 °C (open cup)
Autoignition temperature: Not determined
NFPA rating:

NFPA *Health*:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment. Remove all sources of ignition.
Environmental precautions: Do not flush into surface water or sanitary sewer system.
Methods for cleaning up: Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Technical measures/storage conditions: Keep away from heat and sources of ignition
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Powder
Formula: C14H3OO
Molecular weight: 214.4
Melting point/range: 39 - 40 °C
Boiling point/range: 263.2 °C at 1013 hPa
Density: .8355 g/cm3 at 20 °C

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Vapor pressure:	.0133 hPa at 20 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Slightly soluble
Flash point:	ca. 155 °C (open cup)
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
MYRISTYL ALCOHOL	XB8655000	Oral LD50 Rat : >5 gm/kg Dermal LD50 Rabbit : >5 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
MYRISTYL ALCOHOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
MYRISTYL ALCOHOL	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
MYRISTYL ALCOHOL	Not Listed	Not Listed	Not Listed

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Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
MYRISTYL ALCOHOL	Not Listed	indicator 4; Fully and ICCA sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
MYRISTYL ALCOHOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
MYRISTYL ALCOHOL	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
MYRISTYL ALCOHOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components
MYRISTYL ALCOHOL

Inventory - United States TSCA - Sect. 8(b) Present

nada DSL Inventory List - Present

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Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	204-000-3; C14H30O
Inventory - Japan:	2-217; 2-3704
Korean KECL:	KE-33362
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
MYRISTYL ALCOHOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
MYRISTYL ALCOHOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
MYRISTYL ALCOHOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

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End of Safety Data Sheet

EPAPA005001369

(JeffTreat)

METHYLDIETHANOLAMINE

Material Safety Data Sheet

Arkema Inc.

1 PRODUCT AND COMPANY IDENTIFICATION

Thio and Fine Chemicals
Arkema Inc.
2000 Market Street
Philadelphia, PA 19103

EMERGENCY PHONE NUMBERS:
Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
Medical: Rocky Mountain Poison Control Center
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Customer Service	1-800-628-4453	8:30 to 5:30 EST

Product Name	METHYLDIETHANOLAMINE
Product Synonym(s)	MDEA
Chemical Family	Alkyl Alkanolamine
Chemical Formula	CH3N(C2H4OH)2
Chemical Name	Ethanol, 2,2'-(Methylimino) bis-
EPA Reg Num	
Product Use	

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical Wt. %	OSHA
Methyldiethanolamine	105-59-9	99%	Y
Water	7732-18-5	0.3%	N

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

The components of this product are all on the TSCA Inventory list.

3 HAZARDS IDENTIFICATION

Emergency Overview
Pale straw liquid with amine odor

WARNING!
CAUSES EYE IRRITATION.

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on single exposure animal tests, it is considered to be slightly toxic if swallowed, practically non-toxic if absorbed through skin, severely irritating to eyes and practically non-irritating to skin.

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4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention.

IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

IF SWALLOWED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

5 FIRE FIGHTING MEASURES

Fire and Explosive Properties

Auto-Ignition Temperature	770 F (410 C)		
Flash Point	240 F	Flash Point Method	PMCC
Flammable Limits- Upper	8.8		
Lower	1.4		

Extinguishing Media

Use water spray, carbon dioxide, foam or dry chemical.

Fire Fighting Instructions

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

Fire and Explosion Hazards

When burned, the following hazardous products of combustion can occur:
Oxides of carbon and nitrogen

6 ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Small spills may be flushed away with large volume of water. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7 HANDLING AND STORAGE

Handling

Avoid contact with eyes.
Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Storage

This material is not hazardous under normal storage conditions; however, material should be stored in

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7 HANDLING AND STORAGE

closed containers, in a secure area to prevent container damage and subsequent spillage.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures. Provide ventilation if necessary to minimize exposure. Dilution ventilation is acceptable, but local mechanical exhaust ventilation preferred, if practical, at sources of air contamination such as open process equipment.

Eye / Face Protection

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment immediately available.

Skin Protection

Minimize skin contamination by following good industrial hygiene practice. Wearing rubber gloves is recommended. Wash hands and contaminated skin thoroughly after handling.

Respiratory Protection

Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. If exposures cannot be kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients

The components of this product have no established Airborne Exposure Guidelines

-Only those components with exposure limits are printed in this section.
-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.
-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.
-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

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9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Pale straw liquid with amine odor
pH	NE
Specific Gravity	1.05 @ 20 C
Vapor Pressure	<0.01 mmHg @ 20 C
Vapor Density	4
Melting Point	NA
Freezing Point	-21 C (-5.8 F)
Boiling Point	240-255 C (464-491 F)
Solubility In Water	Complete
Evaporation Rate	NE
Percent Volatile	100
Molecular Weight	119.2

10 STABILITY AND REACTIVITY

Stability

This material is chemically stable under normal and anticipated storage and handling conditions.

Incompatibility

Avoid contact with strong acids, strong alkalis, and strong oxidizers.

Hazardous Decomposition Products

Thermal decomposition giving off toxic and corrosive products: ammonia, carbon dioxide, nitrogen dioxides.

11 TOXICOLOGICAL INFORMATION

Toxicological Information

Data on this material and/or its components are summarized below.

Single exposure (acute) studies indicate:
Oral - Slightly Toxic to Rats (LD50 4,780 mg/kg)
Dermal - Practically Non-toxic to Rabbits (LD50 6,300 mg/kg)
Inhalation - No deaths in rats following exposure to saturated vapor for 8-hours
Eye Irritation - Severely Irritating to Rabbits (59/110)
Skin Irritation - Practically Non-irritating to Rabbits (4-hr exposure, 0.2/8.0)
No skin allergy was observed in guinea pigs following repeated exposure. Severe irritation, but no systemic effects, were observed following repeated application to the skin of rats. No birth defects were observed in the offspring of rats following application to the skin during pregnancy, even a doses which produced adverse effects on the mothers. No genetic changes were observed in tests using bacteria or animals.

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

No data are available.

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12 ECOLOGICAL INFORMATION

Chemical Fate Information

No data are available.

13 DISPOSAL CONSIDERATIONS

Waste Disposal

Incineration is the recommended method for disposal observing all local, state and federal regulations. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14 TRANSPORT INFORMATION

DOT Name	Not Regulated by DOT
DOT Technical Name	
DOT Hazard Class	
UN Number	
DOT Packing Group	PG
RQ	

15 REGULATORY INFORMATION

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	Y	Fire	N
Delayed (Chronic) Health	N	Reactive	N
		Sudden Release of Pressure	N

The components of this product are all on the TSCA Inventory list.

Ingredient Related Regulatory Information:

SARA Reportable Quantities	CERCLA RQ	SARA TPQ
Water	NE	
Methyldiethanolamine	NE	

Chemical Weapons Convention

Methyldiethanolamine

16 OTHER INFORMATION

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Revision Information

Revision Date	11 OCT 2004	Revision Number 7
Supercedes Revision Dated	08-APR-2003	

Revision Summary

ATOFINA Chemicals, Inc. has changed its name to Arkema Inc.

Key

NE= Not Established NA= Not Applicable (R) = Registered Trademark

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PETRO-CANADA

Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	B-2, D2A, D2B		

Section 1. Chemical Product and Company Identification

Product Name	**NAPHTHA (SWEET)**	**Code**	W344
Synonym	Light Naphtha, Heavy Naphtha, Straight Run Naphtha, Reformer Feed, Platformer Feed, Heavy Straight Run Naphtha, Hydrodesulfurized Naphtha, Hydrotreated Naphtha, Light Straight Run Gasoline.	**Validated on**	6/20/2006.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	**In case of Emergency**	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Light and heavy naphthas are intermediate refinery products used as feedstocks to platformer units for the production of high octane motor gasoline blending components.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	**CAS #**	**% (V/V)**	**TLV-TWA(8 h)**	**STEL**	**CEILING**
Complex mixture of aliphatic and aromatic hydrocarbons (C4-C12)	64741-69-1, 64741-42-0, 64741-41-9, 64741-46-4, 64741-78-2	>85	Not established	Not established	Not established
Toluene	108-88-3	<7	50 ppm	Not established	Not established
Xylene (mixed isomers)	1330-20-7	<6	100 ppm	150 ppm	Not established
Benzene	71-43-2	<2	0.5 ppm	2.5 ppm	Not established

Manufacturer Recommendation	Not applicable
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.

Section 3. Hazards Identification.

Potential Health Effects	Flammable liquid. Exercise caution when handling this material. May cause cancer. May cause teratogenicity/embryotoxicity. May cause heritable genetic effects (mutagenicity). This product contains an ingredient or ingredients, which have been shown to cause chronic toxic effects. Contact with this product may cause skin and eye irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.

Section 4. First Aid Measures

Eye Contact	Avoid direct contact. Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye (s) with lukewarm, gently flowing water for 15-20 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
Skin Contact	Avoid direct contact. Wear chemical resistant protective clothing if necessary. Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 15-20 minutes or until chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g., watch bands, belts, etc.). Obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.

Continued on Next Page

Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Quickly transport victim to an emergency care facility.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Class I - flammable liquid (NFPA).	**Flammable Limits**	LOWER: 1%, UPPER: 7.5%
Flash Points	CLOSED CUP: <-18°C (<-0.4°F), NFPA.	**Auto-Ignition Temperature**	288°C (550°F), NFPA.
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite. May accumulate in confined spaces.	**Explosion Hazards in Presence of Various Substances**	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO2), reactive hydrocarbons, aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG2004 GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. SMALL FIRES: Dry chemical, CO2, water spray or regular foam. LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk. Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discolouration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.		

Section 6. Accidental Release Measures

Material Release or Spill	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Notify appropriate authorities immediately. Extinguish all ignition sources. Evacuate non-essential personnel. Ventilate area. Avoid breathing vapours or mists of material. Avoid contact with spilled material. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Do not use paper or other flammable materials to absorb product. Collect used absorbent for later disposal. Ensure clean-up personnel wear appropriate personal protective equipment. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Do not allow spilled materials to come into to contact with incompatible materials (see Section 10). Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary.

Section 7. Handling and Storage

Handling	FLAMMABLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid inhalation of product vapours or mists. Avoid skin contact. Avoid eye contact. Do not ingest this product. Avoid generating mists. Avoid contact with any incompatible or reactive materials. Avoid confined spaces and areas with poor ventilation. Wear proper personal protective equipment (See Section 8). Exercise caution when washing/drying clothing contaminated with flammable materials. Ensure all equipment is grounded/bonded. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product.
Storage	Store as flammable material. Store away from heat and sources of ignition. Store away from incompatible and reactive materials (See section 5 and 10). Store in dry, cool, well-ventilated area. Ensure the storage containers are grounded/bonded.

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Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	***The selection of personal protective equipment varies, depending upon conditions of use.***
Eyes	Chemical splash goggles should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): nitrile, polyvinyl alcohol (PVA), fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Liquid.	**Viscosity**	Not available
Colour	Yellowish to clear	**Pour Point**	Not available
Odour	Gasoline like.	**Softening Point**	Not applicable.
Odour Threshold	Not available	**Dropping Point**	Not applicable.
Boiling Point	20°C (68°F); IBP(for LN) = 102°C (215°F)	**Penetration**	Not applicable.
Density	0.70 to 0.75	**Oil / Water Dist. Coefficient**	Not available
Vapour Density	Not available	**Ionicity (in water)**	Not available
Vapour Pressure	105 mmHg <=14 kPa @ 37.8°C.	**Dispersion Properties**	Not available
Volatility	Volatile.	**Solubility**	Hydrocarbon components virtually insoluble in water. Soluble in alcohol, ether, chloroform, and benzene.

Section 10. Stability and Reactivity

Corrosivity	Not applicable.		
Stability	The product is stable under normal handling and storage conditions.	**Hazardous Polymerization**	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, acids and interhalogens.	**Decomposition Products**	May release COx, reactive hydrocarbons, aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, and ingestion.
Acute Lethality	Acute toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: Toluene (108-88-3): Acute Oral toxicity (LD50): 636 mg/kg (rat) Acute Dermal toxicity (LD50): 12225 mg/kg (rabbit) Acute Inhalation toxicity (LC50): 8800 ppm/4h (rat) Xylene (1330-20-7): Acute Oral toxicity (LD50): 4300 mg/kg (rat) Acute Dermal toxicity (LD50): >1700 mg/kg (rabbit) Acute Inhalation toxicity (LC50): 5000 ppm/4h (rat)

Continued on Next Page

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	Benzene (71-43-2): Acute Oral toxicity (LD50): 930 mg/kg (rat) Acute Dermal toxicity (LD50): >9400 mg/kg (rabbit) Acute Inhalation toxicity (LC50):13229 ppm/4h (rat)
Chronic or Other Toxic Effects	
Dermal Route:	This product contains a component (at >= 1%) that can cause skin irritation. Therefore, this product is considered to be a skin irritant. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.
Inhalation Route:	Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Eye Irritation/Inflammation:	This product contains a component (at >= 1%) that can cause eye irritation. Therefore, this product is considered to be an eye irritant.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product contains a component(s) at >= 0.1% that has been shown to cause mutagenicity in laboratory tests. Therefore, this product is considered to be a mutagen. (Benzene)
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product contains a component(s) at >= 0.1% that has been shown to cause teratogenicity and/or embryotoxicity in laboratory tests. Therefore, this product is considered to be a teratogen/embryotoxin. (Xylene)
Carcinogenicity (ACGIH):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. (Considered to be A1 by the ACGIH. Benzene, 71-43-2)
Carcinogenicity (IARC):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. (Considered to be carcinogenic to humans (group 1) by IARC. Benzene, 71-43-2) (Considered to be probably carcinogenic to humans (group 2A) by IARC. Naphtha (petroleum), heavy straight-run, 64741-41-9; Naphtha, petroleum, light straight-run, 64741-46-4; Naphtha, petroleum, light hydrocracked, 64741-69-1)
Carcinogenicity (NTP):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. (Known to be a human carcinogen according to NTP. Benzene, 71-43-2)
Carcinogenicity (IRIS):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. (Considered to be carcinogenic by IRIS. Benzene, 71-43-2)
Carcinogenicity (OSHA):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. (Considered to be carcinogenic by OSHA. Benzene, 71-43-2)
Other Considerations	This product contains a component(s) at >= 1.0% that has been shown to cause chronic toxic effects. Therefore, this product is considered to be a chronic toxin.

Section 12. Ecological Information

Environmental Fate	Not available	**Persistance/ Bioaccumulation Potential**	Not available
BOD5 and COD	Not available	**Products of Biodegradation**	Not available

Additional Remarks No additional remark.

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Section 13. Disposal Considerations

Waste Disposal Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.

Section 14. Transport Information

TDG Classification	PETROLEUM DISTILLATES, N.O.S., 3, UN1268, PGI (CL-TDG)	**Special Provisions for Transport**	See Transportation of Dangerous Goods Regulations.

Section 15. Regulatory Information

Other Regulations

This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

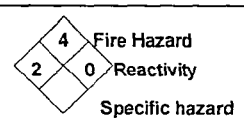
Please contact Product Safety for more information.

DSD/DPD (Europe)	Not evaluated.	**HCS (U.S.A.)**	HCS Class: Flammable liquid having a flash point lower than 37.8°C (100°F). HCS Class: May cause cancer. HCS Class: Irritating substance. HCS Class: Target organ effects.
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	**DOT (U.S.A) (Pictograms)**	Not evaluated for transport Non évalué pour le transport

HMIS (U.S.A.)

Health Hazard	2*
Fire Hazard	4
Reactivity	0
Personal Protection	H

NFPA (U.S.A.)



Rating
0 Insignificant
1 Slight
2 Moderate
3 High
4 Extreme

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous goods by Road (Europe)
ASTM - American Society for Testing and Materials
BOD5 - Biological Oxygen Demand in 5 days
CAS - Chemical Abstract Services
CEPA - Canadian Environmental Protection Act
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CFR - Code of Federal Regulations
CHIP - Chemical Hazard Information and Packaging Approved Supply List
COD - Chemical Oxygen Demand
CPR - Controlled Products Regulations
DOT - Department of Transportation (U.S.A.)
DSCL - Dangerous Substances Classification and Labeling (Europe)
DSD/DPD - Dangerous Substance or Dangerous Preparations Directives (Europe)
DSL - Domestic Substance List (Canada)
EEC/EU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPCRA - Emergency Planning And Community Right-To-Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act
HCS - Hazardous Communication System
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer
IRIS - Integrated Risk Information System
LD50/LC50 - Lethal Dose/Concentration kill 50%
LDLo/LCLo - Lowest Published Lethal Dose/Concentration
NFPA - National Fire Prevention Association
NIOSH - National Institute for Occupational Safety & Health
NPRI - National Pollutant Release Inventory
NSNR - New Substances Notification Regulations (Canada)
NTP - National Toxicology Program
OSHA - Occupational Safety & Health Administration
PEL - Permissible Exposure Limit
RCRA - Resource Conservation and Recovery Act
SARA - Superfund Amendments and Reorganization Act
STEL - Short Term Exposure Limit (15 minutes)
TDG - Transportation Dangerous Goods (Canada)
TDLo/TCLo - Lowest Published Toxic Dose/Concentration
TLV-TWA - Threshold Limit Value-Time Weighted Average
TLm - Median Tolerance Limit
TSCA - Toxic Substances Control Act
USEPA - United States Environmental Protection Agency
USP - United States Pharmacopoeia
WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS

Prepared by Product Safety - JDW on 6/20/2006.

EPAPA005001381

Internet: www.petro-canada.ca/msds Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228 For Product Safety Information: (905) 804-4752	Data entry by Product Safety - DSR.

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.

MATERIAL SAFETY DATA SHEET

VM&P-SW
05 00

Section 1 -- PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

VM&P-SW

HMIS CODES

Health	2
Flammability	3
Reactivity	0

PRODUCT NAME
VM&P Naphtha

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

EMERGENCY TELEPHONE NO.
(216) 566-2917

DATE OF PREPARATION
27-DEC-05

INFORMATION TELEPHONE NO.
(216) 566-2902

Section 2 -- COMPOSITION/INFORMATION ON INGREDIENTS

% by WT	CAS No.	INGREDIENT			UNITS	VAPOR PRESSURE
100	64742-89-8	V. M. & P. Naphtha				
			ACGIH TLV	300	ppm	12 mm
			OSHA PEL	300	ppm	
			OSHA PEL	400	ppm STEL	

Section 3 -- HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE
INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE
EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.
May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

SIGNS AND SYMPTOMS OF OVEREXPOSURE
Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.

CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

Continued on page 2

Section 4 -- FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.
INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
INGESTION: Do not induce vomiting. Get medical attention immediately.

Section 5 -- FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL
50 F PMCC	0.9	6.0

FLAMMABILITY CLASSIFICATION
RED LABEL -- Flammable, Flash below 100 F
EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode when exposed to extreme heat.
Application to hot surfaces requires special precautions.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section 6 -- ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

Section 7 -- HANDLING AND STORAGE

STORAGE CATEGORY
DOL Storage Class IB
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE
Contents are FLAMMABLE. Keep away from heat, sparks, and open flame.
During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.
Consult NFPA Code. Use approved Bonding and Grounding procedures.
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Continued on page 3

Section 8 -- EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation.
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.
Wash hands after using.

VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS
Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

Section 9 -- PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	6.20 lb/gal	742 g/l
SPECIFIC GRAVITY	0.75	
BOILING POINT	240 - 325 F	115 - 162 C
MELTING POINT	Not Available	
VOLATILE VOLUME	100 %	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical)

6.20 lb/gal	742 g/l	Less Water and Federally Exempt Solvents
6.20 lb/gal	742 g/l	Emitted VOC

Section 10 -- STABILITY AND REACTIVITY

STABILITY -- Stable

CONDITIONS TO AVOID
None known.

INCOMPATIBILITY
None known.

HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION
Will not occur

Continued on page 4

Section 11 -- TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

No ingredient in this product is an IARC, NTP or OSHA listed carcinogen.

Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver and urinary systems.

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

TOXICOLOGY DATA

CAS No.	Ingredient Name				
64742-89-8	V. M. & P. Naphtha	LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available

Section 12 -- ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

Section 13 -- DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

Section 14 -- TRANSPORT INFORMATION

No data available.

Section 15 -- REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

Continued on page 5

Section 16 -- OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Shell Chemicals

Material Safety Data Sheet

NEODENE 14 Alpha Olefin
MSDS# 7170
Version 14.1
Effective Date 02/23/2005
According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name	:	**NEODENE 14 Alpha Olefin**
Uses	:	Use as an intermediate in industrial chemicals manufacture.
Product Code	:	V1143
Company	:	**Shell Chemical LP** PO Box 2463 HOUSTON TX 77252-2463 USA
MSDS Request	:	1-800-240-6737
Customer Service	:	1-866-897-4355

Emergency Telephone Number

Chemtrec Domestic (24 hr)	:	1-800-424-9300
Chemtrec International (24 hr)	:	1-703-527-3887

Other Information	:	NEODENE is a registered trademark of Shell trademark Management BV.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Concentration
1-Tetradecene	1120-36-1	100.00%W

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and Odour	:	Clear colourless. Liquid at room temperature. Mild hydrocarbon.
Health Hazards	:	Harmful: may cause lung damage if swallowed. Irritating to skin. Vapours may cause drowsiness and dizziness.
Safety Hazards	:	Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.

Health Hazards

Inhalation	:	This material does not normally present an inhalation hazard, however, in applications where vapours (caused by high temperature) or mists (caused by mixing) are created, breathing may cause a mild burning sensation in the nose, throat and lungs. Vapours may cause drowsiness and dizziness.
Skin Contact	:	Irritating to skin.
Eye Contact	:	Moderately irritating to eyes.
Ingestion	:	Harmful: may cause lung damage if swallowed.
Signs and Symptoms	:	Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-

headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Other signs and symptoms of central nervous system (CNS) depression may include headache, nausea, and lack of coordination. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure.

4. FIRST AID MEASURES

Inhalation	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact	:	Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
Eye Contact	:	Flush eyes with water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision, or swelling persist, transport to the nearest medical facility for additional treatment.
Ingestion	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.
Advice to Physician	:	Potential for chemical pneumonitis. Consider: gastric lavage with protected airway, administration of activated charcoal. Contact a Poison Control Center or toxicologist for guidance.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	107 °C / 225 °F (Tag Closed Cup (ASTM D56))
Auto ignition temperature	:	239 °C / 462 °F
Specific Hazards	:	Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Protective measures	:	Avoid contact with spilled or released material. Immediately

remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Use appropriate containment to avoid environmental contamination. Ventilate contaminated area thoroughly.

Clean Up Methods : For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

Additional Advice : Observe all relevant local and international regulations. The vapour is heavier than air, spreads along the ground and distant ignition is possible.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Avoid contact with the skin. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Extinguish any naked flames. Do Not smoke. Remove ignition sources. Avoid sparks. Handle and open container with care in a well-ventilated area. Do not empty into drains.

Storage : Bulk storage tanks should be diked (bunded). Keep away from aerosols, flammables, oxidizing agents, corrosives and from products harmful or toxic to man or to the environment. Must be stored in a well-ventilated area, away from sunlight, ignition sources and other sources of heat. Nitrogen blanket recommended.

Product Transfer : Keep containers closed when not in use. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during

pumping in order to avoid generation of electrostatic discharge. Do not pressurize drum containers to empty.

Recommended Materials : Mild steel. Stainless steel.

Unsuitable Materials : Copper. Copper alloys.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

Additional Information : Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
1-Tetradecene	SHELL IS	TWA (8 h)	100 ppm		

Additional Information : SHELL IS is the Shell Internal Standard.
Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
Appropriate measures include:
Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers for emergency use.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1920.134.
Where respiratory protective equipment is required, use a full-face mask.

Hand Protection : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374,

		US: F739) made from the following materials may provide suitable chemical protection: Incidental contact/Splash protection: PVC, neoprene or nitrile rubber gloves Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.
Eye Protection	:	Chemical splash goggles (chemical monogoggles).
Protective Clothing	:	Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).
Environmental Exposure Controls	:	Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Clear colourless. Liquid at room temperature.
Odour	:	Mild hydrocarbon.
Boiling point	:	242 - 244 °C / 468 - 471 °F
Melting / freezing point	:	-14 °C / 7 °F
Flash point	:	107 °C / 225 °F (Tag Closed Cup (ASTM D56))
Auto-ignition temperature	:	239 °C / 462 °F
Vapour pressure	:	6.9 Pa at 38 °C / 100 °F 2 Pa at 25 °C / 77 °F
Density	:	775 kg/m3 at 20 °C / 68 °F (ISO 3675)
Water solubility	:	0.014 mg/l at 25 °C / 77 °F (Calculated value(s)) Negligible.
n-octanol/water partition coefficient (log Pow)	:	7.1(Calculated value(s))
Kinematic viscosity	:	1.89 mm2/s at 40 °C / 104 °F 2.75 mm2/s at 20 °C / 68 °F
Viscosity	:	1.53 centiPoise at 38 °C / 100 °F

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources. Avoid exposure to air.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Hazardous Reactions	:	Avoid contact with strong Lewis or mineral acids. Should be reacted with halogens only under controlled conditions. Free radical initiators should be avoided.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Acute Oral Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rat Aspiration into the lungs when swallowed or vomited may

cause chemical pneumonitis which can be fatal.

Acute Dermal Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death. Low toxicity: LC50>5000 ppm / 1 hours, Rat
Skin Irritation	:	Irritating to skin.
Eye Irritation	:	Moderately irritating to eyes.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation to the respiratory system.
Sensitisation	:	Not a skin sensitiser.
Mutagenicity	:	Not mutagenic.

12. ECOLOGICAL INFORMATION

Acute Toxicity

Fish	:	Expected to be not toxic at limit of water solubility.
Aquatic Invertebrates	:	Expected to be not toxic at limit of water solubility.
Algae	:	Expected to be not toxic at limit of water solubility.
Microorganisms	:	Expected to be not toxic at limit of water solubility.
Mobility	:	Adsorbs to soil and has low mobility. Floats on water.
Persistence/degradability	:	Readily biodegradable.
Bioaccumulation	:	Has the potential to bioaccumulate.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
Container Disposal	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

AICS	Listed.	
DSL	Listed.	
INV (CN)	Listed.	
ENCS (JP)	Listed.	(2)-27
TSCA	Listed.	
EINECS	Listed.	214-306-9
KECI (KR)	Listed.	KE-33369
PICCS (PH)	Listed.	

SARA Hazard Categories (311/312)

Immediate (Acute) Health Hazard.

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

16. OTHER INFORMATION

HMIS Rating (Health, Fire, Reactivity)	:	1, 1, 0
NFPA Rating (Health, Fire, Reactivity)	:	0, 1, 0
MSDS Version Number	:	14.1
MSDS Effective Date	:	02/23/2005
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.

Shell Chemicals

Material Safety Data Sheet

NEODENE 14 Alpha Olefin
MSDS# 7170
Version 14.1
Effective Date 02/23/2005
According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

MSDS Regulation	:	The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Uses and Restrictions	:	Chemical intermediate.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name	:	**NEODOL 91**
Uses	:	Use in detergent manufacture.
Product Code	:	V2729
Company	:	**Shell Chemical LP** PO Box 2463 HOUSTON TX 77252-2463 USA
MSDS Request	:	1-800-240-6737
Customer Service	:	1-866-897-4355

Emergency Telephone Number

Chemtrec Domestic (24 hr)	:	1-800-424-9300
Chemtrec International (24 hr)	:	1-703-527-3887

Other Information	:	*NEODOL is a registered trademark of Shell trademark Management BV.*

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Concentration
C9-11 Alcohols	66455-17-2	100.00%

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and Odour	:	Colourless. Liquid at 20 °C. Mild.
Environmental Hazards	:	Toxic to aquatic organisms.

Health Hazards

Skin Contact	:	May cause moderate irritation to skin. Repeated exposure may cause skin dryness or cracking.
Eye Contact	:	Moderately irritating to eyes.
Signs and Symptoms	:	Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.
Environmental Hazards	:	Toxic to aquatic organisms.

4. FIRST AID MEASURES

General Information	:	In general no treatment is necessary, however, obtain medical

advice.

Inhalation	:	Remove to fresh air.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
Eye Contact	:	Flush eyes with water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision, or swelling persist, transport to the nearest medical facility for additional treatment.
Ingestion	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	109 °C / 228 °F (IP 34)
Specific Hazards	:	Carbon monoxide may be evolved if incomplete combustion occurs.
Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Protective measures	:	Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Use the following as appropriate: Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Keep animals off contaminated vegetation. Stay upwind and keep out of low areas. Be ready for fire or possible exposure. Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers. Use appropriate containment to avoid environmental contamination. Ventilate contaminated area thoroughly.
Clean Up Methods	:	For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For small liquid spills (< 1 drum), transfer by mechanical means

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to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

7. HANDLING AND STORAGE

General Precautions	:	Avoid breathing of or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Handling	:	Do not empty into drains.
Storage	:	Bulk storage tanks should be diked (bunded). Vapours from tanks should not be released to atmosphere. Breathing losses during storage should be controlled by a suitable vapour treatment system. Nitrogen blanket recommended for large tanks (capacity 100 m3 or higher). Storage Temperature : 45°C maximum. Insulation (lagging) will minimize heat loss in areas of low ambient temperature. Tanks should be fitted with heating coils in areas where ambient conditions can result in handling temperatures below the freezing point/pour point of the product. Tanks should be fitted with heating coils.
Product Transfer	:	Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling.
Recommended Materials	:	Stainless steel. Epoxy resins. Polyester.
Unsuitable Materials	:	Aluminium. Copper. Copper alloys.
Container Advice	:	Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.
Additional Information	:	Ensure that all local regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

None established.

Additional Information	:	Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use.
Exposure Controls	:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Local exhaust ventilation is

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recommended. Eye washes and showers for emergency use.

Personal Protective Equipment	:	Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
Respiratory Protection	:	If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1920.134.
Hand Protection	:	Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: Incidental contact/Splash protection: Nitrile rubber gloves Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.
Eye Protection	:	Chemical splash goggles (chemical monogoggles).
Protective Clothing	:	Chemical resistant gloves/gauntlets, boots, and apron (where risk of splashing).
Environmental Exposure Controls	:	Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Colourless. Liquid at 20 °C.
Odour	:	Mild.
Boiling point	:	213 - 245 °C / 415 - 473 °F
Pour point	:	-12 °C / 10 °F
Flash point	:	109 °C / 228 °F (IP 34)
Vapour pressure	:	< 5 Pa at 25 °C / 77 °F
Density	:	830 kg/m3 at 20 °C / 68 °F (ASTM D-1298)
Water solubility	:	10 mg/l at 22 °C / 72 °F
n-octanol/water partition coefficient (log Pow)	:	3.8 - 4.7
Kinematic viscosity	:	9 mm2/s at 40 °C / 104 °F
Vapour density (air=1)	:	5.7

10. STABILITY AND REACTIVITY

Stability	:	Oxidises on contact with air. Stable up to 45 degrees C
Conditions to Avoid	:	*Temperatures above 45°C*
Materials to Avoid	:	Copper. Copper alloys. Aluminium. Strong oxidising agents.
Hazardous Decomposition	:	None expected under normal use conditions.

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Products

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on product testing, and/or similar products, and/or components.
Acute Oral Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rat
Acute Dermal Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Low toxicity: LC50 >20 mg/l / 1 hours, Rat
Skin Irritation	:	May cause moderate irritation to skin.
Eye Irritation	:	Moderately irritating to eyes.
Sensitisation	:	Not a skin sensitiser.

12. ECOLOGICAL INFORMATION

Acute Toxicity		
Fish	:	Toxic: 1 < LC/EC/IC50 <= 10 mg/l
Aquatic Invertebrates	:	Toxic: 1 < LC/EC/IC50 <= 10 mg/l
Algae	:	Toxic: 1 < LC/EC/IC50 <= 10 mg/l
Mobility	:	Adsorbs to soil and has low mobility. Floats on water.
Persistence/degradability	:	Readily biodegradable meeting the 10 day window criterion.
Bioaccumulation	:	Bioaccumulation is unlikely to occur due to metabolism and excretion.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
Container Disposal	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG

EPAPA005001400

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

AICS	Listed.	
DSL	Listed.	
INV (CN)	Listed.	
ENCS (JP)	Listed.	(2)-217
TSCA	Listed.	
EINECS	Listed.	
KECI (KR)	Listed.	KE-00292

SARA Hazard Categories (311/312)

No SARA 311/312 Hazards.

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List

C9-11 Alcohols (66455-17-2) 100.00% Listed.

16. OTHER INFORMATION

MSDS Version Number	:	1.
MSDS Effective Date	:	08/02/2005
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this MSDS is in accordance with the

EPAPA005001401

		OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Uses and Restrictions	:	Use in detergent manufacture.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

EPAPA005001402

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
959 ROUTE 46 EAST
PARSIPPANY, NEW JERSEY 07054-0624

EMERGENCY CONTACT:
CHEMTREC 1-800-424-9300
INFORMATION CONTACT:
973-257-1100

SUBSTANCE: NEOHEXANE

TRADE NAMES/SYNONYMS:
MTG MSDS 233; 2,2-DIMETHYLBUTANE; ETHYL-TRIMETHYL METHANE; DIMETHYLBUTANE; BUTANE, 2,2-DIMETHYL-; STCC 4908250; UN 1208; C6H14; MAT16180; RTECS EJ9300000

CHEMICAL FAMILY: hydrocarbons, aliphatic

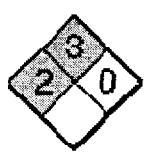
CREATION DATE: Jan 24 1989
REVISION DATE: Sep 15 2005

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: NEOHEXANE
CAS NUMBER: 75-83-2
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=0



EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, nausea, vomiting, headache, symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects

SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
INGESTION:
SHORT TERM EXPOSURE: nausea, vomiting, symptoms of drunkenness
LONG TERM EXPOSURE: no information is available

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 CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. When vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. 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: Evacuation radius: 800 meters (1/2 mile).

FLASH POINT: -54 F (-48 C) (CC)
LOWER FLAMMABLE LIMIT: 1.2%
UPPER FLAMMABLE LIMIT: 7.0%
AUTOIGNITION: 761 F (405 C)
FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances. Store in a tightly closed container. Store in a cool, dry place. Store in a well-ventilated area.

8. EXPOSURE CONTROLS. PERSONAL PROTECTION

EXPOSURE LIMITS:
NEOHEXANE:
HEXANE, ALL ISOMERS OTHER THAN N-HEXANE:
500 ppm (1800 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
1000 ppm (3600 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
500 ppm ACGIH TWA
1000 ppm ACGIH STEL
100 ppm (350 mg/m3) NIOSH recommended TWA 10 hour(s)
510 ppm (1800 mg/m3) NIOSH recommended ceiling 15 minute(s)

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode.
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: colorless
ODOR: Not available
MOLECULAR WEIGHT: 86.18
MOLECULAR FORMULA: C-H3-C-H2-C-(C-H3)3
BOILING POINT: 118 F (48 C)
FREEZING POINT: -148 F (-100 C)
VAPOR PRESSURE: 400 mmHg @ 31 C
VAPOR DENSITY (air=1): 3.0
SPECIFIC GRAVITY (water=1): 0.6485
WATER SOLUBILITY: insoluble
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not available
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: ether, alcohol, acetone, benzene

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES: oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of carbon

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

NEOHEXANE:
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
TARGET ORGANS: central nervous system
ADDITIONAL DATA: Stimulants such as epinephrine may induce ventricular fibrillation.

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): *D001*.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Flammable liquids, n.o.s. (n-Hexane)
ID NUMBER: UN1993
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Flammable liquid, n.o.s. (NEOHEXANE)
UN NUMBER: UN1993
CLASS: 3
PACKING GROUP/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: B

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

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Material Safety Data Sheet

Catalog Number: 212280
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 212280

Product name: NEOPENTYL GLYCOL

Synonyms: Dimethylolpropane; 2,2-Dimethyl-1,3-propanediol; Dimethyltrimethylene glycol; 2,2-Dimethyltrimethylene glycol; Hydroxypivalyl alcohol; Neol; Neopentylene glycol; NPG
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
NEOPENTYL GLYCOL	126-30-7	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause irritation to the eyes, skin and respiratory system., Combustible material

Category of Danger:
Irritant

Principle routes of exposure: Skin
Inhalation: Irritating to respiratory system
Ingestion: Irritating to mouth, throat and stomach
Skin contact: Irritating to skin.
Eye contact: *Contact with eyes may cause irritation*

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard May Cause Eye, Skin and Respiratory Tract irritation.
COMBUSTIBLE MATERIAL AND VAPOR.
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then *place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective* Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not breathe dust Avoid breathing vapors. Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure.

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4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or `alcohol` foam.
Specific hazards:	May flame on exposure to heat or fire. Excessive heat or fire may cause explosion Flammable
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	103 °C (DIN 51758)
Autoignition temperature:	375 °C (DIN 51794)

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Remove all sources of ignition. Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT

EPAPA005001411

Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: Goggles
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Solid
Formula:	C5H12O2
Melting point/range:	124 - 130 °C
Boiling point/range:	210 °C at 1013 hPa
Density:	bulk density ca. 500 kg/m^3 at 20 °C
Vapor pressure:	ca. .03 hPa at 20 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Soluble
Flash point:	103 °C (DIN 51758)
Autoignition temperature:	375 °C (DIN 51794)

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Forms explosive mixture with air. Incompatible with strong acids, caustics, aliphatic amines, isocyanates, oxidizers.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	**RTECS Number:**	**Selected LD50s and LC50s**
NEOPENTYL GLYCOL	TY5775000	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	A primary irritant.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available

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Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
NEOPENTYL GLYCOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
NEOPENTYL GLYCOL	1	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
NEOPENTYL GLYCOL	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
NEOPENTYL GLYCOL	Not Listed	indicator 2; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
NEOPENTYL GLYCOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: *Not regulated*

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
NEOPENTYL GLYCOL	Not Listed

TDG (Canada):

WHMIS hazard class: B4 flammable solids
D2b toxic materials

IMDG/IMO

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IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
NEOPENTYL GLYCOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
NEOPENTYL GLYCOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	204-781-0; C5H12O2
Inventory - Japan:	2-240
Korean KECL:	KE-11811
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
NEOPENTYL GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
NEOPENTYL GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
NEOPENTYL GLYCOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

EPAPA005001414

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End of Safety Data Sheet

EPAPA005001415

MSDS Number: **N3030** * * * * * *Effective Date: **01/09/06** * * * * * Supercedes: **11/10/05***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

NICKEL NITRATE

1. Product Identification

Synonyms: Nickel (II) nitrate, hexahydrate (1:2:6); nickelous nitrate; nitric acid, nickel (2+) salt, hexahydrate; Nickelous nitrate, 6- Hydrate
CAS No.: 13138-45-9 Anhydrous; (13478-00-7 Hexahydrate)
Molecular Weight: 290.83
Chemical Formula: Ni(NO3)2 6H2O
Product Codes:
J.T. Baker: 2784
Mallinckrodt: 6384

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Nickel Nitrate	13138-45-9	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN OR RESPIRATORY REACTION. CANCER HAZARD. CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure. Very toxic to aquatic organisms; may cause long term adverse effects in the aquatic environment.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)
Flammability Rating: 0 - None
Reactivity Rating: 3 - Severe (Oxidizer)
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Yellow (Reactive)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, sore throat, and shortness of breath. Lung damage may result from a single high exposure or lower repeated exposures. Lung allergy occasionally occurs, with asthma type symptoms.
Ingestion:
Toxic. Symptoms may include abdominal pain, diarrhea, nausea, and vomiting. Absorption is poor, but should it occur, symptoms may include giddiness, capillary damage, myocardial weakness, central nervous system depression, and kidney and liver damage.
Skin Contact:
Causes irritation. May cause skin allergy with itching, redness or rash. Some individuals may become sensitized to the substance and suffer "nickel itch", a form of dermatitis.
Eye Contact:
Causes irritation, redness, and pain.
Chronic Exposure:
Prolonged or repeated exposure to excessive concentrations may affect lungs, liver and kidneys. Chronic exposure to nickel and nickel compounds is associated with cancer.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, impaired respiratory or pulmonary function, or with a history of asthma, allergies, or sensitization to nickel compounds may be at an increased risk upon exposure to this substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Wipe off excess material from skin then immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Not combustible, but substance is a strong oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition. Increases the flammability of any combustible material.
Explosion:
Contact with oxidizable substances may cause extremely violent combustion. Strong oxidants may explode when shocked, or if exposed to heat, flame, or friction. Also may act as initiation source for dust or vapor explosions.
Fire Extinguishing Media:
Water or water spray in early stages of fire. Foam or dry chemical may also be used.
Special Information:
Wear full protective clothing and breathing equipment for high-intensity fire or potential explosion conditions.

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage and moisture. Isolate from any source of heat or ignition. Avoid storage on wood floors. Separate from incompatibles, combustibles, organic or other readily oxidizable materials. Areas in which exposure to nickel metal or soluble nickel compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
soluble Nickel compounds as Ni: 1 mg/m3 (TWA)
-ACGIH Threshold Limit Value (TLV):
soluble Nickel compounds as Ni: 0.1 mg/m3 (TWA), A4 - Not classifiable as a human carcinogen
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece particulate respirator (NIOSH type N100 filters) may be worn for up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids. glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.
Other Control Measures:
Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing soluble nickel compounds are handled, processed, or stored. NIOSH recommends pre-placement and periodic medical exams, with maintaining of records for all employees exposed to nickel in the workplace.

9. Physical and Chemical Properties

Appearance:
Green, transparent crystals.
Odor:
Odorless.
Solubility:
238.5g/100cc water @ 0C
Specific Gravity:
2.05
pH:
3.5 - 5.5 (5% solution @ 25C (77F).
% Volatiles by volume @ 21C (70F):

0
Boiling Point:
137C (279F)
Melting Point:
56.7C (135F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
0 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Substance has both oxidant and reducing characteristics, and is unstable when heated or shocked.
Hazardous Decomposition Products:
Emits toxic fumes of nickel and nitrogen oxides when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Aluminum, boron phosphide, cyanides, esters, combustible material, phospham, phosphorus, sodium hypophosphite, stannous chloride, thiocyanates, strong reducing agents, and organic materials.
Conditions to Avoid:
Heat, shock, friction, incompatibles.

11. Toxicological Information

Nickelous Nitrate Hexahydrate; Oral rat LD50: 1620 mg/kg. Investigated as a tumorigen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Nickel Nitrate (13138-45-9)	Yes	No	1

12. Ecological Information

Environmental Fate:
When released into water, this material is not expected to evaporate significantly. This material is not expected to significantly bioaccumulate.

Environmental Toxicity:
Dangerous to the environment. Very toxic to aquatic organisms; may cause long term adverse effects in the aquatic environment.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NICKEL NITRATE
Hazard Class: 5.1
UN/NA: UN2725
Packing Group: III
Information reported for product/size: 4X25LB

International (Water, I.M.O.)

Proper Shipping Name: NICKEL NITRATE
Hazard Class: 5.1
UN/NA: UN2725
Packing Group: III
Information reported for product/size: 4X25LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Nickel Nitrate (13138-45-9)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Nickel Nitrate (13138-45-9)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-	------SARA 313------

Ingredient	RQ	TPQ	List	Chemical Catg.
Nickel Nitrate (13138-45-9)	No	No	No	Nickel cmpd/

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Nickel Nitrate (13138-45-9)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: Yes (Pure / Solid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 1Y
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0** Other: **Oxidizer**
Label Hazard Warning:
DANGER! STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN OR RESPIRATORY REACTION. CANCER HAZARD. CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure. Very toxic to aquatic organisms; may cause long term adverse effects in the aquatic environment.
Label Precautions:
Do not store near combustible materials.
Do not get in eyes, on skin, or on clothing.
Remove and wash contaminated clothing promptly.
Wash thoroughly after handling.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Avoid release to the environment.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, wipe off excess material from skin then immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3, 11, 12, 16.
Disclaimer:
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Brenntag Canada Inc.

BRENNTAG

MATERIAL SAFETY DATA SHEET

AKSHSOL NP 9.5 (NONYL PHENOL), LIQUID

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Road.
Toronto, Ontario
M8Z 2G6
(416) 259-8231

WHMIS Number: 00064783
Index: HCI3605/05A
Effective Date: 2005 March 30
Date of Revision: 2005 March 30
Website: http://www.brenntag.ca

EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)

Toronto, ON (416) 226-6117	Montreal, QC (514) 861-1211	Winnipeg, MB (204) 943-8827
Edmonton, AB (780) 424-1754	Calgary, AB (403) 263-8660	Vancouver, BC (604) 685-5036

PRODUCT IDENTIFICATION

Product Name: Akshsol NP 9.5 (Nonyl Phenol), Liquid.
Chemical Name: Nonyl Phenol Ethoxylate.
Synonyms: Polyoxyethylene (9.5) Nonylphenol.
Chemical Family: Non-ionic surfactant.
Molecular Formula: Not available.
Product Use: Surfactant.
CAS #: 9016-45-9.
WHMIS Classification / Symbol: D-2B: Toxic (Skin and Eye Irritant).

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Causes skin and eye irritation. High vapour concentrations may cause drowsiness. See "Other Health Effects" Section. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

. Inhalation: Excessive contact with mist or spray may cause irritation of mucous membranes, coughing and difficulty in breathing. Vapour from warmed or heated material may cause nausea and dizziness. See "Other Health Effects" Section.

. Skin Contact: Skin contact can cause irritation, especially under the finger nails (and other confined spaces such as under rings or watch bands). May cause defatting, drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis.

. Skin Absorption: A single, prolonged skin exposure is not likely to result in the absorption of toxic amounts of the material.

. Eye Contact: This product causes irritation, redness and pain.

. Ingestion: This product causes irritation, a burning sensation of the mouth and throat and abdominal pain.

Other Health Effects: Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential.

May cause central nervous system (CNS) depression. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure.

3. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Hazardous Ingredients	CAS No.	ACGIH TLV	%
Nonylphenol Polyethylene Glycol Ether	009016-45-9	Not Listed.	60 - 100

4. FIRST AID MEASURES

FIRST AID PROCEDURES

. Inhalation: Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical attention IMMEDIATELY.

. Skin Contact: Start flushing while removing contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, repeat flushing and obtain medical attention.

. Eye Contact: Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.

. Ingestion: Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.

Note to Physicians: This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed.

Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES
Flammability Class (WHMIS): Not regulated.
Flash Point (TCC, Deg. Celsius): Above 150. (3)
Autoignition Temperature (Deg. Celsius): Above 150. (3)
Flammability Limits in Air (%): LEL: Not available. UEL: Not available.

Hazardous Combustion Products: Thermal decomposition products are toxic and may include phenol derivatives, oxides of carbon and irritating gases.

Unusual Fire or Explosion Hazards: Do not direct a solid stream of foam into hot, burning pools. This may cause spattering and increase fire intensity. Closed containers exposed to heat may burst. This material may produce a floating fire hazard in extreme fire conditions.

Sensitivity to Mechanical Impact: Not expected to be sensitive to mechanical impact.
Rate of Burning: Not available.
Explosive Power: Not available.
Sensitivity to Static Discharge: Not expected to be sensitive to static discharge.

EXTINGUISHING MEDIA

Fire Extinguishing Media: Foam. Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog.

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters: Isolate materials that are not involved in the fire and protect personnel. Cool containers with flooding quantities of water until well after the fire is out. Spilled material may cause floors and contact surfaces to become slippery.

Fire Fighting Protective Equipment: Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures: In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Wear protective clothing. Recover spilled material on non-combustible absorbents, such as sand or vermiculite, and place in covered containers for disposal. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices: Use normal "good" industrial hygiene and housekeeping practices. Containers exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn. Vent container frequently, and more often in warm weather, to relieve pressure.

Ventilation Requirements: See Section 8, "Engineering Controls".

Other Precautions: Use only with adequate ventilation and avoid breathing aerosols (vapours or mists). Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use.

STORAGE

Storage Temperature (Deg Celsius): See below.
Ventilation Requirements: General exhaust is acceptable.

Storage Requirements: Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40 Deg. Celsius. Avoid moisture contamination. Protect from direct sunlight. Protect against physical damage.

Special Materials to be Used for Packaging or Containers: Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls: General exhaust is acceptable. Local exhaust ventilation preferred. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection: Safety glasses with side shields are recommended to prevent eye contact. Use chemical safety goggles when there is potential for eye contact. Contact lenses should not be worn when working with this material.

Skin Protection: Gloves and protective clothing made from rubber or plastic should be impervious under conditions of use. Prior to use, user should confirm impermeability. Discard contaminated gloves.

Respiratory Protection: No specific guidelines available. Do not use compressed oxygen in hydrocarbon atmospheres. A NIOSH/MSHA-approved air-purifying respirator equipped with organic vapour cartridges for concentrations up to 1,000 ppm organic vapours. An air-supplied respirator if concentrations are higher or unknown.

If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (4)

Other Personal Protective Equipment: Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

EXPOSURE GUIDELINES

Recommended Exposure Limit: None established for this product.

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State: Liquid.
Appearance and Odour: Colourless to pale yellow liquid. Mild odour.
Odour Threshold (ppm): Not available.
Boiling Range (Deg Celsius): Above 100.
Melting/Freezing Point (Deg Celsius): Not available.
Vapour Pressure (mm Hg at 20 Deg. Celsius): Not available.
Vapour Density (Air = 1.0): Not available.
Relative Density (g/cc): Approximately 1.06.
Bulk Density: 1,060 Kg/M3.
Viscosity: Approximately 250 cPs at 25 Degrees Celsius.
Evaporation Rate (Butyl Acetate = 1.0): Not applicable.
Water Solubility: Soluble in water. Soluble in Ethylene Glycol or Xylene.
Solubility: Not soluble in Paraffin Oils, Mineral Oil or Vegetable Based Oil.
% Volatile by Volume: Not available.
pH: 5 to 8.
Coefficient of Water/Oil Distribution: Not available.
Volatile Organic Compounds (VOC): Not applicable.

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY
Under Normal Conditions: Stable.

Under Fire Conditions: Not flammable.
Hazardous Polymerization: Will not occur.

Conditions to Avoid: High temperatures, sparks, open flames and all other sources of ignition. Keep tightly closed to protect quality.

Materials to Avoid: Strong oxidizers. Lewis or mineral acids.

Decomposition or Combustion Products: Thermal decomposition products are toxic and may include phenol derivatives, oxides of carbon and irritating gases.

11. TOXICOLOGICAL INFORMATION

Toxicological Data:

Nonylphenol Polyethylene Glycol Ether	LD50 (Oral, Rat)	= 1,310 - 2,500 mg/Kg (1)
	LD50 (Dermal, Rabbit)	= 2 mL/Kg (1)

Carcinogenicity Data: The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.
Reproductive Data: No adverse reproductive effects are anticipated.
Mutagenicity Data: No adverse mutagenic effects are anticipated.
Teratogenicity Data: No adverse teratogenic effects are anticipated.
Respiratory / Skin Sensitization Data: None known.
Synergistic Materials: None known.

Other Studies Relevant to Material: Based on the available findings to date, no direct link has been established between exposure to Alkylphenol Ethoxylates (APEs) or their biodegradation intermediates in the environment and any harmful effect on humans due to endocrine (hormone) disruption. (9)

A study by the U.S. government's National Institute of Environment Health Sciences showed no effect on reproduction in laboratory animals exposed to nonylphenol (NP). The study concluded that "NP was not a selective reproductive/developmental toxicant." In this study of three generations of rats, there was some estrogenic activity at the two higher doses (approximately 50 or 150 mg/Kg body weight per day) and no activity at the lower doses (approximately 15 mg/Kg body weight per day). The lower dose was several orders of magnitude higher than the estimated, maximum daily human intake. There was no adverse effect on fertility even at the highest dose. (9)

Commercial APEs, such as Nonylphenol Ethoxylate-4 (NPE4), NPE9 and Octylphenol Ethoxylate-5 (OPE5), have not demonstrated estrogenic activity when tested in the uterotrophic assay of the classic live animal study. (9)

12. ECOLOGICAL INFORMATION

Ecotoxicity: Not available. May be harmful to aquatic life.

Environmental Fate: This product is biodegradable. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

Biological Degradability: Approximately 80 %. (3)

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals: None required.

Waste Disposal Methods: This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in

accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.

Safe Handling of Residues: See "Waste Disposal Methods".

Disposal of Packaging: Empty containers retain product residue. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT / U.S. DOT CLASSIFICATION: Not regulated.

15. REGULATORY INFORMATION

CANADA
CEPA - NSNR: All constituents of this product are included on the DSL.
CEPA - NPRI: Nonyl Phenol Ethoxylate.
Controlled Products Regulations Classification (WHMIS): D-2B: Toxic (Skin and Eye Irritant).

USA
Environmental Protection Act: All constituents of this product are included on the TSCA inventory.
OSHA Hazard Communication (29CFR 1910.1200) Classification: Skin and Eye Irritant.

HMIS: 1 Health, 1 Fire, 0 Reactivity. (8)

INTERNATIONAL: Not available.

16. OTHER INFORMATION

ADDITIONAL INFORMATION AND SOURCES USED

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. "CHEMINFO", through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2004, American Conference of Governmental Industrial Hygienists, Cincinnati, 2004.
6. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.
7. NFPA 325M Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1994 Edition, Quincy, MA, 1994.
8. Regulatory Affairs Group, Brenntag Canada Inc.
9. Alkylphenol Ethoxylates (APE) Research Council, Washington, D.C., February, 2000. http://www.aperc.org/canada.htm

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

British Columbia: 20333-102B Avenue, Langley, BC, V1M 3H1
Phone: (604) 513-9009 Facsimile: (604) 513-9010

Alberta: 6628 - 45 th. Street, Leduc, AB, T9E 7C9
Phone: (780) 986-4544 Facsimile: (780) 986-1070

Manitoba: 681 Plinquet Street, Winnipeg, MB, R2J 2X2
Phone: (204) 233-3416 Facsimile: (204) 233-7005

Ontario: 43 Jutland Road, Toronto, ON, M8Z 2G6
Phone: (416) 259-8231 Facsimile: (416) 259-6175

Quebec: 2900 Jean Baptiste Des., Lachine, PQ, H8T 1C8
Phone: (514) 636-9230 Facsimile: (514) 636-0877

Atlantic: A-105 Akerley Boulevard, Dartmouth, NS, B3B 1R7
Phone: (902) 468-9690 Facsimile: (902) 468-3085

Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.

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Naphthenic Acid
Material Safety Data Sheet

Section	Title	Section	Title
1 –	Company and Product Identification	9 –	Physical and Chemical Properties
2 –	Composition, Information on Ingredients	10 –	Stability and Reactivity
3 –	Hazards Identification	11 –	Toxicological Information
4 –	First Aid Measures	12 –	Ecological Information
5 –	Fire Fighting Measures	13 –	Disposal Considerations
6 –	Accidental Release Measures	14 –	Transport Information
7 –	Handling and Storage	15 –	Regulatory Information
8 –	Exposure Controls and Personal Protection	16 –	Other Information

SECTION 1. Company and Product Identification

1.1 MSDS Name: Naphthenic Acid

Chemical Name: Naphthenic Acid

Synonyms: Sunaptic Acid B and Sunaptic Acid C

Chemical Formula: RCOOH

Molecular Weight: 200-350-Mixture

CAS Number: 1338-24-5

EINECS Number: 215-662-8

1.2 Supplier: Port Arthur Chemical & Environmental Services, LLC
2420 South Gulfway Drive
Port Arthur, TX 77640
713-416-4160

1.4 Emergency Contact: **Bo Cumberland 713-416-4160**
CHEMTREC 800-424-9300

SECTION 2. Composition and Information on Ingredients

2.1 Chemical Ingredients (% by wt):

CAS #	Chemical Name	Percent	EINECS / ELINCS
1338-24-5	Napthenic Acid	ca. 100	215-662-8

SECTION 3. Hazards Identification

3.1 Appearance: Clear Light Yellow Viscous Liquid.
Caution! May cause eye and skin irritation. May cause respiratory and digestive tract irritation. The toxicological properties of this material have not been fully investigated.
Target Organs: No data found.

3.2 Eyes: May cause eye irritation.

3.4 Skin: May cause skin irritation.

3.5 Ingestion: May cause irritation of the digestive tract. The toxicological properties of this substance have not been fully investigated.

3.6 Inhalation: May cause respiratory tract irritation. The toxicological properties of this substance have not been fully investigated.

3.7 Chronic: No information found.

SECTION 4. First Aid Measures

4.1 Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

4.2 Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

4.3 Ingestion: Never give anything by mouth to an unconscious person. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Get medical aid if irritation or symptoms occur.

4.4 Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

4.5 Notes to Physician: Treat symptomatically and supportively.

SECTION 5. Fire Fighting Measures

5.1 General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protection gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas.

5.2 Extinguishing Media: Water may be ineffective. Use agent most appropriate to extinguish fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

5.3 Flash Point: 149 deg C (300.20 deg F)

5.4 Auto-ignition Temperature: Not Applicable

5.5 Exposure Limits, Lower: 1%

5.6 Upper: Not Available

5.7 NFPA Rating: (estimated) Health:0; Flammability:0; Instability: 0

SECTION 6. Accidental Release Measures

6.1 General Information: Use proper personal protective equipment as indicated in Section 8 (below).

6.2 Spills and Leaks: Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do NOT use combustible materials such as sawdust. Provide ventilation.

SECTION 7. Handling and Storage

7.1 Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

7.2 Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

SECTION 8. Exposure Controls and Personal Protection

8.1 Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

8.2 Exposure Limits:

Chemical Name	ACGIH	NIOSH	OSHA – Final PELs
Napthenic Acid	None Listed	None Listed	None Listed

8.3 OSHA Vacated PELs: Napthenic Acid: No OSHA Vacated PELs are listed for this chemical.

8.4 Personal Protection Equipment:

- **Eyes:** 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:** Wear appropriate protective gloves to prevent skin exposure.
- **Clothing:** Wear appropriate protective clothing to prevent skin exposure.
- **Respirators:** A respiratory protection program that meets OSHA'S 29 CFR 1910.134 and ANSIZ88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

SECTION 9. Physical and Chemical Properties

9.1 Physical State: Viscous Liquid

9.2 Appearance: Clear Light Yellow

9.3 Odor: None Reported

9.4 pH: Not Available

9.5 Vapor Pressure: Very Low

9.6 Vapor Density: Not Available

9.7 Evaporation Rate: Not Available

SECTION 9. Physical and Chemical Properties CONTINUED

9.8 Viscosity: 25 deg C ST

9.9 Boiling Point: 160.0 – 198.0 deg C @ 6.00mm

9.10 Freezing and Melting Point: Not Available

9.11 Decomposition Temperature: Not Available

9.12 Solubility: Not Available

9.13 Specific Gravity and Density: 0.982 g/cm3

9.14 Molecular Formula: Not Applicable

9.15 Molecular Weight: Not Available

SECTION 10. Stability and Reactivity

10.1 Chemical Stability: Stable under normal temperatures and pressures.

10.2 Conditions to Avoid: Incompatible materials, strong oxidants.

10.3 Incompatibilities with Other Materials: Metals, strong oxidizing agents.

10.4 Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

10.5 Hazardous Polymerization: Has not been reported.

SECTION 11. Toxicological Information

11.1 RTECS #:

11.2 CAS #: 1338-24-5: QK8750000

11.3 LD50 AND LC50:

11.4 Oral: Rat: LD50 = 3gm/kg

11.5 Carcinogenicity: CAS# 1338-24-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

SECTION 11. Toxicological Information CONTINUED

11.6 Epidemiology: No information found

11.7 Teratogenicity: No information found

11.8 Reproductive Effects: No information found

11.9 Mutagenicity: No information found

11.10 Neurotoxicity: No information found

SECTION 12. Ecological Information

No Information Available

SECTION 13. Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None Listed
RCRA U-Series: None Listed

SECTION 14. Transportation Information

	U.S. DOT	Canada TDG
Shipping Name:	Not Regulated as a Hazardous Material	No Information Available
Hazard Class:	9137	
UN Number:		
Packing Group:		

SECTION 15. Regulatory Information

U.S. Federal

15.1 TSCA: CAS# 1338-24-5 is listed on the TSCA inventory.

15.2 Health and Safety Reporting List: None of the chemicals are on the Health & Safety Reporting List.

SECTION 15. Regulatory Information CONTINUED

15.3 Chemical Test Rules: None of the chemicals in this product are under a Chemical Test Rule.

15.4 Section 12b: None of the chemicals are listed under TSCA Section 12b.

15.5 TSCA Significant New Use Rule: None of the chemicals in this material have a SNUR under TSCA.

15.6 CERCLA Hazardous Substances and Corresponding RQs: CAS# 1338-24-5: 100 lb final RQ; 45.4 kg final RQ.

15.7 SARA Section 302 Extremely Hazardous Substances: None of the chemicals in this product have a TPQ.

15.8 Section 313: No chemicals are reported under Section 313.

15.9 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 depeletors.

15.10 Clean Water Act: CAS# 1338-24-5 is listed as a 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.

15.11 OSHA: None of the chemicals in this product are considered highly hazardous by OSHA.

15.12 State: CAS# 1338-24-5 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

15.13 California Prop 65: California No Significant Risk Level: None of the chemical in this product are listed.

15.14 European / International Regulations: European Labeling in Accordance with EC Directives.

15.15 Hazard Symbols: Not Available

15.16 Risk Phrases:

15.17 Safety Phrases: S 24/25 Avoid contact with skin and eyes.

SECTION 15. Regulatory Information CONTINUED

15.18 WGK (Water Danger/Protection): CAS# 1338-24-5: 1

15.19 Canada – DSL/NDSL: CAS# 1338-24-5 is listed on Canada's DSL List.

15.20 Canada – WHMIS: Not Available. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

15.21 Canadian Ingredient Disclosure List: No Information Listed

SECTION 16. Additional Information

MSDS Creation Date: November 7, 2008

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EPAPA005001440

Material Safety Data Sheet

WEAK Naphthenic CAUSTIC SOLUTION

SECTION 1 – Chemical Product and Company Identification
SECTION 2 – Composition, Information on Ingredients
SECTION 3 – Hazards Identification
SECTION 4 – First Aid Measures
SECTION 5 – Fire Fighting Measures
SECTION 6 – Accidental Release Measures
SECTION 7 – Handling and Storage
SECTION 8 – Exposure Controls and Personal Protection
SECTION 9 – Physical and Chemical Properties
SECTION 10 – Stability and Reactivity
SECTION 11 – Toxicological Information
SECTION 12 – Ecological Information
SECTION 13 – Disposal Considerations
SECTION 14 – Transport Information
SECTION 15 – Regulatory Information
SECTION 16 – Other Information

SECTION 1 – CHEMICAL PRODUCT and COMPANY IDENTIFICATION

1.1	Product Name	Naphthenic Caustic Solution
	Chemical Family	Inorganic Salt Solution
	Formula	NA (mixture)
1.2	Manufacturer/Source	Port Arthur Chemical & Environmental Services, LLC. 2420 S. Gulfway Dr Port Arthur, TX 77021 713-416-4160
1.3	Emergency Contact	Bo Cumberland 713-416-4160 CHEMTREC 800-424-9300

SECTION 2 – COMPOSITION and INFORMATION ON INGREDIENTS

2.1 Chemical Ingredients (% by wt)

	Typical Analysis	
Sodium Sulfide (Na2S)	CAS#: 1313-82-2	0 – 4%
Sodium Hydroxide (NaOH)	CAS#: 1310-73-2	0 –11%
Naphthenic Acid		0- 5%
Water		remaining %

SECTION 3 – HAZARDS IDENTIFICATION

NFPA: Health – 3 Flammability – 0 Reactivity – 1

EMERGENCY OVERVIEW

Warning: Solution is highly alkaline.
May evolve small amounts of hydrogen sulfide, a highly toxic gas.
EYE contact will cause marked eye irritation and possible corneal damage.
SKIN contact will result in irritation and possible corrosion of the skin.
INGESTION will irritate and burn the mouth, throat and the gastrointestinal tract; contact with stomach acid will cause hydrogen sulfide vapors to be released.
HEATING or ACID contact will cause hydrogen sulfide gas to evolve.

3.1 POTENTIAL HEALTH EFFECTS

EYE: Contact with the eyes will cause marked eye irritation and possibly severe corneal damage.

SKIN CONTACT: Contact with the skin will cause skin irritation or a burning sensation. Prolonged contact will result in corrosion of the skin.

SKIN ABSORPTION: Absorption is unlikely to occur.

INGESTION: Ingestion will result in severe burning and corrosion of mouth, throat and the gastrointestinal tract. If the ingested material contacts stomach acid, highly toxic hydrogen sulfide gas will be evolved.

INHALATION: Product solution and vapors may contain a small amount of hydrogen sulfide gas in ppm. Exposure to this gas causes headaches, nausea, dizziness and continued exposure can lead to loss of consciousness and death.

CHRONIC EFFECTS – CARCINOGENICITY: Not listed as a carcinogen by NTP, IARC or OSHA.

SECTION 4 – FIRST AID MEASURES

4.1 **EYES:** Immediately flush with large quantities of water for 15 minutes. Hold eyelids apart during irrigation to insure thorough flushing of the entire area of the eye. Obtain immediate medication.

4.2 **SKIN:** Immediately flush with large quantities of water. Remove contaminated clothing under a safety shower. Obtain immediate medical attention.

4.3 **INGESTION:** DO NOT INDUCE VOMITING. If victim is conscious, immediately give 2 to 4 glasses of water. If vomiting does occur, repeat fluid administration. Obtain immediate medical attention.

4.4 **INHALATION:** Remove victim form contaminated atmosphere. If breathing is labored, administer oxygen. If breathing has ceased, clear airway and start mouth to mouth resuscitation. If heart has stopped beating, external heart massage should be applied. Obtain immediate medical attention.

SECTION 5 – FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

FLASH POINT: Not Flammable METHOD USED: NA

5.2 FLAMMABLE LIMITS: Hydrogen Sulfide LFL: 4% UFL: 44%

5.3 EXTINGUISHING MEDIA: Water spray or foam or as appropriate for combustion involved in fire.

5.4 FIRE and EXPLOSIVE HAZARDS: Solution is non-flammable. However if these solutions are exposed to heat or acids, hydrogen sulfide will be released and may form explosive mixtures with air (see above). Keep containers and/or storage vessels in fire area cooled with water spray. Heating may cause the release of some hydrogen sulfide vapors.

5.5 FIRE FIGHTING EQUIPMENT: Because of the possible presence of toxic gases and the corrosive nature of the product, wear self-contained breathing apparatus, positive pressure, MSHA / NIOSH (approved or equivalent) and full protective gear.

SECTION 6 – ACCIDENTIAL RELEASE MEASURES

6.1 SMALL RELEASES: Isolate for 75 feet. Confine area to qualified response personnel. Wear proper Personnel Protective equipment (See Section 8). Confine release material by berming or diverting its path Absorb on sand, earth or other inert dry absorbent. Do not allow into sewer, storm drains or any waterway. Oxidize residual reactive sulfides with a weak (3-5%) hydrogen peroxide solution to stop the release of any hydrogen sulfide. Remove contaminated soil and dispose of in accordance with all governmental regulations.

6.2 LARGE RELEASES: Activate Emergency Response Plan procedures. Isolate release area for 500 feet. Confine area to qualified response personnel. Wear proper Personnel Protective Equipment (See Section 8). Shut off release, if safe to do so. Dike spill area to prevent runoff into sewers, drains, or surface waterways .
Treat remaining material as a small release (See 6.1).

SECTION 7 – HANDLING and STORAGE

7.1 HANDLING: Wear proper protective equipment (See Section 8). Avoid breathing product vapors. Avoid contact with skin and eyes. Use only in a well ventilated area. Dilute product only in enclosed containers. Wash thoroughly after handling.

7.2 STORAGE: Store in well ventilated areas. Do not store combustibles in the area of storage vessels. Keep away from any sources of heat or flame.

SECTION 8 – EXPOSURE CONTROLS and PERSONAL PROTECTION

8.1 RESPIRATORY PROTECTION: If working near open container or storage vessel opening or open tank truck dome cover, have available self-contained breathing apparatus, positive pressure, MSHA / NIOSH (approved or equivalent), or respirator. Normally, this caustic has a low concentration of sulfides below 10000 ppm, in solution which may not require the use of a respirator.

8.2 SKIN PROTECTION: Neoprene rubber gloves, pvc rain suit and boots can be worn to prevent contact with the liquid. Wash contaminated clothing prior to reuse. Contaminated leather shoes cannot be cleaned and should be discarded.

8.3 EYE PROTECTION: Chemical goggles and a full face shield.

8.4 EXPOSURE GUIDELINES:

	OSHA		ACGIH	
	TWA	STEL	TLV	STEL
Hydrogen Sulfide	20 ppm (ceiling)		10 ppm (ceiling)	

8.5 ENGINEERING CONTROLS: Use adequate exhaust ventilation to prevent inhalation of product vapors. Where feasible scrub process or storage vessel vapors with caustic solution. Maintain eye wash safety shower in areas where chemical is handled.

SECTION 9 – PHYSICAL and CHEMICAL PROPERTIES

9.1 APPEARANCE: Light to dark brown to green or red liquid.

9.2 ODOR: Possibly hydrogen sulfide (rotten egg) odor.

9.3 BOILING POINT: Not Determined

9.4 VAPOR PRESSURE: Not Determined

9.5 VAPOR DENSITY: (Air = 1.0) 1.17

9.6 SOLUBILITY IN WATER: Complete

9.7 SPECIFIC GRAVITY: 1.03 – 1.3 (8.59 – 10.83 lbs/gal)

9.8 pH : 11.5 – 13.5

9.9 VOLATILE: Not Determined

SECTION 10 – STABILITY and REACTIVITY

10.1 STABILITY: This is a stable material.

10.2 HAZARDOUS POLYMERIZATION: Will not occur.

10.3 HAZARDOUS DECOMPOSITION PRODUCTS: Heating product may evolve H2S gas. Fire conditions will cause the production of sulfur dioxide. Hydrogen sulfide (4 – 44%) may form flammable mixtures with air.

10.4 INCOMPATIBILITY: Acids will cause the release of highly toxic hydrogen sulfide. Sulfidic caustic solution is not compatible with copper, zinc, aluminum or their alloys (i.e. bronze, brass, galvanized metals, etc.).
(See Section 7.2 Storage)

SECTION 11 – TOXICOLOGICAL INFORMATION

11.1 ORAL: Data not available.

11.2 DERMAL: Data not available.

11.3 INHALATION: INH-RAT LC 50: 444 ppm (hydrogen sulfide)

11.4 CHRONIC and CARCINOGENICITY: No evidence available.

11.5 TERATOLOGY: Data not available.

11.6 REPRODUCTION: Data not available.

11.7 MUTAGENICITY: Data not available.

SECTION 12 – ECOLOGICAL INFORMATION

None Available

SECTION 13 – DISPOSAL CONSIDERATIONS

If released to the environment for other than its intended purpose, this product contains some reactive sulfides but not a sufficient quantity to meet the definition of a D003, hazardous waste. The pH may be high enough to meet the definition of a corrosive waste, D002.

SECTION 14 – TRANSPORT INFORMATION

14.1 DOT SHIPPING NAME: Corrosive liquids, n.o.s.

14.2 DOT HAZARD CLASS: 8

14.3 UN/NA NUMBER: UN1760

14.4 PACKING GROUP: II

14.5 DOT PLACARD: Corrosive

14.6 DOT LABLE(s): Corrosive

14.7 IMO SHIPPING NAME: Sodium Hydroxide Solution

14.8 RQ (REPORTABLE QUANTITY): 1,000 lbs (454 Kg) 100% basis (Approx. 538 gals)

14.9 USCG BARGE CERTIFICATION: SSH (sodium sulfide, hydrosulfide solutions, H2S 15 ppm or less). SSI (sodium sulfide, hydrosulfide solutions, H2S greater than 15 ppm but less than 200 ppm).

SECTION 15 – REGULATORY INFORMATION

15.1 OSHA: This product is listed as a hazardous material under criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200.

15.2 SARA TITLE III. a. EHS (Extremely Hazardous Substance) List:

b. Sections 311 and 312 (Tier I, II) Categories:

Immediate (acute)	Yes
Fire	No
Sudden Release	No
Reactivity	Yes
Delayed (chronic)	No

c. Section 313 (Toxic Release Report-Form R): No

d. TPQ (Threshold Planning Quantity): No

15.3 CERCLA and SUPERFUND: RQ (Reportable Quantity) 1,000 lbs

15.4 TSCA (Toxic Substance Control Act) Inventory List: Yes

15.5 RCRA (Resource Conservation and Recovery Act) Status: No

15.6 WHMIS (Canada) Hazard Classification: E, D1

15.7 DOT HAZARDOUS MATERIAL: (See Section 14) Yes

15.8 CAA HAZARDOUS AIR POLLUTANT (HAP): No

SECTION 16 – OTHER INFORMATION

REVISIONS: The entire MSDS was reformatted to comply to ANSI Standard Z400.1-1993.

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MATERIAL SAFETY DATA SHEET

Sheet No. 9500

SECTION 1: PRODUCT IDENTIFICATION

Catalog No.: D-1947
Product Name: *n*-Octyl-d_{17} Alcohol
CAS No.: 153336-13-1

SECTION 2: CHEMICAL INFORMATION (UNLABELLED)

Chemical Name: *n*-OCTYL ALCOHOL
CAS No.: 111-87-5
Synonyms: 1-Octanol; Capryl Alcohol; Caprylic Alcohol; 1-Hydroxyoctane

SECTION 3: HAZARDS IDENTIFICATION

Known Hazards: COMBUSTIBLE, IRRITANT

SECTION 4: FIRST AID MEASURES

Skin Contact: Wash with water.
Ingestion: Medical assistance for gastric lavage.
Inhalation: Remove to fresh air, artificial respiration or oxygen if necessary.

SECTION 5: FIRE FIGHTING MEASURES

Extinguishing Media: Carbon dioxide, dry chemical powder, foam.
Special Fire Fighting Equipment: Wear a self-contained breathing apparatus and protective clothing.
Unusual Fire and Explosion Hazards: Combustible.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
Spill Clean-up Methods: Provide adequate ignition-proof ventilation. Remove all heat and ignition sources. Carefully absorb on vermiculite and transfer to a closed container.

SECTION 7: HANDLING AND STORAGE

Usage/Handling Precautions: Good fumehood
Storage Conditions: Store at room temperature. Adequate ventilation. Protect from heat and ignition sources. Protect from light.

SECTION 8: EXPOSURE CONTROL / PERSONAL PROTECTION

Respiratory Protection: Self-contained breathing apparatus or chemical cartridge.
Hand Protection: Chemical-resistant gloves, solvent-resistant gloves.
Eye Protection: Wear safety goggles.
Other Protective Equipment: Protective clothing.
Other Protective Measures: Provide safety showers and eyewash station near workplace.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Colorless liquid
Odour: *Penetrating, aromatic odor*

Boiling Point (°C):	194-6	**Density:**	0.83
Melting Point (°C):	-15 to -17	**Vapour Density (Air = 1):**	4.5
Vapour Pressure (mm Hg):	< 1	**Volatiles (%):**	100
Water Solubility (%):	< 0.1		
Flash Point (°C):	81	**Method:**	Closed cup
Autoignition Temperature (°C):	272		

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.
Incompatibility (Materials to Avoid): *Oxidizing/reducing agents.*
Hazardous Decomposition Products: CO/CO_2 on combustion.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute and Chronic Health Hazards

Oral LD_{50}:	1790 mg/kg (mouse)	**Dermal Mild:**	500 mg (rabbit)
INV LD_{50}:	69 mg/kg (mouse)		
TLV:	None verified.		

Effects of Overexposure: Irritant (eyes, respiratory, skin). Possible skin sensitizer.

SECTION 12: ECOLOGICAL INFORMATION

Data not yet available.

SECTION 13: DISPOSAL CONSIDERATIONS

Disposal Procedures: Via licensed disposal company. Dispose of according to federal and local regulations.

SECTION 14: TRANSPORT INFORMATION

Contact C/D/N Isotopes Inc.

SECTION 15: REGULATORY INFORMATION

TLV: None verified.

SECTION 16: OTHER INFORMATION

This product is not radioactive. The data given for this product are those of the corresponding unlabelled product indicated in Section 2, unless specifically indicated otherwise. Safety data for the labelled compounds are generally unavailable but the hazards and properties are assumed to be similar or identical to those of the unlabelled compounds. While the information set forth is believed to be accurate, C/D/N ISOTOPES INC. extends no warranties with respect hereto and disclaims all liabilities from reliance thereon. All judgements as to the suitability of the data presented with respect to the use of this product are the responsibility of the purchaser and intended user.

Date: May 24, 2006

C/D/N ISOTOPES INC. Vincent Guay

Vincent Guay, Ph.D.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Crude Oil Tank Bottom Sludge
Product Code: None
Generic Name: Refinery Intermediate
Chemical Family: Petroleum Hydrocarbon

Responsible Party: Unocal Corporation
Union Oil Company of California
14141 Southwest Freeway
Sugar Land, Texas
77478

For further information contact MSDS Coordinator
8am - 4pm Central Time, Mon - Fri: 337-295-6198

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:

For Chemical Emergencies:	For Health Emergencies:
Spill, Leak, Fire or Accident	San Francisco Poison
Call CHEMTREC	Control Center
North America: (800)424-9300	Cont. US: (800)356-3129
Others: (703)527-3887(collect)	Outside US: (415)821-5338

Health Hazards: May contain or liberate poisonous hydrogen sulfide gas. Probable skin cancer hazard. Use ventilation adequate to keep exposures below recommended limits (see Section 2). Avoid breathing vapor or mist. Avoid contact with eyes, skin and clothing. Do not taste or swallow. Wash thoroughly after handling.

Physical Hazards: Flammable liquid and vapor. Keep away from heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment).

< Physical Form: Solid with Liquid
< Appearance: Sludge
< Odor: Hydrocarbon

NFPA HAZARD CLASS:		
	Health:	2 (Moderate)
	Flammability:	3 (High)
	Reactivity:	0 (Least)

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2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	% Weight	EXPOSURE GUIDELINE Limits	Agency	Type
Crude Oil CAS# 8002-05-9	1-25	Not Established		
Sulfur	0.01-1.4	Not Established		
Hydrogen Sulfide CAS# 110-54-3	Varies(<1)	10 ppm	ACGIH	TWA
		15 ppm	ACGIH	STEL
		20 ppm	OSHA	CEIL
		10 ppm	MSHA	TWA
		10 ppm	Cal.OSHA	TWA
		15 ppm	Cal.OSHA	STEL
		50 ppm	Cal.OSHA	CEIL

OTHER COMPONENTS	% Weight	EXPOSURE GUIDELINE Limits	Agency	Type
Soil CAS# None	25-97	Not Established		
Water CAS# 7732-18-5	1-25	Not Established		

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or you local agencies, for further information.

3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

Eye: Contact may cause mild eye irritation including stinging, watering and redness.

Skin: Contact may cause mild skin irritation including redness, burning, and drying and cracking of the skin. No harmful effects from skin absorption are expected.

Inhalation (Breathing): Low to moderate degree of toxicity by

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inhalation.

Ingestion (Swallowing): Low degree of toxicity by ingestion.

Signs and Symptoms: Effects of overexposure may include irritation of the nose, throat and digestive tract, nausea, vomiting, diarrhea, transient excitation followed by signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, and fatigue), coughing, runny nose, shortness of breath, chest pain, blurred vision, abdominal pain, muscle weakness, irregular heartbeats (arrhythmias), pulmonary edema (accumulation of fluids in the lungs), breathing difficulties, respiratory failure, convulsions, coma and death.

Cancer: Probable human skin cancer hazard (see Sections 11 and 14).

Target Organs: No data available.

Developmental: Potential hazard to the fetus (see Section 11).

Other Comments: This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin and respiratory (asthma-like) disorders.

Exposure to high concentrations of this material may increase the sensitivity of the heart to certain drugs. Persons with pre-existing heart disorders may be more susceptible to this effect (see Section 4 - Note to Physicians).

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Wipe material from skin and remove contaminated shoes and clothing. Cleanse affected area(s) thoroughly by washing with mild soap and water and, if necessary, a waterless skin cleanser. If irritation or redness develops, seek medical attention.

Inhalation (Breathing): If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Note To Physicians: Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (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.

This material may contain or liberate hydrogen sulfide. In high doses hydrogen sulfide may produce pulmonary edema and respiratory depression or paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. If unresponsive to supportive care, nitrites may be an effective antidote.

5. FIRE FIGHTING MEASURES

Flammable Properties:
Flash Point: 100-<200°F
OSHA Flammability Class: Flammable Liquid
LEL/UEL: No data
Autoignition Temperature: No data

Unusual Fire & Explosion Hazards: This material is flammable and can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it

can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Fire Fighting Instructions: Hazardous combustion/decomposition products may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection. For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8). Prevent spilled material from entering sewers, storm drains, other unauthorized treatment drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors (see Section 5). Spilled material may be absorbed into an appropriate absorbent material. Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is make into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Section 2 and 8). Wash thoroughly after handling. Do not wear contaminated clothing or shoes. Use good personal hygiene practice.

"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 governmental and industrial references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. In a tank, barge, or other closed container, the vapor space above materials that contain hydrogen sulfide (H2S) may result in concentrations immediately dangerous to life and health (IDLH). Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area "No Smoking or Open Flame." Store only in approved containers. 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 OSHA standards and appropriate fire codes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see

appropriate electrical codes).

Personal Protective Equipment (PPE):

Respiratory: Wear a positive pressure air supplied respirator in situations where there may be potential for airborne exposure to H2S above exposure limits (see Section 2). H2S has poor warning properties, and appropriate air purifying cartridges are not commercially available. A NIOSH certified air-purifying respirator with an organic vapor cartridge may be used under conditions where H2S is not detected, and airborne concentrations of hydrocarbons are expected to exceed exposure limits. Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Skin: The use of gloves impermeable to the specific material handled is advised to prevent skin contact and possible irritation (see glove manufacturer literature for information on permeability).

Eye/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

Flash Point: 100-<200°F
Flammable/Explosive Limits (%): No data
Autoignition Temperature: No data
Appearance: Sludge
Physical State: Solid with Liquid
Odor: Hydrocarbon
pH: No data

Vapor Pressure (mm Hg): No data
Vapor Density (air=1): No data
Boiling Point: No data
Freezing/Melting Point: No data
Solubility in Water: Insoluble
Specific Gravity: 0.98
Bulk Density: 8.18 lbs/gal

10. STABILITY AND REACTIVITY

Chemical Stability: Stable under normal conditions of storage and handling. Flammable liquid and vapor. Vapor can cause flash fire.

Conditions To Avoid: Avoid all possible sources of ignition (see Sections 5 & 7).

Incompatible Materials: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Combustion can yield carbon dioxide, carbon monoxide, other organic compounds, hydrogen sulfide and sulfur oxides.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Crude Oil (CAS# 8002-05-9)

Carcinogenicity: Chronic application of crude oil to mouse skin resulted in an increased incidence of skin tumors. Crude oil has been identified as a carcinogen by IARC.

Developmental: Dermal exposure to crude oil during pregnancy resulted in limited evidence of developmental toxicity in laboratory animals. Decreased fetal weight and increased resorptions were noted at maternally toxic doses. No significant effects on pup growth or other developmental landmarks were observed postnatally.

12. DISPOSAL CONSIDERATIONS

If generated during exploration development and production of crude oil, natural gas, or geothermal energy, this material is exempt from RCRA (40 CFR 261.4(b)(5); FR Vol 53, No. 129, 7/6/88, 25446, 25453). Otherwise, this material, if discarded as produced, would be a RCRA

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"characteristic" hazardous waste due to the characteristic(s) of ignitability (D001), benzene (D018) and possibly reactivity (D003). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this material, once it becomes a waste, is subject to the land disposal restriction in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

13. TRANSPORT INFORMATION

DOT Proper Shipping Name / Technical Name: Determined on a case-by-case basis
Hazard Class or Division: 3
ID #: Not determined

14. REGULATORY INFORMATION

This material contains the following chemicals subject to the reporting requirements of **SARA 313** and 40 CFR 372:

COMPONENT	CAS NUMBER	WEIGHT %
Hydrogen Sulfide	7783-06-4	Varies <1%

Warning: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of **California Proposition 65** (CA Health & Safety Code Section 25249.5):

COMPONENT	EFFECT
Benzene	Cancer
Various Polycyclic Aromatic Hydrocarbons	Skin Cancer
Toluene	Developmental Toxicant

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components.

EPA (CERCLA) Reportable Quantity: ----None----

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15. DOCUMENTARY INFORMATION

Issue Date: 11/29/99
Previous Issue Date: 03/31/99
Product Code: 1267
Previous Product Code: 1267

16. DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information in this document is believed to be correct as of the date issued. **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 THIS INFORMATION, 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.** This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of the product for his particular purpose and on the condition that he assume the risk of his use thereof.

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OILY WATER

MATERIAL SAFETY INFORMATION SHEET

safety-kleen.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **OILY WATER**

SYNONYMS: Waste oil; Used lubricating oil; Oil and water mixture

PRODUCT PART NUMBER(S): Not applicable.

PRODUCT USE: Oil or water mixture for re-refining or reprocessing.
If this product is used in combination with other products, refer to the Material Safety Data Sheets for those products.

	24-HOUR EMERGENCY PHONE NUMBERS	
These numbers are for emergency use only. If you desire non-emergency product information, please call a phone number listed below.	**MEDICAL:**	**TRANSPORTATION (SPILL):**
	1-800-752-7869	**1-800-468-1760**

MANUFACTURER/ SUPPLIER: Safety-Kleen Systems, Inc.
5400 Legacy Drive
Cluster II, Building 3
Plano, Texas 75024
USA
1-800-669-5740
www.Safety-Kleen.com

TECHNICAL INFORMATION: 1-800-669-5740 Press 1 then 1 then Extension 7500

MSDS FORM NUMBER: 82962 **ISSUE:** NEW ISSUE

ORIGINAL ISSUE: May 12, 2004 **SUPERSEDES:** NA

PREPARED BY: Product MSDS Coordinator **APPROVED BY:** MSDS Task Force

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

				OSHA PEL		ACGIH TLV®			
WT%	NAME	SYNONYM	CAS NO.	TWA	STEL	TWA	STEL	LD[a]	LC[b]
21-79	Lubricating oils, used	Used oil	70514-12-4	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.
21-79*	Water/solids	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.
0 to 10*	Hydrocarbon solvents. May include gasoline, diesel fuel, jet fuel, mineral spirits, etc.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.
0 to 1.5*	Metals. May include lead, iron, zinc, copper, chromium, arsenic, nickel, and others: each below 1.0 WT%.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.
0 to 1.0*	Polynuclear aromatics. May include naphthalene, fluoranthene, phenanthrene, pyrene, and others: each below 0.3 WT%.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.
0 to 0.5*	Chlorinated solvents.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.	N. Av.

N.Av. = Not Available

*Even though the concentration range does not fall under the ranges prescribed by WHMIS, this is the actual range which varies with each batch of the product.

[a]Oral-Rat LD_{50} (mg/kg)

[b]Inhalation-Rat LC_{50}

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE
Liquid, black and viscous (thick), petroleum odor.

WARNING!
PHYSICAL HAZARDS
Combustible liquid.

HEALTH HAZARDS
May be harmful if inhaled.
May be harmful if absorbed through skin.
May be harmful or fatal if swallowed.
May irritate the respiratory tract (nose, throat, and lungs), eyes, and skin.
Suspect cancer hazard. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
Contains material which can cause birth defects.
Contains material which can cause lung, liver, kidney, skin, and/or central nervous system damage.

ENVIRONMENTAL HAZARDS
Product may be toxic to fish, plants, wildlife, and/or domestic animals.

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POTENTIAL HEALTH EFFECTS

Effects may vary depending on material composition. Typical effects may include:

INHALATION (BREATHING): High concentrations of vapor or mist may be harmful if inhaled. High concentrations of vapor or mist may irritate the respiratory tract (nose, throat, and lungs). High concentrations of vapor or mist may cause nausea, vomiting, headaches, dizziness, loss of coordination, numbness, and other central nervous system effects. Massive acute overexposure may cause rapid central nervous system depression, sudden collapse, coma, and/or death.

EYES: May cause irritation.

SKIN: May cause irritation. Product may be absorbed through the skin and cause harm as noted under **INHALATION (BREATHING)**.

INGESTION (SWALLOWING): May be harmful or fatal if swallowed. May cause throat irritation, nausea, vomiting, and central nervous system effects as noted under **INHALATION (BREATHING)**. Breathing product into the lungs during ingestion or vomiting may cause lung injury and possible death.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with pre-existing cardiovascular, liver, kidney, respiratory tract (nose, throat, and lungs), central nervous system, eye, and/or skin disorders may have increased susceptibility to the effects of exposure.

CHRONIC: Prolonged or repeated inhalation may cause oil pneumonia, lung tissue inflammation, fibrous tissue formation, and/or toxic effects as noted under **INHALATION (BREATHING)**. Prolonged or repeated eye contact may cause inflammation of the membrane lining the eyelids and covering the eyeball (conjunctivitis). Prolonged or repeated skin contact may cause drying, cracking, redness, itching, and/or swelling (dermatitis).

CANCER INFORMATION: This product contains mineral oils, untreated or mildly treated, which can cause cancer. This product may contain hydrocarbon and chlorinated solvents; metals, and polynuclear aromatics which can cause cancer. Risk of cancer depends on duration and level of exposure. For more information, see **SECTION 11: CARCINOGENICITY**.

POTENTIAL ENVIRONMENTAL EFFECTS

Product may be toxic to fish, plants, wildlife, and/or domestic animals.
Also see **SECTION 12: ECOLOGICAL INFORMATION**.

SECTION 4: FIRST AID MEASURES

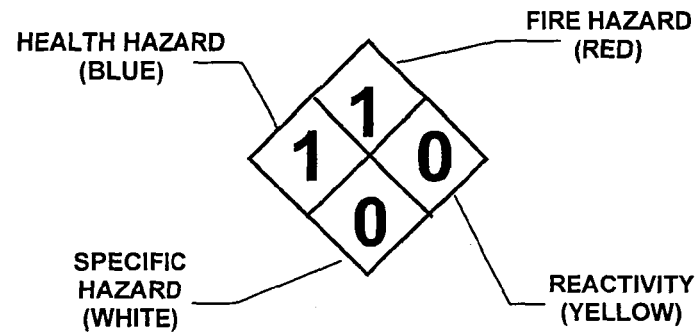
INHALATION: (BREATHING)	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Oxygen should only be administered by qualified personnel. Someone should stay with victim. Get medical attention if breathing difficulty persists.
EYES:	If irritation or redness from exposure to vapor develops, move away from exposure into fresh air. Upon contact, immediately flush eyes with plenty of lukewarm water, holding eyelids apart, for 15 minutes. Get medical attention.
SKIN:	Remove affected clothing and shoes. Wash skin thoroughly with soap and water. Get medical attention if irritation or pain develops or persists.
INGESTION: (SWALLOWING)	Do NOT induce vomiting. Immediately get medical attention. Call 1-800-752-7869 for additional information. If spontaneous vomiting occurs, keep head below hips to avoid breathing the product into the lungs. Never give anything to an unconscious person by mouth.
NOTE TO PHYSICIANS:	Treat symptomatically and supportively. Treatment may vary with condition of victim and specifics of incident. Call 1-800-752-7869 for additional information.

SECTION 5: FIRE FIGHTING MEASURES

FLASH POINT:	>200°F (93°C) (minimum) Pensky-Martens Closed Cup
FLAMMABLE LIMITS IN AIR:	Not available.
AUTOIGNITION TEMPERATURE:	Not available.
HAZARDOUS COMBUSTION PRODUCTS:	Decomposition and combustion materials may be toxic. Burning may produce phosgene gas, nitrogen oxides, carbon monoxide, and unidentified organic compounds.
CONDITIONS OF FLAMMABILITY:	Heat, sparks, or flame. Product may burn but does not ignite readily.
EXTINGUISHING MEDIA:	Use carbon dioxide, regular foam, dry chemical, water spray, or water fog.

NFPA 704 HAZARD IDENTIFICATION:

This information is intended solely for the use by individuals trained in this system.



FIRE FIGHTING INSTRUCTIONS:

Keep storage containers cool with water spray. A positive-pressure, self-contained breathing apparatus (SCBA) and full-body protective equipment are required for fire emergencies.

FIRE AND EXPLOSION HAZARDS:

Heated containers may rupture. "Empty" containers may retain residue and can be dangerous. Product is not sensitive to mechanical impact. Product may be sensitive to static discharge, which could result in fire or explosion.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Remove all ignition sources. Do not touch or walk through spilled product. Stop leak if you can do it without risk. Wear protective equipment and provide engineering controls as specified in **SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Ventilate area and avoid breathing vapor or mist. A vapor suppressing foam may be used to reduce vapors. Contain spill away from surface waters and sewers. Contain spill as a liquid for possible recovery, or sorb with compatible sorbent material and shovel with a clean, sparkproof tool into a sealable container for disposal.

Additionally, for large spills: Water spray may reduce vapor, but may not prevent ignition in closed spaces. Dike far ahead of liquid spill for collection and later disposal.

There may be specific federal regulatory reporting requirements associated with spills, leaks, or releases of this product. Also see **SECTION 15: REGULATORY INFORMATION.**

SECTION 7: HANDLING AND STORAGE

HANDLING: Keep away from heat, sparks, or flame. Where flammable mixtures may be present, equipment safe for such locations should be used. Use clean, sparkproof tools and explosion-proof equipment. When transferring product, storage tanks, tanker trucks, and rail tank cars should be grounded and bonded. Do not breathe vapor or mist. Use in a well ventilated area. Avoid contact with eyes, skin, clothing, and shoes. Do not smoke while using this product.

SHIPPING AND STORING: Keep container tightly closed when not in use and during transport. Do not pressurize, cut, weld, braze, solder, drill, or grind containers. Keep containers away from heat, flame, sparks, static electricity, or other sources of ignition. Empty product containers may retain product residue and can be dangerous. See **SECTION 14: TRANSPORT INFORMATION** for Packing Group information.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use general ventilation, process enclosures, local exhaust ventilation, or other engineering controls to control air-borne levels. Where explosive mixtures may be present, equipment safe for such locations should be used.

PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION: A respiratory protection program which meets USA's OSHA General Industry Standard 29 CFR 1910.134 or Canada's CSA Standard Z94.4-M1982 requirements must be followed whenever workplace conditions warrant a respirator's use. Consult a qualified Industrial Hygienist or Safety Professional for respirator selection guidance.

EYE PROTECTION: Wearing chemical goggles is recommended.
Contact lens may be worn with eye protection.

SKIN PROTECTION: Where prolonged or repeated skin contact is likely, wear neoprene, nitrile (4 mil minimum), PVC (polyvinyl chloride), or equivalent protective gloves; wearing natural rubber or equivalent gloves is not recommended.

When product is heated and skin contact is likely, wear heat-insulating gloves, boots, and other protective clothing.

To avoid prolonged or repeated contact with product where spills and splashes are likely, wear appropriate chemical-resistant faceshield, boots, apron, whole body suits, or other protective clothing.

PERSONAL HYGIENE:	Wash thoroughly with soap and water after handling product and before eating, drinking, or using tobacco products. Clean affected clothing, shoes, and protective equipment before reuse. Discard affected clothing, shoes, and/or protective equipment if they cannot be thoroughly cleaned. Discard leather articles, such as shoes, saturated with the product.
OTHER PROTECTIVE EQUIPMENT:	Where spills and splashes are likely, facilities storing or using this product should be equipped with an emergency eyewash and shower, both equipped with clean water, in the immediate work area.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE, APPEARANCE, AND ODOR:	Liquid, black and viscous (thick), petroleum odor.
ODOR THRESHOLD:	Not available.
MOLECULAR WEIGHT:	Not applicable.
SPECIFIC GRAVITY:	0.8 to 1.0 at 60°F (15.6°C) (water = 1)
DENSITY:	6.7 to 8.3 LB/US gal (800 to 1000 g/l) (approximately)
VAPOR DENSITY:	greater than 1 (air = 1) (based on kerosene)
VAPOR PRESSURE:	Not available.
BOILING POINT:	Not available.
FREEZING/MELTING POINT:	Not available.
pH:	Not applicable.
EVAPORATION RATE:	less than 1 (butyl acetate = 1)
SOLUBILITY IN WATER:	Slight.
FLASH POINT:	>200°F (93°C) (minimum) Pensky-Martens Closed Cup
FLAMMABLE LIMITS IN AIR:	Not available.
AUTOIGNITION TEMPERATURE:	Not available.

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable under normal temperatures and pressures. Avoid heat, sparks, or flame.

INCOMPATIBILITY: Avoid acids, alkalies, oxidizing agents, reducing agents, reactive halogens, or reactive metals.

REACTIVITY: Polymerization is not known to occur under normal temperatures and pressures. Not reactive with water.

HAZARDOUS DECOMPOSITION PRODUCTS: None under normal temperatures and pressures. Also see **SECTION 5: HAZARDOUS COMBUSTION PRODUCTS.**

SECTION 11: TOXICOLOGICAL INFORMATION

SENSITIZATION: Based on best current information, there may be known human sensitization associated with this product.

MUTAGENICITY: Based on best current information, there may be mutagenicity associated with this product.

CARCINOGENICITY: Mineral oils, untreated or mildly treated are listed by IARC as a known carcinogen. Mineral oils, untreated or mildly treated are classified by NTP as having limited evidence of carcinogenicity in humans or sufficient evidence of carcinogenicity in experimental animals.

There may be hydrocarbon and chlorinated solvents; metals, and polynuclear aromatics present in this product which are listed by OSHA as known carcinogens. There may be hydrocarbon and chlorinated solvents; metals, and polynuclear aromatics present in this product which are listed by IARC as known, probable, or possible carcinogens. There may be hydrocarbon and chlorinated solvents; metals, and polynuclear aromatics present in this product which are classified by NTP as known carcinogens or as having limited evidence of carcinogenicity in humans or sufficient evidence of carcinogenicity in experimental animals. There may be hydrocarbon and chlorinated solvents; metals, and polynuclear aromatics present in this product which are recognized by ACGIH as confirmed or suspected human carcinogens.

Also see **SECTION 3: CANCER INFORMATION.**

REPRODUCTIVE TOXICITY: Based on best current information, there may be reproductive toxicity associated with this product.

TERATOGENICITY: Based on best current information, there may be teratogenicity associated with this product.

TOXICOLOGICALLY SYNERGISTIC PRODUCT(S): Based on best current information, there may be toxicologically synergistic products associated with this product.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY: Not available.

OCTANOL/WATER PARTITION COEFFICIENT: Not available.

VOLATILE ORGANIC COMPOUNDS: Not available.
As per 40 CFR Part 51.100(s).

SECTION 13: DISPOSAL CONSIDERATIONS

Dispose in accordance with federal, state, provincial, and local regulations. Regulations may also apply to empty containers. The responsibility for proper waste disposal lies with the owner of the waste. Contact Safety-Kleen regarding proper recycling or disposal.

SECTION 14: TRANSPORT INFORMATION

DOT: Not regulated.

TDG: Not regulated.

EMERGENCY RESPONSE GUIDE NUMBER: Not applicable.
Reference *North American Emergency Response Guidebook*

SECTION 15: REGULATORY INFORMATION

USA REGULATIONS SARA SECTIONS 302 AND 304: Based on the ingredient(s) listed in **SECTION 2**, this product does not contain any "extremely hazardous substances" listed pursuant to Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) Section 302 or Section 304 as identified in 40 CFR Part 355, Appendix A and B.

SARA SECTIONS This product poses the following physical and health hazards as

311 AND 312: defined in 40 CFR Part 370 and is subject to the requirements of sections 311 and 312 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA):
Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard

SARA SECTION 313: This product may contain "toxic" chemicals subject to the requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR Part 372.

CERCLA: This product may contain "hazardous substances" listed pursuant to Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) in 40 CFR Part 302, Table 302.4.

TSCA: Not available.

CALIFORNIA: This product is not for sale or use in the State of California.

CANADIAN REGULATIONS
WHMIS: Not regulated

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): Not available.

SECTION 16: OTHER INFORMATION

REVISION INFORMATION: New Issue.

LABEL/OTHER INFORMATION: Not available.

User assumes all risks incident to the use of this product. To the best of our knowledge, the information contained herein is accurate. However, Safety-Kleen assumes no liability whatsoever for the accuracy or completeness of the information contained herein. No representations or warranties, either express or implied, or merchantability, fitness for a particular purpose or of any other nature are made hereunder with respect to information or the product to which information refers. The data contained on this sheet apply to the product as supplied to the user.

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Material Safety Data Sheet

Catalog Number: 151781
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 151781

Product name: OLEIC ACID

Synonyms: cis-9-Octadecenoic Acid; Century CD Fatty Acid; Emersol 210; Red Oil; Pamolyn
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
OLEIC ACID	112-80-1	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: *Do not induce vomiting without medical advice.*
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: *None known*

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5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards: Burning produces irritant fumes.
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: 188.8°C
Autoignition temperature: 362.7°C
NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment.
Environmental precautions: Prevent product from entering drains.
Methods for cleaning up: Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

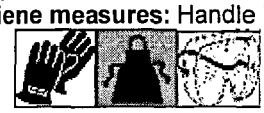
Storage:

0°C
STORE UNDER NITROGEN
PROTECT FROM LIGHT

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.



9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor Pure oleic acid is a colorless or nearly colorless liquid with a lardy smell. If exposed to air, it may develop a yellow to brown color and a rancid odor as it oxidizes.
Physical state: Liquid
Formula: C18-H34-O2
Molecular weight: 282.52

EPAPA005001471

Melting point/range:	14 °C (57.2 °F)
Boiling point/range:	360 °C (680 °F); oleic acid begins to decompose at 80-100 °C.
Density:	0.895 (water = 1)
Vapor pressure:	5.46 x 10-7 mm Hg at 25 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Practically not soluble
Flash point:	188.8°C
Autoignition temperature:	362.7°C

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Incompatible with strong oxidizers, perchloric acid, and aluminum powder; may cause explosions. Corrodes aluminum.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
OLEIC ACID	RG2275000	Oral LD50 Rat : 74 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
OLEIC ACID	Not Listed	Not Listed	Not Listed

EPAPA005001472

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
OLEIC ACID	Not Listed	Not Listed	LC50 (96 hr) fathead minnow: 205 mg/L. Cond: Static, 18-22 °C.

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
OLEIC ACID	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
OLEIC ACID	Not Listed	indicator 4; Fully and ICCA sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
OLEIC ACID	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
OLEIC ACID	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
OLEIC ACID	Not Listed	Not Listed

IMO-labels:

EPAPA005001473

15. REGULATORY INFORMATION

International Inventories

Components	
OLEIC ACID	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	204-007-1; C18H34O2
Inventory - Japan:	2-609; 2-975
Korean KECL:	KE-26450
Philippines PICCS:	Present

U.S. regulations:

Components	**California Proposition 65 -**	**Massachusetts Right to Know List:**	**New Jersey Right to Know List:**	**Pennsylvania Right to Know List:**
OLEIC ACID	Not Listed	Not Listed	Not Listed	[present]

Components	**Florida substance List:**	**Rhode Island Right to Know List:**	**Illinois - Toxic Air Contaminants**	**Connecticut - Hazardous Air Pollutants**
OLEIC ACID	Not Listed	Flammable	Not Listed	Not Listed

Components	**SARA 313 Emission reporting/Toxic Release of Chemicals**	**CERCLA/SARA - Section 302 Extremely Haz**	**NTP:**	**IARC:**
OLEIC ACID	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001474

Material Safety Data Sheet

Catalog Number: 217056
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 217056

Product name: n-OCTADECYL ALCOHOL TECHNICAL GRADE

Synonyms: 1-Octadecanol; Decyl Octyl Alcohol; Stearol
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
n-OCTADECYL ALCOHOL	112-92-5	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Precautions - ANSI Label Keep away from heat and flame.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

EPAPA005001475

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use water spray (fog), foam, dry chemical or CO2.
Extinguishing media which must not be used for safety reasons: Do not use a solid water stream as it may scatter and spread fire.
Specific hazards: combustible material
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: ca. 195 °C (open cup)
Autoignition temperature: 450°C
NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment. Remove all sources of ignition.
Environmental precautions: Do not flush into surface water or sanitary sewer system.
Methods for cleaning up: Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Technical measures/storage conditions: Keep away from heat and sources of ignition
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor White
Physical state: Solid

EPAPA005001476

Formula:	C18H38O
Melting point/range:	57.4 - 57.7 °C
Boiling point/range:	340 - 360 °C at 1013 hPa
Density:	.8124 g/cm3 at 59 °C
Vapor pressure:	.00015 hPa at 20 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Slightly soluble
Flash point:	ca. 195 °C (open cup)
Autoignition temperature:	450°C

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Incompatible with strong acids, caustics, aliphatic amines, isocyanates.

Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
n-OCTADECYL ALCOHOL	RG2010000	Oral LD50 Rat : 20 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
n-OCTADECYL ALCOHOL	Not Listed	Not Listed	Not Listed

EPAPA005001477

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
n-OCTADECYL ALCOHOL	Not Listed	Not Listed	LC50 (96 hr) fathead minnow: 0.0016 mg/L.

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
n-OCTADECYL ALCOHOL	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
n-OCTADECYL ALCOHOL	Not Listed	indicator 2; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
n-OCTADECYL ALCOHOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: *Do not re-use empty containers*

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
n-OCTADECYL ALCOHOL	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
n-OCTADECYL ALCOHOL	Not Listed	Not Listed

IMO-labels:

EPAPA005001478

15. REGULATORY INFORMATION

International Inventories

Components	
n-OCTADECYL ALCOHOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	204-017-6; C18H38O
Inventory - Japan:	2-217; 2-3704
Korean KECL:	KE-26419
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
n-OCTADECYL ALCOHOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
n-OCTADECYL ALCOHOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
n-OCTADECYL ALCOHOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001479

Material Safety Data Sheet

Octane

ACC# 17260

Section 1 - Chemical Product and Company Identification

MSDS Name: Octane
Catalog Numbers: AC129370020, AC129370250, AC129375000, AC325950010, AC325950020, AC325950025, AC325950250, O3980-1
Synonyms: n-Octane.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
111-65-9	Octane	>95	203-892-1

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 13 deg C.
Warning! Flammable liquid and vapor. Causes eye, skin, and respiratory tract irritation. Breathing vapors may cause drowsiness and dizziness. Aspiration hazard if swallowed. Can enter lungs and cause damage.
Target Organs: Central nervous system.

Potential Health Effects
Eye: Causes eye irritation.
Skin: Causes skin irritation. May be absorbed through the skin in harmful amounts. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.
Ingestion: Aspiration hazard. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.
Inhalation: Causes respiratory tract irritation. May cause narcotic effects in high concentration.

Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Flammable liquid and vapor. May accumulate static electrical charges, and may cause ignition of its own vapors. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire.
Extinguishing Media: Use foam, dry chemical, or carbon dioxide. Water may be ineffective. Water may spread fire.
Flash Point: 13 deg C (55.40 deg F)
Autoignition Temperature: 206 deg C (402.80 deg F)
Explosion Limits, Lower:1.0
Upper: 6.5
NFPA Rating: (estimated) Health: 1; Flammability: 3; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before use. Use with adequate ventilation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous.

Keep away from heat, sparks and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Octane	300 ppm TWA	75 ppm TWA; 350 mg/m3 TWA 1000 ppm IDLH	500 ppm TWA; 2350 mg/m3 TWA

OSHA Vacated PELs: Octane: 300 ppm TWA; 1450 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: mild odor - gasoline-like
pH: Not available.
Vapor Pressure: 11 mm Hg @ 20 deg C
Vapor Density: 3.9 (air=1)
Evaporation Rate:0.6 (butyl acetate=1)
Viscosity: Not available.
Boiling Point: 124-127 deg C
Freezing/Melting Point:-57 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:0.708
Molecular Formula:C8H18
Molecular Weight:114.23

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 111-65-9: RG8400000
LD50/LC50:
CAS# 111-65-9:
Inhalation, rat: LC50 = 118 gm/m3/4H;

Carcinogenicity:
CAS# 111-65-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Water flea EC50 = 0.38 mg/L; 48 Hr.; Unspecified ConditionsBacteria: Phytobacterium phosphoreum: EC50 = 890 mg/L; 30 minutes; Microtox test No data available.
Environmental: No information available.
Physical: No information available.
Other: AQUATIC FATE: Photolysis or hydrolysis of n-octane in aquatic systems is not expected to be important. The biodegradation of n-octane may occur in aquatic environments, however volatilization and adsorption are expected to be far more important fate processes. The log bioconcentration factor (log BCF) for n-octane has been estimated to range from 2.89 to 3.71suggesting bioconcentration may be an important factor in aquatic systems. An estimated range for Koc from 5500 to 15,600 indicates n-octane will strongly absorb to carbon.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	OCTANES	OCTANES
Hazard Class:	3	3
UN Number:	UN1262	UN1262
Packing Group:	II	II
Additional Info:		FLASHPOINT 13C

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 111-65-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
ction 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 111-65-9: immediate, fire.
Section 313 No chemicals are 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 Substances 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:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 111-65-9 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

.lifornia Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN F N

Risk Phrases:

R 11 Highly flammable.
R 38 Irritating to skin.
R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R 65 Harmful: may cause lung damage if swallowed.
R 67 Vapours may cause drowsiness and dizziness.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.
S 9 Keep container in a well-ventilated place.
S 60 This material and its container must be disposed of as hazardous waste.
S 61 Avoid release to the environment. Refer to special instructions /safety data sheets.
S 62 If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

WGK (Water Danger/Protection)

CAS# 111-65-9: 1

Canada - DSL/NDSL

CAS# 111-65-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 111-65-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 6/08/1999
Revision #6 Date: 5/24/2006

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
959 ROUTE 46 EAST
PARSIPPANY, NEW JERSEY 07054-0624

EMERGENCY CONTACT:
CHEMTREC 1-800-424-9300
INFORMATION CONTACT:
973-257-1100

SUBSTANCE: OCTENE

TRADE NAMES/SYNONYMS:
OCTYLENE; CAPRYLENE; OCTENES; MIXED OCTENES; MIXED OCTENE ISOMERS; C8H16; 00230187

CHEMICAL FAMILY: alkenes

CREATION DATE: Nov 07 2003
REVISION DATE: Dec 09 2004

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: OCTENE
CAS NUMBER: 25377-83-7
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: hydrocarbon odor
MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, aspiration hazard, central nervous system depression
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation, nausea, headache, drowsiness, dizziness, loss of coordination

LONG TERM EXPOSURE: no information is available
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: irritation
INGESTION:
SHORT TERM EXPOSURE: nausea, vomiting, headache, drowsiness, dizziness, loss of coordination, aspiration hazard
LONG TERM EXPOSURE: no information is available

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 CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: Aspiration hazard. DO NOT induce vomiting. If vomiting occurs, keep head lower than hips to help prevent aspiration. Get immediate medical attention. Give artificial respiration if not breathing.

NOTE TO PHYSICIAN: For inhalation, consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Vapor/air mixtures are explosive. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Dike for later disposal. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. 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, 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. Do not scatter spilled material with high-pressure water streams. 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.

FLASH POINT: 70 F (21 C) (1-OCTENE)
LOWER FLAMMABLE LIMIT: 0.7 % by volume (1-OCTENE)
UPPER FLAMMABLE LIMIT: 3.9 % by volume (1-OCTENE)
AUTOIGNITION: 430 F (221 C) (1-OCTENE)
FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
OCTENE:
1-OCTENE:
75 ppm AIHA WEEL recommended TWA

VENTILATION: Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
Any chemical cartridge respirator with organic vapor cartridge(s).
Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).
Any air-purifying respirator with a full facepiece and an organic vapor canister.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
APPEARANCE: clear
COLOR: colorless
TEXTURE: oily
ODOR: hydrocarbon odor
MOLECULAR WEIGHT: 112.22
BOILING POINT: 250.2-258.1 F (121.2-125.6 C)
FREEZING POINT: -195 to -126 F (-126 to -87.7 C)
VAPOR PRESSURE: 36 mmHg @ 38 C (1-OCTENE)
VAPOR DENSITY (air=1): 3.9 (1-OCTENE)
SPECIFIC GRAVITY (water=1): 0.7141-0.7243 @ 20 C
WATER SOLUBILITY: immiscible
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: 2 ppm (1-OCTENE)
EVAPORATION RATE: Not available
VISCOSITY: 0.393 cP @ 38 C (1-OCTENE)
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: acetone, ether
Miscible: ethanol

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES: oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of carbon

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

OCTENE:
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
TARGET ORGANS: central nervous system

12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Flammable liquids, n.o.s. (OCTENE)
ID NUMBER: UN1993
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Flammable liquid, n.o.s. (OCTENE)
UN NUMBER: UN1993
CLASS: 3
PACKING GROUP/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Not determined.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

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Material Safety Data Sheet

2-Octanol

ACC# 28040

Section 1 - Chemical Product and Company Identification

MSDS Name: 2-Octanol
Catalog Numbers: O269-500
Synonyms: Capryl alcohol; 1-Methyl-1-heptanol; sec-Caprylic alcohol; 2-Octyl alcohol.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
123-96-6	2-Octanol	100	204-667-0

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless liquid. Flash Point: 71 deg C.
Caution! Combustible liquid and vapor. May cause skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause respiratory tract irritation. May cause eye irritation. May cause central nervous system effects.
Target Organs: Lungs.

Potential Health Effects
Eye: May cause severe eye irritation. Causes redness and pain. Contact may cause transient irritation.
Skin: May cause skin irritation. May be absorbed through the skin. Prolonged or repeated contact may dry/defat the skin and cause irritation. This material causes erythema, inflammation and cracking of the skin which heals in 10-12 days.
Ingestion: Aspiration hazard. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into

the lungs may cause chemical pneumonitis, which may be fatal.
Inhalation: Inhalation of high concentrations may cause central nervous system effects characterized by nausea, headache, dizziness, unconsciousness and coma. May cause respiratory irritation.
Chronic: Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Use water spray to keep fire-exposed containers cool. Containers may explode when heated. Combustible liquid and vapor. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid floats on water and may travel to a source of ignition and spread fire.
Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.
Flash Point: 71 deg C (159.80 deg F)
Autoignition Temperature: 390 deg C (734.00 deg F)
Explosion Limits, Lower:.80 vol %
Upper: 7.40 vol %
NFPA Rating: (estimated) Health: 1; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Remove all sources of ignition. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before

reuse. Use with adequate ventilation. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Keep away from heat, sparks and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Avoid breathing vapor or mist.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2-Octanol	none listed	none listed	none listed

OSHA Vacated PELs: 2-Octanol: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear chemical splash goggles.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: *sweetish odor - pungent odor*
pH: Not available.
Vapor Pressure: 1 mm Hg @ 32.8 deg C
Vapor Density: 4.49 (air=1)
Evaporation Rate:0.05 (n-Butyl Alcohol=1)
Viscosity: Not available.
Boiling Point: 174 - 181 deg C @ 760 mmHg
Freezing/Melting Point:-38 deg C
Decomposition Temperature: Not available.
Solubility: Insoluble.
Specific Gravity/Density:.81 g/cm3
Molecular Formula:C8H18O
Molecular Weight:130.23

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, acrid smoke and fumes.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 123-96-6: RH0795000
LD50/LC50:
CAS# 123-96-6:
Oral, mouse: LD50 = 300 mg/kg;
Oral, rabbit: LD50 = 9300 mg/kg;
Oral, rat: LD50 = 200 mg/kg;

Carcinogenicity:
CAS# 123-96-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: Photolysis or hydrolysis of 2-octanol is not expected to be important in soils. 2-Octanol should biodegrade rapidly in acclimated terrestrial environments. An estimated range for Koc from 92 to 718 indicates a wide range of adsorption characteristics for 2-octanol and the mobility class in soil may range from low to high. Photolysis or hydrolysis of 2-octanol in aquatic systems is not expected to be important. biodegrade rapidly in acclimated aquatic environments. The log bioconcentration factor (log BCF) has been estimated to range from
Physical: Alcohols are generally resistant to hydrolysis.
Other: Based upon a water solubility of 1120 mg/l at 25 deg C and log Kow of 2.72, the bioconcentration factor (log BCF) for 2-octanol has been calculated to be 1.07 and 1.84, respectively, from recommended regression-derived equations. These BCF values indicate the potential for 2-octanol to bioconcentrate in aquatic organisms is low. Based on a water solubility of 1120 mg/l at 25 C and a log Kow of 2.72, respective Koc values of 92 and 718 for 2-octanol have been calculated from various regression-derived equations. These Koc values indicate a wide range of adsorption characteristics for 2-octa

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts .3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 123-96-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 123-96-6: fire.
Section 313 No chemicals are 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 Substances 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:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE

CAS# 123-96-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 123-96-6: 1

Canada - DSL/NDSL

CAS# 123-96-6 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B3, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 2/25/1999

Revision #6 Date: 6/06/2006

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

Material Safety Data Sheets

P-Z

MSDS

EPAPA005001499

D

MATERIAL SAFETY DATA SHEET

B65W511
03 00

Section 1 -- PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

B65W511

HMIS CODES

Health	2
Flammability	2
Reactivity	0

PRODUCT NAME PAINT

POLY-LON* 1900 Polyester Polyurethane (Part A), Extra White

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

EMERGENCY TELEPHONE NO.

(216) 566-2917

DATE OF PREPARATION

09-MAY-06

INFORMATION TELEPHONE NO.

(216) 566-2902

Section 2 -- COMPOSITION/INFORMATION ON INGREDIENTS

% by WT	CAS No.	INGREDIENT			UNITS	VAPOR PRESSURE
11	110-43-0	Methyl n-Amyl Ketone				
			ACGIH TLV	50	ppm	2.14 mm
			OSHA PEL	100	ppm	
18	108-65-6	1-Methoxy-2-Propanol Acetate				
			ACGIH TLV	Not Available		1.8 mm
			OSHA PEL	Not Available		
3	1332-58-7	Kaolin				
			ACGIH TLV	2	mg/m3 as Resp. Dust	
			OSHA PEL	10	mg/m3 Total Dust	
			OSHA PEL	5	mg/m3 Respirable Fraction	
35	13463-67-7	Titanium Dioxide				
			ACGIH TLV	10	mg/m3 as Dust	
			OSHA PEL	10	mg/m3 Total Dust	
			OSHA PEL	5	mg/m3 Respirable Fraction	

Section 3 -- HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.
May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.

Continued on page 2

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
May cause allergic respiratory and/or skin reaction in susceptible persons or sensitization. This effect may be delayed several hours after exposure.
CANCER INFORMATION
For complete discussion of toxicology data refer to Section 11.

Section 4 -- FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
SKIN: Wash affected area thoroughly with soap and water. Remove contaminated clothing and launder before re-use.
INHALATION: If any breathing problems occur during use, LEAVE THE AREA and get fresh air. If problems remain or occur later, IMMEDIATELY get medical attention.
INGESTION: Do not induce vomiting. Get medical attention immediately.

Section 5 -- FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL
102 F PMCC	1.1	13.1

FLAMMABILITY CLASSIFICATION
Combustible, Flash above 99 and below 200 F
EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode when exposed to extreme heat.
Application to hot surfaces requires special precautions.
During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used.
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section 6 -- ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate the area.
Remove with inert absorbent.

Section 7 -- HANDLING AND STORAGE

STORAGE CATEGORY
DOL Storage Class II

Continued on page 3

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Contents are COMBUSTIBLE. Keep away from heat and open flame.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Section 8 -- EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

NO PERSON SHOULD USE THIS PRODUCT, OR BE IN THE AREA WHERE IT IS BEING USED, IF THEY HAVE CHRONIC (LONG-TERM) LUNG OR BREATHING PROBLEMS OR IF THEY EVER HAD A REACTION TO ISOCYANATES.

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

Where overspray is present, a positive pressure air supplied respirator (TC19C NIOSH/MSHA approved) should be worn. If unavailable, a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2 may be effective. Follow respirator manufacturer's directions for use. Wear the respirator for the whole time of spraying and until all vapors and mists are gone. NO PERSONS SHOULD BE ALLOWED IN THE AREA WHERE THIS PRODUCT IS BEING USED UNLESS EQUIPPED WITH THE SAME RESPIRATOR PROTECTION RECOMMENDED FOR THE PAINTERS.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

To prevent skin contact, wear gloves which are recommended by glove supplier for protection against materials in Section 2.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PROTECTIVE EQUIPMENT

Use barrier cream on exposed skin.

OTHER PRECAUTIONS

This product must be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

Continued on page 4

Section 9 -- PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	11.78 lb/gal	1411 g/l
SPECIFIC GRAVITY	1.42	
BOILING POINT	284 - 308 F	140 - 153 C
MELTING POINT	Not Available	
VOLATILE VOLUME	47 %	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical)

3.56 lb/gal	427 g/l	Less Water and Federally Exempt Solvents
3.56 lb/gal	427 g/l	Emitted VOC

Section 10 -- STABILITY AND REACTIVITY

STABILITY -- Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

Section 11 -- TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

No ingredient in this product is an IARC, NTP or OSHA listed carcinogen.

Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver, urinary and blood forming systems.

Persons sensitive to isocyanates will experience increased allergic reaction on repeated exposure.

Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

TOXICOLOGY DATA

CAS No.	Ingredient Name				
110-43-0	Methyl n-Amyl Ketone				
		LC50	RAT	4HR	Not Available
		LD50	RAT		1670 mg/kg
108-65-6	1-Methoxy-2-Propanol Acetate				
		LC50	RAT	4HR	Not Available
		LD50	RAT		8500 mg/kg
1332-58-7	Kaolin				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available
13463-67-7	Titanium Dioxide				
		LC50	RAT	4HR	Not Available
		LD50	RAT		Not Available

Continued on page 5

Section 12 -- ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
No data available.

Section 13 -- DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD
Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

Section 14 -- TRANSPORT INFORMATION

No data available.

Section 15 -- REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element

No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65
WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION
All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

Section 16 -- OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Material Safety Data Sheet

Catalog Number: 102553
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 102553

Product name: PALMITIC ACID

Synonyms: Hexadecanoic Acid; Cetylic Acid; Hydrofol
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
PALMITIC ACID	57-10-3	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

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5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	White
Physical state:	Solid
Formula:	C16-H32-O2
Molecular weight:	256.42
Melting point/range:	63-64 °C (146 °F)
Boiling point/range:	352 °C (665 °F)
Density:	0.853 at 62 °C (water = 1)

Vapor pressure:	Very low at 25 °C 1 mm Hg (0.133 kPa) at 154 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Insoluble
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
PALMITIC ACID	RT4550000	Oral LD50 Rat : >10 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
PALMITIC ACID	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
PALMITIC ACID	Not Listed	Not Listed	LC50 (96 hr) red killifish: 150 mg/L.

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
PALMITIC ACID	Not Listed	Not Listed	Not Listed

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Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
PALMITIC ACID	Not Listed	indicator 4; ICCA sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
PALMITIC ACID	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
PALMITIC ACID	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
PALMITIC ACID	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
PALMITIC ACID	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present

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EU EINECS List -	200-312-9; C16H32O2
Inventory - Japan:	2-608
Korean KECL:	KE-18438
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
PALMITIC ACID	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
PALMITIC ACID	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
PALMITIC ACID	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

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Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 09/15/2006 Reviewed on 09/01/2006

1 Identification of substance:

Product details:

Product name: Paraformaldehyde

Stock number: 36606

Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department
Emergency information:
During normal hours the Health, Safety and Environmental Department.
After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

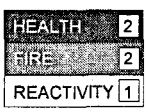
Chemical characterization:
Description: (CAS#)
Paraformaldehyde (CAS# 30525-89-4): 100%

3 Hazards identification

Hazard description:

C Corrosive
F Highly flammable

Information pertaining to particular dangers for man and environment
R 11 Highly flammable.
R 20/22 Harmful by inhalation and if swallowed.
R 34 Causes burns.
R 40 Limited evidence of a carcinogenic effect.
R 43 May cause sensitization by skin contact.
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)



Health (acute effects) = 2
Flammability = 2
Reactivity = 1

4 First aid measures

General information
Immediately remove any clothing soiled by the product.
After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

(Contd. on page 2)

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Product name: Paraformaldehyde

(Contd. of page 1)

After eye contact
Rinse opened eye for several minutes under running water. Then consult a doctor.
After swallowing Seek immediate medical advice.

5 Fire fighting measures

Suitable extinguishing agents
Use carbon dioxide, extinguishing powder or foam. Water may be ineffective but may be used for cooling exposed containers.
Special hazards caused by the material, its products of combustion or resulting gases:
In case of fire, the following can be released:
Carbon monoxide and carbon dioxide
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

Person-related safety precautions:
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources
Measures for environmental protection:
Do not allow material to be released to the environment without proper governmental permits.
Measures for cleaning/collecting:
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
Keep away from ignition sources.
Additional information:
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
Information for safe handling:
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Information about protection against explosions and fires:
Keep ignition sources away.
Protect against electrostatic charges.

Storage
Requirements to be met by storerooms and receptacles:
Store in a cool location.
Information about storage in one common storage facility:
Store away from oxidizing agents.
Further information about storage conditions:
Keep container tightly sealed.

(Contd. on page 3)

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acc. to OSHA and ANSI

Printing date 09/15/2006 Reviewed on 09/01/2006

Product name: Paraformaldehyde

(Contd. of page 2)

Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:
Not required.
Additional information: No data

Personal protective equipment
General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.
Breathing equipment:
Use suitable respirator when high concentrations are present.
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
Material of gloves
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Eye protection:
Safety glasses
Tightly sealed goggles
Full face protection
Body protection: Protective work clothing.

9 Physical and chemical properties:

General Information	
Form:	Powder
Color:	White
Odor:	Pungent
Change in condition	
Melting point/Melting range:	163-165°C (325-329°F) (dec)
Boiling point/Boiling range:	Not determined
Sublimation temperature / start:	Not determined
Flash point:	71°C (160°F)
Flammability (solid, gaseous)	Highly flammable.
Ignition temperature:	Not determined
Decomposition temperature:	Not determined
Explosion limits:	
Lower:	Not determined
Upper:	Not determined

(Contd. on page 4)

Material Safety Data Sheet
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Product name: Paraformaldehyde

(Contd. of page 3)

Vapor pressure:	Not determined
Density at 20°C (68°F):	1.45 g/cm³

10 Stability and reactivity

Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.
Materials to be avoided: Oxidizing agents
Dangerous reactions No dangerous reactions known
Dangerous products of decomposition: Carbon monoxide and carbon dioxide

11 Toxicological information

Acute toxicity:

LD/LC50 values that are relevant for classification:		
Oral	LD50	800 mg/kg (rat)
Dermal	LD50	10000 mg/kg (rbt)
Inhalative	LC50/4H	1070 mg/m3/4H (rat)
Irritation of skin	severe	500 mg/24H (rbt)
Irritation of eyes	severe	100 mg (rbt)

Primary irritant effect:
on the skin:
Corrosive effect on skin and mucous membranes.
Irritant to skin and mucous membranes.
on the eye:
Strong corrosive effect.
Irritating effect.
Sensitization: No sensitizing effects known.
Other information (about experimental toxicology):
Mutagenic effects have been observed on tests with laboratory animals.
Subacute to chronic toxicity:
Subacute to chronic toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:
Sense Organs and Special Senses (Eye) - lacrimation.
Lungs, Thorax, or Respiration - dyspnea.
Gastrointestinal - changes in structure or function of salivary glands.
Gastrointestinal - other changes.
Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol).
Behavioral - somnolence (general depressed activity).
Behavioral - fluid intake.
Behavioral - food intake (animal).
Skin and Appendages - corrosive (after topical esposure).
Nutritional and Gross Metabolic - body temperature decrease.
Nutritional and Gross Metabolic - weight loss or decreased weight gain.

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Printing date 09/15/2006 Reviewed on 09/01/2006

Product name: Paraformaldehyde

(Contd. of page 4)

Subacute to chronic toxicity:
Corrosive materials are acutely destructive to the respiratory tract, eyes, skin and digestive tract. Eye contact may result in permanent damage and complete vision loss. Inhalation may result in respiratory effects such as inflammation, edema, and chemical pneumonitis. May cause coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. Ingestion may cause damage to the mouth, throat and esophagus. May cause skin burns or irritation depending on the severity of the exposure.

Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.
Carcinogen as defined by OSHA.

12 Ecological information:

General notes:
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations

Product:
Recommendation
Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

DOT regulations:

Hazard class:	4.1
Identification number:	UN2213
Packing group:	III
Proper shipping name (technical name):	PARAFORMALDEHYDE
Label	4.1

Land transport ADR/RID (cross-border)

ADR/RID class:	4.1 (F1) Flammable solids
Danger code (Kemler):	40
UN-Number:	2213

(Contd. on page 6)

Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 09/15/2006 Reviewed on 09/01/2006

Product name: Paraformaldehyde

(Contd. of page 5)

Packaging group:	III
Description of goods:	2213 PARAFORMALDEHYDE

Maritime transport IMDG:

IMDG Class:	4.1
UN Number:	2213
Label	4.1
Packaging group:	III
Proper shipping name:	PARAFORMALDEHYDE

Air transport ICAO-TI and IATA-DGR:

ICAO/IATA Class:	4.1
UN/ID Number:	2213
Label	4.1
Packaging group:	III
Proper shipping name:	PARAFORMALDEHYDE

15 Regulations

Product related hazard informations:

Hazard symbols:
C Corrosive
F Highly flammable

Risk phrases:
11 Highly flammable.
20/22 Harmful by inhalation and if swallowed.
34 Causes burns.
40 Limited evidence of a carcinogenic effect.
43 May cause sensitization by skin contact.

Safety phrases:
9 Keep container in a well-ventilated place.
20 When using do not eat or drink.
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
45 In case of accident or if you feel unwell, seek medical advice immediately.
60 This material and its container must be disposed of as hazardous waste.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

(Contd. on page 7)

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acc. to OSHA and ANSI

Printing date 09/15/2006 *Reviewed on 09/01/2006*

Product name: Paraformaldehyde

(Contd. of page 6)

All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use:
For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.
Contact: Darrell R. Sanders

MATERIAL SAFETY DATA SHEET

Date Printed: 07/06/2006
Date Updated: 02/06/2006
Version 1.4

Section 1 - Product and Company Information

Product Name	PENTA(ETHYLENE GLYCOL), 98%
Product Number	335754
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
PENTA(ETHYLENE GLYCOL)	4792-15-8	No

Formula	C10H22O6
Synonyms	3,6,9,12-Tetraoxatetradocane-1,14-diol
RTECS Number:	RZ2670000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Irritant.
Irritating to eyes, respiratory system 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

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLASH POINT
235 °F 113 °C Method: closed cup

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. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Mechanical exhaust required. Safety shower and eye bath.

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

EPAPA005001519

Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance: Physical State: Liquid

Property	Value	At Temperature or Pressure
Molecular Weight	238.28 AMU	
pH	N/A	
BP/BP Range	184 °C	2 mmHg
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	1.125 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	235 °F 113 °C	Method: closed cup
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	1.463	
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: Strong oxidizing agents, Acid chlorides, Acid anhydrides.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

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: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

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SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Guinea pig
22500 mg/kg
LD50

Section 12 - Ecological Information

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
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. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xi
Indication of Danger: Irritant.
R: 36/37/38
Risk Statements: Irritating to eyes, respiratory system and skin.
S: 26-36
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Irritant.
Risk Statements: Irritating to eyes, respiratory system and skin.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes

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: Yes

EPAPA005001521

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.
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1. PRODUCT AND COMPANY INFORMATION

Manufacturer: ConAgra Food Ingredients Co.
1350 Pacheco Pass Hwy.
Gilroy, CA 95020

Information Phone No: 800-289-5060
Hours: Mon. to Fri. 8:00 am – 5:00 pm
INFOTRAC Emergency No: 1-800-535-5053
Outside the United States call collect 1-352-323-3500
Hours: 24 hrs a day

Product Name: Dehydrated Red Pepper, whole, crushed or ground
Date Issued: 5/25/05

2. HAZARDOUS COMPONENTS

Ingredient	CAS Number	% by Wt.	OSHA PEL	ACGIH TLV
none				

3. HAZARD IDENTIFICATION

Emergency overview: **This product has not been classified as a health hazard.**

It has not been listed as a carcinogen by NTP (National Toxicology Program) or IARC (International Agency for Research on Cancer). It is not regulated as a carcinogen by OSHA (Occupational Safety and Health Administration.

Eye Contact: Irritating to eyes; may cause watering eyes.

Skin Contact: Irritating to skin.

Inhalation: Irritating to nose; may cause sneezing.

Ingestion: Irritating to throat.

Other Effects: None known

4. EMERGENCY FIRST AID PROCEDURES

Eyes: Flush eyes with water for 15 minutes while holding eyelids apart

Skin: Wash with mild soap and water. Flush with large quantities of water.

Inhalation: Remove to fresh air.

Ingestion: N/A

5. FIRE FIGHTING & EXPLOSION DATA

Flash Point (° F): N/A
UEL: N/A **LEL:** N/A

Extinguishing Media: Water, Foam, CO_2 or dry chemical.

Fire Fighting Procedures: Use standard procedures.

Explosion Hazards: None

Reactivity Data: This material presents no significant hazard. Hazardous Polymerization will not occur, and it will not react violently with water. This product is stable; there is no hazardous decomposition and no incompatibility hazards.

6. SPILL, RELEASE AND WASTE DISPOSAL PROCEDURES

Dispose in accordance with local and state federal regulations.

7. STORAGE AND HANDLING

It is recommended that this material be stored in tight, full containers in a cool, dry place away from light.

8. PERSONAL PROTECTION

Eyes:	Safety glasses or goggles recommended
Respiratory:	Protective dust mask recommended
Equipment and Apparel:	Protective gloves recommended
Other Protective Equipment:	None required
Ventilation:	Adequate ventilation and dust collection system recommended

9. PHYSICAL & CHEMICAL PROPERTIES

Physical State: Solid
Color: Typical of red pepper
Boiling Point: N/A
Specific Gravity: N/A
Odor: Typical of red pepper
Solubility in Water: N/A
Vapor Pressure: N/A

10. STABILITY & REACTIVITY

This product is stable under normal conditions.

11. TOXICOLOGICAL PROPERTIES

No product or composition toxicological information is available.

12. ECOLOGICAL INFORMATION

No ecological studies have been done for this product.

13. DISPOSAL CONSIDERATIONS

Dispose of in accordance with local, state and federal regulations.

14. DOT INFORMATION

Not regulated.

15. REGULATORY INFORMATION

U.S. Federal Regulations:	As Follows
OSHA:	Non-hazardous by definition of Hazard Communication Standard (29 CFR §1910.1200).

CERCLA-SARA Hazard Category:

This product has been reviewed according to the EPA "Hazard Categories" promulgated under Section 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to be non-hazardous.

SARA Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR §372.

Chemical Name	CAS Number	% by Wt.
Capsicum annum	8023-77-6	

16. OTHER INFORMATION

NFPA Hazard Classification:

Health: 1 **Flammability:** 1 **Reactivity:** 0

Previous MSDS Revision Date: 10/31/02

Reason for Revision: Update

Disclaimer: The information in this MSDS was obtained from current and reliable sources; however, the data is provided without any warranty, expressed or implied, regarding its correctness or accuracy. Since the conditions for use, handling, storage and disposal of this product are beyond the manufacturer's control, it is the responsibility of the user both to determine safe conditions for use of this product and to assume liability for loss, damage, or expense arising out of the products improper use. No warranty expressed or implied regarding the product described herein will be created by or inferred from any statement or omission in this MSDS. Various federal, state, or provincial agencies may have specific regulations concerning the transportation, handling, storage, use, or disposal of this product, which may not be reflected in this MSDS. The user should review these regulations to ensure full compliance.

MATERIAL SAFETY DATA SHEET

Date Prepared: September 1, 2006

1. PRODUCT INFORMATION

Product Identifier: Petroleum Distillates

Application and Use: Degreasing Agent: Cleaning Solvent

Product Description: Aliphatic hydrocarbon

CAS number: 64742-47-8

REGULATORY CLASSIFICATION

WHIMIS Information:
Class B, Division 3: Combustible Liquids

TDG Information (Rail/Road):
PIN Number: UN 1268
Shipping Name: Naphtha, petroleum or petroleum distillates
Packing Group III
Primary: EOG Class 3

EMERGENCY TELEPHONE NUMBER

Health/Transportation
24 Hour Service (506)648-3060
(506)432-9500

MANUFACTURER/SUPLIER

Eastern Environmental
17 Jones Court
Sussex, N.B. E4E 2S2

2. REGULATED COMPONENTS

The following component details defined in accordance with sub-paragraph 13 (a) (1) to (IV) or paragraph 14 (a) of the Hazardous Products Act.

NAME	%	CAS
Light Distillate-Hydro-treated	100	64742-47-8

LD50 :> 5 g/kg oil rat.
>3 g/kg skin rabbit.

3. TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Spec. Gravity	0.70 at 15.5 deg. C
Cap. Pres	1.3 kPa at 38 deg. C
Solubility in Water	0
Boiling Point	157 to 200 deg. C
Freezing/Melting Point	-18 C
Viscosity	1.13 cST at 25 deg. C
Capor Density (air = 1)_	4.7
Evaporation Rate	0.11
% Volatile	100
Odor	Mild petroleum odor.
Appearance	Clear, blue liquid

4. HEALTH HAZARD INFORMATION

NATURE OF HAZARD:

INHALATION:

High vapor/aerosol concentrations (greater than approximately 1000ppm) are irritation to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, unconsciousness, and other central nervous system effects, including death.

EYE CONTACT:

Slightly irritation, but will not injure eye tissue.

SKIN CONTACT:

Low toxicity. Frequent or prolonged contact may irate the skin and cause a skin rash (dermatitis) Skin contact may aggravate an existing dermatitis condition.

INGESTION:

Minimal toxicity
Small amounts of liquid aspirated into the respiratory system during ingestion or from vomiting may cause mild to severe pulmonary injury and possible death.

CHRONIC:

Prolonged and repeated exposure of male rats to inhalation of light hydrocarbon vapors in the same naphtha boiling range as this material produced kidney disorders and/or damage. These effects were not observed in similar studies with female rats and male and female mice in limited studies with other animal species and are believed to be unique to the male rat. A number of human studies have not shown clinical evidence of an association between light hydrocarbon exposure and disease. It is highly unlikely that kidney effects observed in male rates significant implications for humans exposed at or below the occupational exposure limits.

SPECIAL HEALTH PRECAUTIONS:

Health studies have shown that many petroleum hydrocarbons pose potential human health risks which may vary from person to person. As a precaution, exposure to liquids, vapors, mists or fumes should be minimized.

OCCUPATIONAL EXPOSURE LIMIT

ACGIH RECOMMENDS:

100 ppm based on composition. Local regulated limited may vary.

5. FIRST AID MEASURES

INHALATION:

In emergency situations use proper respiratory protection to immediately remove the affected victim from exposure. Administer artificial respiration if breathing has stopped. Keep at rest. Call for prompt medical attention.

EYE CONTACT:

Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN CONTACT:

Immediately flush with large amounts of water. Use soap if available. Remove contaminated clothing, including shoes, after flushing has begun.

INGESTION:

If swallowed, DO NOT induce vomiting. Keep at rest. Get prompt medical attention.

6. PREVENTIVE AND CORRECTIVE MEASURES

PERSONAL PROTECTION:

The selection of personal protective equipment varies depending upon condition of use.
Where prolonged and/or repeated skin and eye contact is likely to occur.
Wear safety glasses with side shields, long sleeves, and chemical resistant gloves.
Where eye contact is unlikely, but may occur as a result or short and/or periodic exposures, wear safety glasses with side shields.
Where concentrations in air may exceed the occupational exposure limits given in Section 4 and where engineering, work practices or other means of exposure reduction are not adequate, approved respirators may be necessary to prevent over exposure by inhalation.

ENGINERRING CONTROLS:

The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fume hood. Provide mechanical ventilation of confined spaces.

HANDLING, STORAGE AND SHIPPING:

Keep container closed. Handle and open containers with care. Store in a cool, well ventilated place away from incompatible materials.
DO NOT handle or store near open flame, heat, or other source of ignition. Protect material from direct sunlight.
Material will accumulate static charges which may cause and electrical spark (ignition source). Use proper grounding procedures.
DO NOT pressurize, cut heat or weld containers.
Empty product containers may contain product residue. DO NOT reuse empty containers without commercial cleaning or reconditioning.

SPILL CONTROL AND DISPOSAL:

Consult an expert on the disposal of recovered material. Ensure disposal is in compliance with government requirements and ensure conformity to local disposal regulations. Notify the appropriate authorities immediately. Take all additional action necessary to prevent and remedy the adverse effects of the spill.

LAND SPILL:

Eliminate source of ignition. Keep public away. Prevent additional discharge of material, if possible to do so without hazard.
Prevent spills from entering sewers, watercourses or low areas. Contain spilled liquid with sand or earth. Do not use combustible materials such as sawdust.
Recover by pumping (use an explosion proof motor or hand pump), or by using a suitable absorbent.

WATER SPILL:

Remove from surface by skimming or with suitable absorbents. If allowed by local authorities and environmental agencies, sinking and/or suitable dispersants may be used in unconfined waters.

7. FIRE AND EXPLOSION

Flashpoint and Method	42 deg. C TCC
Auto-Ignition Temperature	229C
Flammable Limited	1.1 to 6% by volume

GENERAL HAZARDS:

Combustible liquid: May form combustible mixtures at or above the flash point.
Toxic gases will form upon combustion.

FIRE FIGHTING:

Use water spray to cool fire exposed surfaces and to protect personnel.
Shut off fuel to fire.
Use foam, dry chemical or water spray to extinguish fire.
Respiratory and eye protection required for fire fighting personnel.
Avoid spraying water directly into storage containers due to danger of boil over.
A self-contained breathing apparatus (SCBA) should be used for all indoor fires and any significant outdoor fires. For small outdoor fires, which may easily be extinguished with a portable fire extinguisher, use of an SCBA may not be required.
This liquid is volatile and gives off invisible vapors. Either the Liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode.

HAZARDOUS COMBUSTION PRODUCTS;

Fumes, smoke and carbon monoxide.

8. REACTIVITY DATA

GENERAL:

This product is stable and hazardous polymerization will not occur.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:

Strong oxidizing agents.

HAZARDOUS DECOMPOSITION:

Not applicable.

9. NOTES
No comments at this time.

10. PREPARATION

Eastern Environmental Services Ltd.

CAUTION:

The information contained herein relates only to this product or material and may not be valid when used in combination with any other product or material or in any process. If the product is not to be used for a purpose or under conditions which are normal or reasonable, this information can not be relied upon as complete or applicable. For greater certainty, uses other than those described in "Application and Use" of section 1 must be reviewed with the supplier. The information contained herein is based on information available at the indicated date of preparation.

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product name: General Purpose Viscosity Standard – Petroleum oil

Alternate description/ brand: S3, C6, G6, S6, C10, G10, N10, C20, G20, S20, T27L, C35, G35, N35, C60, G60, S60, C100, G100, N100, C200, G200, S200(KU), S200, C350, G350, N350, N350(KU), K400(KU), C600, G600, N600, S600(KU), S600*,YS-30**, YS-35**

Product description: Highly refined mineral oil

**An alternate formulation of S600 is composed of synthetic base oil, which makes no significant difference in the hazard assessment of the product*

**YS-30 and YS-35 contain up to 40% of a synthetic base oil, which makes no significant difference in the hazard assessment of the products*

Product code: 9727-C25, 9727-C31, 9727-C32, 9727-C35, 9727-C37, 9727-C40, 9727-C42, 9727-C45, 9727-C47, 9727-E10 ,9727-Y20, 9727-C50, 9727-W10 , 9727-W12 , 9727-W15 , 9727-W20 , 9727-W25 , 9727-W30 , 9727-W35 , 9727-W40 , 9727-W45, 9727-Y10, 9727-Y15, 9727-Y25, 9727-T20, 9727-T25

Intended use: Viscometer calibration standards

COMPANY IDENTIFICATION

Supplier: **Cannon Instrument Company**
2139 High Tech Road
State College, Pennsylvania 16803

Product Technical Information: (814) 353-8000
Product MSDS Information: (814) 353-8000

EMERGENCY TELEPHONE NUMBER:

24-Hour Transportation Emergency: (800) 255-3924 Domestic CHEM-TEL Inc.
24-Hour Health Emergency: +1 (813) 248-0585 Overseas CHEM-TEL Inc. (please call collect)

SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

- **OSHA Hazardous Substance(s) or Complex Substance(s)**

None present. This is not a hazardous substance as defined in the OSHA Hazard Communication Standard

SECTION 3 HAZARD IDENTIFICATION

This product is a mixture that has not been tested in laboratory animals. The following is based on characterizations of components as provided by suppliers

EFFECTS OF OVEREXPOSURE:

Acute effects

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Eye: Non-toxic, not classified as irritating. Direct contact may cause temporary redness and discomfort.

Skin: No significant irritation expected from a single short-term exposure

Inhalation: No significant effects expected from a single short-term exposure. Inhalation exposures are not expected under recommended uses/ conditions

Oral: Low ingestion hazard in normal use. If ingested, do not induce vomiting.

Prolonged/ repeated exposure effects

Skin: Not classified as hazardous

Inhalation: Not classified as hazardous

Oral: Not classified as hazardous

Repeated and/or prolonged exposure may cause irritation to the skin, eyes or respiratory tract. For mineral base oils: Base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of severely treated oils show no evidence of carcinogenic effects.

Signs and symptoms of overexposure:

Irritation and/ or redness of eyes and skin

Medical conditions aggravated by exposure

None identified

NFPA HAZARD ID: Health: 0 Flammability: 1 Reactivity: 0
(National Fire Protection Association)

NOTE: This material should not be used for any other purpose than the intended use in Section 1

SECTION 4 FIRST AID MEASURES

INHALATION	Not expected to be a problem since high temperature or high mechanical shear are required to generate airborne exposure. However, if respiratory irritation, dizziness, nausea, or unconsciousness occurs due to excessive vapor or mist exposure, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or mouth-to-mouth resuscitation.
SKIN CONTACT	Wash contact areas with soap and water. Remove and clean oil soaked clothing daily and wash affected area.
EYE CONTACT	Flush thoroughly with water. If irritation occurs, call a physician.
INGESTION	Seek medical attention. Do not induce vomiting.

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NOTE TO PHYSICIAN: Ingested material, if aspirated into the lungs, can cause chemical pneumonitis.

SECTION 5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate extinguishing media: Carbon dioxide, foam, dry chemical and water fog. Water can be used to cool fire exposed containers

FIRE FIGHTING

Fire fighting instructions: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep the exposed containers cool. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

Unusual fire hazards: None identified

Hazardous combustion products: Thermal breakdown of this product during fire or very high heat conditions may evolve the following hazardous decomposition products: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products

FLAMMABILITY PROPERTIES

Flash point °C (°F) [method]: >201 °F/ 94 °C (minimum)
Flammable limits (approx. Volume % in air) – *not determined*
Autoignition temperature °C (°F): not determined

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases to appropriate authorities as required.

CONTAINMENT/ CLEANUP

PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:

LAND SPILL: Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping or contain spilled material with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as required by regulations (see Section 13.)

WATER SPILL: Confine the spill immediately with booms. Notify relevant authorities. Remove from the surface by skimming or with suitable absorbents

ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.

PERSONAL PROTECTIVE EQUIPMENT FOR SPILLS

Eyes: Use proper protection – safety glasses as a minimum

Skin: Washing at mealtime and end-of-shift is adequate

Inhalation: No respiratory protection should be needed

Precautionary measures: Avoid eye contact. Use reasonable care

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SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid prolonged/ repeated skin contact. Use with adequate ventilation

STORAGE:

Keep containers closed when not in use. Do not store in open or unlabelled containers. Store away from strong oxidizing agents and combustible materials. Do not store near heat, sparks, flame or strong oxidants.

SPECIAL PRECAUTIONS

Prevent small spills and leakages to optimize housekeeping and avoid slip hazard.

EMPTY CONTAINER WARNING

Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. *Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.*

STORAGE

Use reasonable care and store away from oxidizing materials

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

When mists/aerosols can occur, the following are recommended:

5 mg/m3 (as oil mist) - ACGIH Threshold Limit Value (TLV)
10 mg/m3 (as oil mist) - ACGIH Short Term Exposure Limit (STEL)
5 mg/m3 (as oil mist) – OSHA Permissible Exposure Limit (PEL)

ENGINEERING CONTROLS

General ventilation is recommended. *No local exhaust ventilation should be needed*

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection:

No respiratory protection should be needed

Hand Protection:

No special protection needed

Eye Protection:

Use proper protection – safety glasses as a minimum

Specific Hygiene Measures:

Washing at mealtime and end-of-shift is adequate

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SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Cannon Instrument Company as indicated in Section 1 for additional data.

GENERAL INFORMATION

Physical state:	Liquid
Form:	Liquid
Color:	Light amber color
Odor:	Characteristic petroleum odor
Odor threshold:	not available

IMPORTANT HEALTH, SAFETY AND ENVIRONMENTAL INFORMATION

Specific Gravity @ 25°C: <0.9
Bulk density g/cc: not determined
Density, kg/m³ (lbs./gal.): not determined
Flash point °C (°F) [method]: >201 °F/ 94 °C (minimum)
Flammable limits (approx. Volume % in air) - not determined
Ignition temperature (polymers) °C (°F): not applicable
Autoignition temperature °C (°F): not determined
Boiling point/range °C (°F): >154 °C/ 309°F
Vapor density @ 101 kPa (air =1): not determined
Vapor pressure @ 20°C, kPa (mm Hg): not determined
Evaporation rate (n-butyl acetate =1): not determined
pH: not applicable
Log Pow (n-Octanol/water partition coefficient): not determined
Solubility in water (20 °C): negligible
Viscosity: see product specification

OTHER INFORMATION

Freezing point °C (°F):	not determined
Melting Point °C (°F):	not determined
Pour point °C (°F):	not determined
Molecular weight:	not available
Hygroscopic:	no
Coefficient of thermal expansion:	not determined

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: Extreme heat and high energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizing agents/ materials can cause a reaction

HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur

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SECTION 11 TOXICOLOGICAL INFORMATION

This product is a mixture of components, and it has not been tested. Information from suppliers indicates that the product is not classifiable as hazardous

SECTION 12 ECOLOGICAL INFORMATION

Environmental fate and distribution

No specific environmental data are available for this product; this assessment is based on information for similar components/ products.

Air: This product has a low vapor pressure. As a result, it is unlikely to become an atmospheric contaminant under recommended conditions of use

Water: This product has low water solubility. Since it has a specific gravity of <1, if discharged to water, it will form a surface film. As the product is non-volatile and has a high binding affinity for particulate matter, it will absorb to particulates and form sediment.

Soil: This product is expected to have a high binding affinity for particulate matter in soil

Degradation: This product is expected to be inherently biodegradable.

Environmental effects

Toxicity to water organisms: Based on analogy to similar materials, this product is expected to exhibit low toxicity to aquatic organisms

Toxicity to soil organisms: No available information

Bioaccumulation: Bioaccumulation is unlikely due to the very low water solubility of this product; therefore bioavailability to aquatic organisms is minimal

Fate and effects in water treatment plants

This product or similar products have been shown to be non-toxic to sewage sludge bacteria

SECTION 13 DISPOSAL CONSIDERATIONS

When a decision is made to discard this material, it is not considered a hazardous waste under Resource Conservation and Recovery Act (RCRA).

State or local laws may impose additional regulatory requirements regarding disposal

WASTE DISPOSAL: Product is suitable for burning in an enclosed, controlled burner for fuel value. Such burning may be limited pursuant to the Resource Conservation and Recovery Act. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at an appropriate government waste disposal facility. Use of these methods is

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subject to user compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT):
Not subject to DOT

SEA (IMDG)
Not subject to IMDG code

AIR (IATA)
Not subject to IATA regulations

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING:

This product, and/ or its constituents, is listed on the US EPA/ TSCA (Toxic Substances Control Act) Inventory

COMMUNITY RTK:

Chemical Name	CAS Number	Typical Value	Component TPQ	Product TPQ
Highly refined mineral oil	64742-54-7 64742-57-0 64742-53-6 *	100%	Not applicable	Not applicable

*Suppliers of certain components have not provided specific identities for the supplied highly refined mineral oil An alternate formulation for S600 is composed of synthetic oil, CAS# 68037-01-4. YS-30 and YS-35 contain up to 40% of a synthetic base oil, CAS# 68037-01-4

Section 304 CERCLA HAZARDOUS SUBSTANCES:

This product contains no chemicals that are classified as hazardous under SARA 312

SARA (311/312) REPORTABLE HAZARD CATEGORIES:

This product contains no chemicals that are classified as hazardous under SARA 312

SARA (313) TOXIC RELEASE INVENTORY:

This product contains no chemicals that are regulated under SARA 313

SECTION 16 OTHER INFORMATION

This 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. The information and recommendations contained herein is compiled from suppliers' MSDS and are accurate and reliable to the best of Cannon Instrument Company's knowledge and belief as of the indicated revision date. No representation, warranty or guarantee, however, is made with regards to accuracy, reliability or completeness. Conditions of use of the material are under the control of the user; therefore, it is the user's responsibility to determine the suitability and completeness of such information for any specific conditions/ use.

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Summary:

- **October 15, 2005 -- This MSDS has been fully reviewed and reformatted to conform to changes in standard format**

NOTES:

This 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. The information and recommendations contained herein is compiled from suppliers' MSDS and are accurate and reliable to the best of Cannon Instrument Company's knowledge and belief as of the indicated revision date. No representation, warranty or guarantee, however, is made with regards to accuracy, reliability or completeness. Conditions of use of the material are under the control of the user; therefore, it is the user's responsibility to determine the suitability and completeness of such information for any specific conditions/ use.

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EASTMAN

MATERIAL SAFETY DATA SHEET

Revision Date: 04/28/2006
MSDSUSA/ANSI/EN/150000001047/Version 6.1

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1Product Name	2Eastman(TM) DEP Plasticizer
3Product Identification Number(s)	400080-00, P0008000, P0008001, P0008002, P0008003, P0008004, P0008005, E0008001
5Manufacturer/Supplier	6Eastman Chemical Company 200 South Wilcox Drive Kingsport, TN 37660-5280 US +14232292000
7MSDS Prepared by	8Eastman Product Safety and Health
9Chemical Name	10diethyl 1,2-benzenedicarboxylate
11Synonym(s)	1200080-00 900124
13Molecular Formula	14C12H14O4
15Molecular Weight	16222.23
17Product Use	18plasticizer
19OSHA Status	20hazardous

21For emergency health, safety & environmental information, call 800-EASTMAN.

22For emergency transportation information, call CHEMTREC at 800-424-9300 or call 800-EASTMAN.

1. COMPOSITION INFORMATION ON INGREDIENTS

1(Typical composition is given, and it may vary. A certificate of analysis can be provided, if available.)

2Weight %	3Component	4CAS Registry No.
5100%	6diethyl phthalate	784-66-2

1. HAZARDS IDENTIFICATION

1LOW HAZARD FOR USUAL INDUSTRIAL OR COMMERCIAL HANDLING BY TRAINED PERSONNEL
2
3HMIS® Hazard Ratings: 4Health - 1, Flammability -1, Chemical Reactivity - 0

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5HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

1. FIRST-AID MEASURES

1 **Inhalation:** If symptomatic, move to fresh air. Get medical attention if symptoms persist.
2 **Eyes:** Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Get medical attention if symptoms persist.
3 **Skin:** Wash with soap and water. Get medical attention if symptoms occur.
4 **Ingestion:** Seek medical advice.

1. FIRE FIGHTING MEASURES

1 **Extinguishing Media:** water spray, dry chemical, carbon dioxide, foam
2 **Special Fire-Fighting Procedures:** Wear self-contained breathing apparatus and protective clothing.
3 **Hazardous Combustion Products:** carbon dioxide, carbon monoxide
4 **Unusual Fire and Explosion Hazards:** none

1. ACCIDENTAL RELEASE MEASURES

1 Absorb spill with vermiculite or other inert material, then place in a container for chemical waste.
2 **For Large Spills:** Flush spill area with water spray. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

1. HANDLING AND STORAGE

1 **Personal Precautionary Measures:** No special precautionary health measures should be needed under anticipated conditions of use.
2 **Prevention of Fire and Explosion:** Keep from contact with oxidizing materials.
3 **Storage:** Keep container closed.

1. EXPOSURE CONTROLS/PERSONAL PROTECTION

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1Country specific exposure limits have not been established or are not applicable unless listed below.

2DIETHYL PHTHALATE
3US. ACGIH Threshold Limit Values
4Time Weighted Average (TWA): 5 mg/m3
5US. NIOSH: Pocket Guide to Chemical Hazards
6Recommended exposure limit (REL): 5 mg/m3
7US. California Code of Regulations, Title 8, Sec tion 5155. Airborne Contaminants
8Time Weighted Average (TWA) Permissible Exposure Limit (PEL): 5 mg/m3

9 **Ventilation:** 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.

10 **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. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

11 **Eye Protection:** It is a good industrial hygiene practice to minimize eye contact.

12 **Skin Protection:** It is a good industrial hygiene practice to minimize skin contact.

13 **Recommended Decontamination Facilities:** eye bath, washing facilities

1. PHYSICAL AND CHEMICAL PROPERTIES

1 **Physical Form:** liquid
2 **Color:** colorless
3 **Odor:** odorless
4 **Specific Gravity:** 1.12 (20 °C)
5 **Vapor Density:** 7.7
6 **Melting Point:** -3 °C
7 **Boiling Point:** 298 °C
8 **Viscosity:** 9.5 mPa.s (25 °C) ,
9 **Solubility in Water:** 0.12 g/l
10 **Octanol/Water Partition Coefficient:** P: 4 - 11; log P: 0.62 - 1.04
11 **Flash Point:** 160 °C (Setaflash closed cup)
12 **Autoignition Temperature:** 457 °C (ASTM D2155)
13 **Thermal Decomposition Temperature:** (DSC) No exotherm to 450°C
14

1. STABILITY AND REACTIVITY

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1Stability:	2Stable.
3Incompatibility:	4Material reacts with strong oxidizing agents.
5Hazardous Polymerization:	6Will not occur.

1. TOXICOLOGICAL INFORMATION

1Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.

2

3Oral LD-50:(rat)	49,000 mg/kg
5Oral LD-50:(rabbit)	61,000 mg/kg
7Inhalation LC-50: (rat)	86 h: > 4.64 mg/l (highest concentration tested)
9Dermal LD-50: (guinea pig)	10 >20 mL/Kg (highest dose tested)
11Skin Irritation (guinea pig)	12slight
13Eye Irritation (rabbit)	14slight

1. ECOLOGICAL INFORMATION

1Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.
2Oxygen Demand Data:
3BOD-5: 2,000 mg/g

4COD (Chemical Oxygen Demand):: 1,660 - 2,100 mg/g

5Acute Aquatic Effects Data:
696 h LC-50 (rainbow trout): 12 mg/l NOEC: 3.8 mg/l
796 h LC-50 (bluegill sunfish): 17 mg/l NOEC: 1.6 mg/l
896 h LC-50 (sheepshead minnow): 29 mg/l NOEC: 20 mg/l
996 h LC-50 (fathead minnow): 17 mg/l NOEC: 4 mg/l
1048 h LC-50 (golden orfe): 53 - 61 mg/l
1148 h EC-50 (daphnid): 86 mg/l NOEC: 38 mg/l
1296 h EC-50 (Selenastrum capricornutum): 85.6 mg/l

1. DISPOSAL CONSIDERATIONS

1Discharge, treatment, or disposal may be subject to national, state, or local laws. Incinerate.

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1. TRANSPORT INFORMATION

1Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

2DOT (USA)

3Class 9, Packing Group III when material is shipped in quantities in one package at or above the Reportable Quantity and when no other hazard class applies; otherwise, not regulated.

4Reportable Quantity: 454 kg (diethyl phthalate)

5Possible Shipping Description(s):

6Environmentally hazardous substances, liquid, n.o.s. (diethyl phthalate)
79 UN 3082 III

8Sea - IMDG (International Maritime Dangerous Goods)

9Class not regulated

10Possible Shipping Description(s):

not regulated

1Air - ICAO (International Civil Aviation Organization)

2Class not regulated

3Possible Shipping Description(s):

not regulated

1. REGULATORY INFORMATION

1 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.

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2 **WHMIS (Canada) Status:** noncontrolled

3SARA 311-312 Hazard Classification(s):
4immediate (acute) health hazard

5SARA 313: none, unless listed below

6Carcinogenicity Classification (components present at 0.1% or more): none, unless listed below

7 **TSCA (US Toxic Substances Control Act):** This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

8 **DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act):** This product is listed on the DSL or otherwise complies with CEPA new substance notification requirements.

9 **EINECS (European Inventory of Existing Commercial Chemical Substances):** This product is listed on EINECS or otherwise complies with EINECS requirements. **EINECS Number:** 201-550-6

10 **AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme):** This product is listed on AICS or otherwise complies with NICNAS.

11 **MITI (Japanese Handbook of Existing and New Chemical Substances):** This product is listed in the Handbook or has been approved in Japan by new substance notification.

12 **ECL (Korean Toxic Substances Control Act):** This product is listed on the Korean inventory or otherwise complies with the Korean Toxic Substances Control Act.

1. OTHER INFORMATION

Visit our website at www.EASTMAN.com or call 001-423-229-2000.

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information. Users should make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials, the safety and health of employees and customers, and the protection of the environment.

Highlighted areas indicate new or changed information.

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Material Safety Data Sheet

The Dow Chemical Company

Product Name: PROPYL CELLOSOLVE(TM) SOLVENT

Issue Date: 06/06/2006
Print Date: 12 Jun 2006

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name
PROPYL CELLOSOLVE(TM) SOLVENT

COMPANY IDENTIFICATION
The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

Customer Information Number: 800-258-2436

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 989-636-4400
Local Emergency Contact: 989-636-4400

2. Hazards Identification

Emergency Overview
Color: Colorless
Physical State: Liquid
Odor: mild, sweet
Hazards of product:

WARNING! Combustible liquid and vapor. Causes eye irritation. Harmful if absorbed through skin. May cause skin irritation. May be harmful if inhaled. Vapor explosion hazard. Vapors may travel a long distance; ignition and/or flash back may occur. Isolate area. Keep upwind of spill. Stay out of low areas.

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

Potential Health Effects
Eye Contact: May cause severe eye irritation. May cause moderate corneal injury. Effects may include pain, marked redness and swelling.
Skin Contact: Prolonged contact may cause skin irritation with local redness.
Skin Absorption: Prolonged or widespread skin contact may result in absorption of harmful amounts.

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Inhalation: Prolonged excessive exposure may cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract (nose and throat). Observations in animals include: Red-coloured urine.
Ingestion: 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.
Effects of Repeated Exposure: In animals, effects have been reported on the following organs: blood (hemolysis) and secondary effects on the kidney and liver. Human red blood cells have been shown to be significantly less sensitive to hemolysis than those of rodents and rabbits.
Birth Defects/Developmental Effects: Has been toxic to the fetus in lab animals at doses toxic to the mother.

3. Composition Information

Component	CAS #	Amount
Ethylene glycol monopropyl ether	2807-30-9	> 99.0 %

4. First-aid measures

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.
Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Seek medical attention if symptoms occur or irritation persists. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.
Inhalation: Move person to fresh air; if effects occur, consult a physician.
Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.
Notes to Physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.
Medical Conditions Aggravated by Exposure: Excessive exposure may aggravate preexisting liver and kidney disease. Repeated excessive exposure may aggravate preexisting blood disease (anemia).

5. Fire Fighting Measures

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.
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. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. 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.
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). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire

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from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.
Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. 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.
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.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Small spills: Absorb with materials such as: Non-combustible material. Clay. Zorb-all®. Wash the spill site with large quantities of water. Large spills: Dike area to contain spill. 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.
Personal Precautions: Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Isolate area. Keep unnecessary and unprotected personnel from entering the area. No smoking in area. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Vapor explosion hazard. Keep out of sewers. Refer to Section 7, Handling, for additional precautionary measures.
Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Material may float on water and any runoff may create an explosion or fire hazard if ignited.

7. Handling and Storage

Handling
General Handling: No smoking, open flames or sources of ignition in handling and storage area. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Electrically ground and bond all equipment. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation.
Other Precautions: 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. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage
Minimize sources of ignition, such as static build-up, heat, spark or flame. Keep container closed. Store in the following material(s): Carbon steel. Stainless steel. Do not store in: Aluminum. Copper. Galvanized iron. Galvanized steel.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Ethylene glycol monopropyl ether	Dow IHG	TWA	20 ppm SKIN
	Dow IHG	STEL	60 ppm SKIN

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A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.
It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

Personal Protection

Eye/Face Protection: Use chemical goggles.
Skin 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. Safety shower should be located in immediate work area. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). 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.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required, use an approved air-purifying or positive-pressure supplied-air respirator depending on the potential airborne concentration. For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure air line with auxiliary self-contained air supply. The following should be effective types of air-purifying respirators: Organic vapor cartridge.
Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. Physical and Chemical Properties

Physical State	Liquid
Color	Colorless
Odor	mild, sweet
Flash Point - Closed Cup	57 °C (135 °F) *ASTM D93*
Flammable Limits In Air	**Lower:** 1.3 %(V) *Literature*
	Upper: 15.8 %(V) *Literature*
Autoignition Temperature	235 °C (455 °F) *Literature*
Vapor Pressure	1.6 mmHg @ 20 °C *Literature*
Boiling Point (760 mmHg)	150 °C (302 °F) *Literature* .
Vapor Density (air = 1)	3.6 *Literature*
Specific Gravity (H2O = 1)	0.912 20 °C/20 °C *Literature*
Freezing Point	-90 °C (-130 °F) *Literature*
Melting Point	No test data available
Solubility in Water (by weight)	100 % @ 20 °C
pH	No test data available
Molecular Weight	104 g/mol *Literature*
Octanol/Water Partition Coefficient	0.08 *Estimated*

EPAPA005001548

Evaporation Rate (Butyl Acetate = 1)	0.2 *Literature*
Dynamic Viscosity	2.7 cps @ 20 °C *Literature*

10. Stability and Reactivity

Stability/Instability
Thermally stable at typical use temperatures.
Conditions to Avoid: Do not distill to dryness. Product can oxidize at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Hazardous Polymerization
Will not occur.

Thermal Decomposition
Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Ketones. Organic acids.

11. Toxicological Information

Acute Toxicity
Ingestion
LD50, Rat, male 3,089 mg/kg
Skin Absorption
LD50, Rat 876 mg/kg
LD50, Guinea pig 1,000 - 5,000 mg/kg
Inhalation
LC50, 6 h, Vapor, Rat, male > 2,132 ppm
Sensitization
Skin
Did not cause allergic skin reactions when tested in guinea pigs.
Repeated Dose Toxicity
In animals, effects have been reported on the following organs: blood (hemolysis) and secondary effects on the kidney and liver. Human red blood cells have been shown to be significantly less sensitive to hemolysis than those of rodents and rabbits.
Developmental Toxicity
Has been toxic to the fetus in lab animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

12. Ecological Information

CHEMICAL FATE

Movement & Partitioning
Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).
Henry's Law Constant (H): 1.47E-8 atm*m3/mole; 25 °C Estimated
Partition coefficient, n-octanol/water (log Pow): 0.08 Estimated
Partition coefficient, soil organic carbon/water (Koc): 1 Estimated

Persistence and Degradability
Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).

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Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
2.16E-11 cm3/s		Estimated

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
13 %	66 %	100 %	

Chemical Oxygen Demand: 1.94 mg/mg
Theoretical Oxygen Demand: 2.15 mg/mg

ECOTOXICITY

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, fathead minnow (Pimephales promelas): > 1,000 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, water flea Daphnia magna: > 5,000 mg/l
Toxicity to Micro-organisms
EC50; bacteria, Growth inhibition: > 1,000 mg/l

13. Disposal Considerations

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. DOW HAS 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

DOT Non-Bulk
NOT REGULATED

DOT Bulk
Proper Shipping Name: FLAMMABLE LIQUID, NOS
Technical Name: ETHYLENE GLYCOL MONOPROPYL ETHER
Hazard Class: 3 **ID Number:** UN 1993 **Packing Group:** PG III

IMDG
Proper Shipping Name: FLAMMABLE LIQUID, NOS
Technical Name: ETHYLENE GLYCOL MONOPROPYL ETHER
Hazard Class: 3 **ID Number:** UN1993 **Packing Group:** PG III
EMS Number: F-E,S-E

ICAO/IATA
Proper Shipping Name: FLAMMABLE LIQUID, NOS
Technical Name: ETHYLENE GLYCOL MONOPROPYL ETHER
Hazard Class: 3 **ID Number:** UN1993 **Packing Group:** PG III
Cargo Packing Instruction: 310
Passenger Packing Instruction: 309

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This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. 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

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

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Component	CAS #	Amount
Ethylene glycol monopropyl ether	2807-30-9	>= 99.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:
The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Ethylene glycol monopropyl ether	2807-30-9	>= 99.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:
To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)
This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

European Inventory of Existing Commercial Chemical Substances (EINECS)
The components of this product are on the EINECS inventory or are exempt from inventory requirements.

US. 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.

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16. Other Information

Product Literature

Additional information on this product may be obtained by calling your Dow Chemical Company sales or customer service contact. Ask for a product brochure.

Hazard Rating System

NFPA	Health	Fire	Reactivity
	2	2	0

Recommended Uses and Restrictions

Dow recommends that you use this product in a manner consistent with the listed use. If your intended use is not consistent with Dow's stated use, please contact Dow's Customer Information Group. An oxygenated solvent - For industrial conversion as a raw material for manufacture of articles or goods. For industrial formulation for inclusion in a final product. For industrial use as a process aid. For industrial formulation as a process control material. For industrial consumption as a process raw material. For industrial consumption as a component of a reaction system.

Revision

Identification Number: 1982 / 1001 / Issue Date 06/06/2006 / Version: 4.1
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation

The Dow Chemical Company 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.

EPAPA005001552

THERMOIL
The Lubricant Solution.

Product Name:

CAS#64741-96-4 and #64742-63-8

Lubricating oil / Machine oil / Motor oil/Compressor Oil

Chemical Name:
Petroleum lubricating oil

Health	1
Flammability	1
Reactivity	0

A. Product appearance & odor
Liquid, Amber & Clear color,
Bland petroleum odors

B. Hazardous ingredients/components

Components	CAS # of component	Approximate concentration
Solvents refined heavy naphthenic distillate, Petroleum and solvent dewaxed heavy napthenic Distillate, petroleum and all components are listed On the U.S. TSCA inventory	64741-96-4 and 64742-63-8	100%

This product and all components are listed on the U.S. TSCA inventory

Exposure limit for total product	Basis
5 mg/m3 for oil mist in air	OSHA regulation 29 CFR 1910.1000
5mg/m3 for oil mist	Recommended by the American Conference Of Govt. Industrial hygienists (ACGIH)

C. Primary routes of entry & emergency & first aid procedures

Eye Contact
If splashed into eyes, flush with clear water for 15 min. or until irritation subsides. If irritation persist, call a physician.

Skin Contact
In case of skin contact, remove any contaminated clothing and wash skin thoroughly with soap and water.

Inhalation
Vapor pressure is very low. Vapor inhalation under ambient condition is normally not a problem. If overcome by vapor from hot product, immediately remove from exposure and call a physician. If breathing is irregular or has stopped, start resuscitation; administer oxygen, if available. If overexposed to oil mist, remove from further exposure until mist subsides.

Ingestion
If ingested, DO NOT induce vomiting; call a physician immediately.

10/25/01

Thermoil Corp. 7 Franklin Avenue, Brooklyn, NY 11211 Tel: 718 855-0544 Fax: 718 643-6691

D. Fire & Explosion hazard information

Flash Point (minimum)
210 c (410 F)
ASTM D 92, Cleveland open cup

Autoignition Temperature
Greater than 260 C (500 F)

Handling Precautions
Use product with caution around heat, sparks, pilot lights static electricity, and open flames.

Flammable or explosive limits (approximate percent by volume in air)

Estimated values: Lower flammable limit 0.9% upper flammable limit 7%

Extinguishing media and fire fighting procedures
The following procedures for this type of product are based on the recommendations in the National Fire Protection Assoc. "Fire Protection Guide on Hazardous Materials". Eighth Edition (1984).

Use water spray, dry chemical, foam or carbon dioxide to extinguish fire. Use water to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse vapors and provide protection for men attempting to stop a leak. Water spray may be used to flush spills away from exposures. Minimize breathing of gases, vapor, fumes or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

Decomposition products under fire conditions
Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.

"Empty" container warning
"Empty" containers retain residue (liquid and/or vapor) and can be dangerous. Do not pressurized, cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death. Do not attempt to clean since residue is difficult to remove. "Empty" drums" should be completely drained, properly bunged and promptly returned to a drum reconditioner. All other containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. For work on tanks refer to OSHA regulations, ANSI Z49.1. Pertaining to cleaning, etc.

E. Health & Hazard Information

Variability among individuals
Health studies have shown that many petroleum hydrocarbons and synthetic lubricants pose potential human health risks, which may vary, from person to person. As a precaution, exposure to liquids, vapors, mists, or fumes should be minimized.

Effects of overexposure (signs & symptoms of exposure)
Prolonged or repeated skin contact may cause skin irritation.

Nature of hazard & toxicity information
In accordance with the current OSHA hazard communication standard criteria, this product does not require a cancer hazard warning. This is because the product is formulated from base stocks which are severely hydrotreated, severely solvent extracted, and/or processed by mild hydrotreatent and extraction. Alternatively, it may consist of components not otherwise affected by IARC criteria, such

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as atmospheric distillates or synthetically derived material, and as such is not characterized by current IARC classification.
Prolonged or repeated skin contact with this product tends to remove skin oils, possibly leading to irritation and dermatitis; However, based on human experience and available toxicological data, this product is judged to be neither a "corrosive" nor an "irritant" by OSHA criteria.

Product contacting the eyes may cause eye irritation.

Product has a low order of acute oral and dermal toxicity, but minute amounts aspirated into the lungs during ingestion or vomiting may cause mild to severe pulmonary injury and possibly death.

This product is judged to have an acute oral LD50 (RAT) greater than 5 G/KG of body weight, and an acute dermal LD50 (RABBIT) greater than 3.16 g/kg of body weight.

Pre-existing medical conditions, which may aggravated by exposure
None recognized.

F. Physical Data

The following data are approximate or typical values and should not be used for precise design purposes.

Boiling range IBP aprox. 274 c (525 F) By ASTM D 2887	Vapor pressure Less than 0.01 MM HG @ 20c
Specific gravity (15.6 c/15.6c) 0.90	Vapor density (air = 1) Greater than 5
Molecular weight Not determined	Percent VOLATILE BY VOLUME Negligible from open container In 4 hours @ 38 c (100 F)
PH Essentially neutral	Evaporation rate @ 1 ATM. & 25c (77 F) (N-Butyl Acetate = 1) Less than 0.01
Pour, congealing or melting pt. -9 c (15 F) Viscosity	Solubility in water @ 1 ATM. & 25c (77 F) Negligible; Less than 0.1%

G. Reactivity
This product is stable and will not react violently with water. Hazardous polymerization will not occur. Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite or calcium hypochlorite.

H. Environmental information

Steps to be taken in case material is release or spilled recover free product. Add sand, earth or other suitable absorbent to spill area. Minimize skin contact, keep product out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourse, or extensive land areas. Assure conformity with applicable governmental regulations.

The following information may be useful in complying with various states and federal regulations under various environmental statutes:

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Reportable quantity (RQ) EPA regulation 40 CFR 302 (CERCLA Sect. 102)
No RQ for product or any constituent greater that 1% or 0.1% (carcinogen)

Threshold planning quantity (TPQ) EPA regulation 40 CFR 355 (SARA Sect. 301)
No TPQ for product or any constituent greater than 1% or 0.1% (carcinogen)

Toxic chemical release reporting EPA regulation 40 CFR 370 (SARA Sect. 313)
No toxic chemical is present greater than 1% or 0.1% (carcinogen)

Hazardous chemical reporting EPA regulation 40 CFR (SARA Sect. 311/12)
Acute chronic fire pressure reactive not applicable
EPA Hazard Class Code: HAZARD HAZARD HAZARD HAZARD HAZARD

I. Protection & precautions

Ventilation
Use local exhaust to capture vapor, mists or fumes, if necessary. Provide sufficient ventilation to prevent exceeding recommended exposure limit or buildup of explosive concentrations of vapor in air, no smoking or other ignition sources.

Respiratory protection
Use supplied-air respiratory protection in confined or enclosed spaces, if needed.

Protective gloves
Use chemical-resistant gloves. If needed, to avoid prolonged or repeated skin contact.

Eye protection
Use splash goggles or face shield when eye contact may occur.

Other protective equipment
Use chemical-resistant apron or other impervious clothing, if needed, to avoid contaminating regular clothing, which could result in prolonged or repeated skin contact.

Work practices / Engineering controls
Keep containers closed when not in use. Do not store near heat, sparks, flames or strong oxidants. In order to prevent fire or explosion hazards use appropriate equipment.

Information on electrical equipment appropriate for use with this product may be found in the latest edition of the National Electrical Code (NFPA-70). This document is available from the National Fire Assoc. Mass.

Personal Hygiene
Minimize breathing vapor, mist or fumes. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; Launder or dry clean before re-use; discard if oil soaked. Cleanse skin thoroughly after contact, before breaks and meals, and at the end of work period. Waterless hand cleaners followed by washing thoroughly with soap and water readily remove this product from skin.

J. Transportation & OSHA related label information

Transportation incident information
For further information relative to spills resulting from transportation incidents, refer to the latest Dept. of Transportation emergency response guidebook for hazardous materials incidents. DOT P 5800.3.

DOT identification number
Not applicable

OSHA required label information
In compliance with hazard and right-to-know requirements, the following OSHA hazard warning should be found on a label, bill of lading or invoice accompanying this shipment:

(OSHA hazard warnings not applicable for this product)
(Therefore, no OSHA warnings would appear on the label)

The information and recommendations contained herein are, to the best of Thermoil's knowledge and belief, accurate and reliable as of date issued. Thermoil does not warrantor guarantee their accuracy (or reliability), and Thermoil shall not be liable for any loss or damage arising out of the use thereof.

The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use. If buyer repackages this product, legal council should be consulted to insure proper health, safety and other necessary information is included on the container.

The environmental information included under section H hereof as well as the hazardous materials identification system (HMIS) and national fire protection association (NFPA) ratings have been included by us in order to provide additional health and hazard classification information.

Oxid L.P.
101 Concrete Street, Houston, Texas 77012
(Phone) 713-924-6400 (Fax) 713-923-7922

MATERIAL SAFETY DATA SHEET

TEROL®

1. PRODUCT IDENTIFICATION

Chemical Name:	Polyester Polyol
Chemical Family:	Phthalic Acid Ester
Trade Name:	Terol® 198, 250
Revision Date:	November 01, 2004
EMERGENCY CONTACT:	713-924-6408 (Oxid 24-hr number) CHEMTREC 1-800-424-9300

2. HAZARDOUS COMPONENTS

CAS No.	Material or Component	Percentage
107-21-1	Ethylene Glycol	<1.0
123-91-1	1,4 – Dioxane	<0.1

3. HAZARDS IDENTIFICATION

Ingestion: Harmful if swallowed.

Skin: Substance may be mildly irritating to the skin.

Inhalation: At elevated temperatures vapor may cause irritation to the respiratory tract.

Eyes: Mildly irritating.

Special Medical Conditions By Exposure: None known

Exposure Limits: ACGIH Threshold Limit Value (TLV) –	Polyester Polyol	Not listed
	Ethylene Glycol	50 ppm Ceiling
	1,4-Dioxane	25 ppm (Skin)
OSHA Permissible Exposure Limit (PEL) –	Polyester Polyol	Not listed
	Ethylene Glycol	50 ppm Ceiling
	1,4-Dioxane	100 ppm (Skin)

Carcinogens: 1,4 Dioxane is carcinogenic to animals orally but not by inhalation. There is inadequate evidence of carcinogenicity of 1,4-Dioxane to humans.

For disclaimer of liability, see statement on Page 4

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4. FIRST AID MEASURES

Ingestion:	Get medical attention immediately. Never give water to an unconscious person.
Skin:	Remove soiled clothing and wash with soap and water. If irritation persis ts, seek medical attention.
Inhalation:	If symptomatic remove to fresh air. If symptoms persist seek medical attention.
Eyes:	Rinse immediately with water for 15 minutes. If irritation persists, seek medical attention.

5. FIRE FIGHTING MEASURES

Flash Point:	>200°F PMCC (93°C)
Flammable Limits in Air % by Volume:	N/A
Extinguishing Media:	Water, Foam, Carbon Dioxide or Dry Chemical
Unusual Fire and Explosion Hazard:	None Known

6. ACCIDENTAL RELEASE MEASURES

In Case of a Transportation Accident, Contact CHEMTREC at 1-800-424-9300.

In case of spills or release: Use appropriate personal protective equipment measures during clean-up. For small spills, use a solid absorbent and place in disposal container. For large spills, dike the area to facilitate salvage or disposal. Avoid run-off into storm sewers.

7. HANDLING AND STORAGE

Storage and Handling: Product should be stored apart from oxidizing agents or other strong reactive materials.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Eye Protection:	Use safety glasses with side shields or chemical splash goggles
Hand Protection:	Wear rubber or neoprene gloves
Skin Protection:	Wear protective clothing
Respiratory Protection:	Have appropriate NIOSH-approved respirator available

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity:	1.20 @ 25°C (77°F)	Boiling Point:	>246°C (474.8°F)
Vapor Pressure (PSIA):	<0.1 @ 20°C (68°F)	pH:	5-7
Solubility In Water:	Miscible to 25%	Evaporation Rate (Butyl Acetate =1):	<1.0
Physical Description:	Dark Brown, viscous liquid, no odor		

For disclaimer of liability, see statement on Page 4

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10. STABILITY AND REACTIVITY

Conditions to Avoid: Heat sources, oxidizing agents

Hazardous Decomposition Products: On heating/burning releases carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

Polyester Polyol:	Not Determined		
Ethylene Glycol: (Acute)	LD50 oral rat	4700	mg/kg
	LD50 dermal rabbit	9530	mg/kg
1,4-Dioxane: (Acute)	LD50 oral rabbit	2000	mg/kg
	LD50 dermal rabbit	7600	mg/kg

12. ECOLOGICAL INFORMATION

There are no extensive ecological data available on the components of this product..

13. DISPOSAL CONSIDERATIONS

Incineration is the preferred method where permitted under appropriate federal, state, or local regulations. This product, when spilled or disposed of, is a non-hazardous solid waste as defined in Resource Conservation Recovery Act Regulations (40CFR261)..

14. TRANSPORT INFORMATION

The proper shipping name / hazard class may vary by packaging, properties, and mode of transportation.
Typical shipping names are:

ALL TRANSPORTATION MODES: This product is not regulated by the U. S. Department of transportation (DOT).

AIR TRANSPOIRATION:
(IATA / ICAO)

MARINE TRANSPORTATION:
(IMDG / IMO)

UN/ID NO.: Not applicable
HAZARD CLASS - PRIMARY: Not applicable
PACKING GROUP:
IATA PACKING INSTRUCTION:
IATA CARGO AIRCRAFT LIMIT:

FLASH POINT: >200°F PMCC

TECHNICAL NAME(s):
RQ LBS. (Per pkg.): Not Applicable
RQ COMPONENTS (s): Not Applicable
MARINE POLLUTANT (s): Not Applicable

For disclaimer of liability, see statement on Page 4

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15. REGULATORY INFORMATION

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CRF 472.

CAS No.	Material or Component	% by Weight
107-21-1	Ethylene Glycol	< 1.0
123-91-1	1,4-Dioxane	< 0.1

Toxic Substance Control Act: The components in this product are on the TSCA Inventory.

Canada's Domestic Substance List: For information concerning product status, please contact Oxid, L.P. Customer Service at 713/924-6401

16. OTHER INFORMATION

NFPA RATING: (NFPA 704 Rating: 0 - Insignificant 1 - Slight 2 - Moderate 3 - High 4 – Extreme)

Health: 1 Flammability: 1 Reactivity: 0

THIS INFORMATION MUST BE INCLUDED IN ALL MSDSs THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.

® Indicates a Trademark of Oxid L. P.

The information provided herein is given in good faith, but no Warranty, express or implied, is made.

Rev 11/01/04

EPAPA005001561

Material Safety Data Sheet

Catalog Number: 195445
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 195445

Product name: POLYETHYLENE GLYCOL

Synonyms: Carbowax; PEG; Poly(Ethylene Oxide); Alkapol PEG-200
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
POLYETHYLENE GLYCOL	25322-68-3	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause irritation to the eyes, skin and respiratory system., Combustible material

Category of Danger:
Irritant

Principle routes of exposure: Skin
Inhalation: Irritating to respiratory system
Ingestion: Irritating to mouth, throat and stomach
Skin contact: Irritating to skin.
Eye contact: Contact with eyes may cause irritation

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard May Cause Eye, Skin and Respiratory Tract irritation.
COMBUSTIBLE MATERIAL AND VAPOR.
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Keep away from heat and flame. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid breathing vapors. Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure.

4. FIRST AID MEASURES

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General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or `alcohol` foam.
Extinguishing media which must not be used for safety reasons:	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards:	combustible material
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	199 to 238 °C (open cup)
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment. Remove all sources of ignition.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place. Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing
Eye protection: Goggles

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Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Powder
Formula:	$(C_2H_4O)_x \cdot H_2O$
Molecular weight:	8000
Melting point/range:	No data available at this time.
Boiling point/range:	No Data available at this time.
Density:	1.1-1.2 g/ml
Vapor pressure:	<0.01 mmHg at 20 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Soluble
Flash point:	199 to 238 °C (open cup)
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	**RTECS Number:**	**Selected LD50s and LC50s**
POLYETHYLENE GLYCOL	TQ4027000	Oral LD50 Rat : 28 gm/kg Oral LD50 Mouse : 34 gm/kg Dermal LD50 Rabbit : >20 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	A primary irritant.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

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Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
POLYETHYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
POLYETHYLENE GLYCOL	1; Fussnote 11	Not Listed	LC50 (24 hr) goldfish:>5000 mg/L. (PEG 200, 400, 800).:

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
POLYETHYLENE GLYCOL	Not Listed	EC50 (15 min) *Photobacterium* phosphoreum:100,000 mg/L Microtox test (polymer unspecified).:	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
POLYETHYLENE GLYCOL	Not Listed	indicator 3; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
POLYETHYLENE GLYCOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
POLYETHYLENE GLYCOL	Not Listed

TDG (Canada):

WHMIS hazard class: D2b toxic materials

:

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IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
POLYETHYLENE GLYCOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
POLYETHYLENE GLYCOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
Inventory - Japan:	2-441; 7-129; 8-429
Korean KECL:	KE-20228
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
POLYETHYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
POLYETHYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
POLYETHYLENE GLYCOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

EPAPA005001566

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001567

MATERIAL SAFETY DATA SHEET

EVAL COMPANY OF AMERICA
2625 BAY AREA BOULEVARD (SUITE 300)
HOUSTON, TX 77058-1551
281-204-4610 (9am – 5pm CST)
281-474-1524 (After 5pm)

EMERGENCY TELEPHONE
800-424-9300 (Chemtrec)

NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)

[redacted]

MATERIAL SAFETY DATA SHEET

EVAL COMPANY OF AMERICA
2625 BAY AREA BOULEVARD (SUITE 300)
HOUSTON, TX 77058-1551
281-204-4610 (9am – 5pm CST)
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800-424-9300 (Chemtrec)

NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)

[redacted]

MATERIAL SAFETY DATA SHEET

EVAL COMPANY OF AMERICA
2625 BAY AREA BOULEVARD (SUITE 300)
HOUSTON, TX 77058-1551
281-204-4610 (9am – 5pm CST)
281-474-1524 (After 5pm)

EMERGENCY TELEPHONE
800-424-9300 (Chemtrec)

NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)

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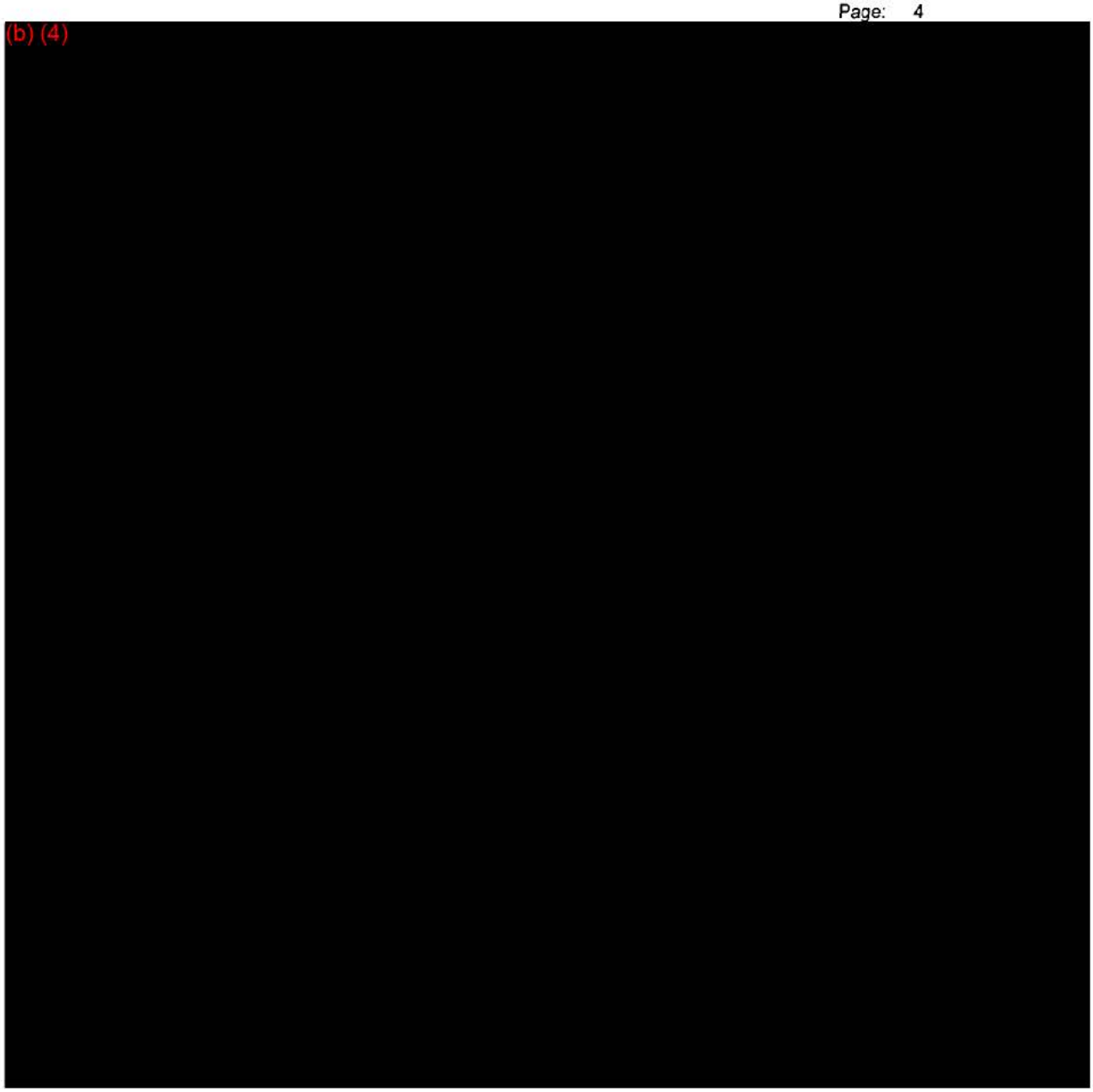

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SUPERSEDES:

(b) (4)

Material Safety Data Sheet

Catalog Number: 218150
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 218150

Product name: POLYPROPYLENE GLYCOL

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
POLYPROPYLENE GLYCOL	25322-69-4	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed., Combustible material

Category of Danger:
Harmful

Principle routes of exposure: Skin
Inhalation: Harmful by inhalation.
Ingestion: Harmful if swallowed.
Skin contact: Harmful in contact with skin.
Eye contact: Risk of serious damage to eyes

Statements of hazard HARMFUL IF SWALLOWED. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR INHALED.
COMBUSTIBLE MATERIAL AND VAPOR.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Statement of First Aid If swallowed, do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.
Precautions - ANSI Label Do not taste or swallow. Wash thoroughly after handling. Keep away from heat and flame.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.

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Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	combustible material
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	199 to 227 °C (open cup)
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment. Remove all sources of ignition.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Technical measures/storage conditions:	Keep containers tightly closed in a cool, well-ventilated place. Keep away from heat and sources of ignition
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless
Physical state:	Liquid
Formula:	(C3H6O)x•H2O
Melting point/range:	No data available at this time.
Boiling point/range:	No Data available at this time.
Density:	1.004 g/ml
Vapor pressure:	<0.01 mm Hg (20°C)
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	No data available
Flash point:	199 to 227 °C (open cup)
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Incompatible with sulfuric acid, isocyanates, perchloric acid, oxidizers.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
POLYPROPYLENE GLYCOL	TR5600000	TR5250000:Polypropylene glycol (12/1/97) Oral LD50 Rat : >2 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

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Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
POLYPROPYLENE GLYCOL	Not Listed	indicator 3; Fully sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
POLYPROPYLENE GLYCOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: *Do not re-use empty containers*

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
POLYPROPYLENE GLYCOL	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
POLYPROPYLENE GLYCOL	Not Listed	Not Listed

IMO-labels:

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15. REGULATORY INFORMATION

International Inventories

Components	
POLYPROPYLENE GLYCOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
Inventory - Japan:	7-129
Korean KECL:	KE-20270
Philippines PICCS:	Present

U.S. regulations:

Components	**California Proposition 65 -**	**Massachusetts Right to Know List:**	**New Jersey Right to Know List:**	**Pennsylvania Right to Know List:**
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	**Florida substance List:**	**Rhode Island Right to Know List:**	**Illinois - Toxic Air Contaminants**	**Connecticut - Hazardous Air Pollutants**
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	**SARA 313 Emission reporting/Toxic Release of Chemicals**	**CERCLA/SARA - Section 302 Extremely Haz**	**NTP:**	**IARC:**
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

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SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 11/17/2006
Date Updated: 02/04/2006
Version 1.1

Section 1 - Product and Company Information

Product Name	POTASSIUM THIOSULFATE HYDRATE
Product Number	416983
Brand	ALDRICH
Company	Sigma-Aldrich Canada, Ltd
Address	2149 Winston Park Drive Oakville ON L6H 6J8 CA
Technical Phone:	9058299500
Fax:	9058299292
Emergency Phone:	800-424-9300

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
POTASSIUM THIOSULFATE HYDRATE	None	No

Formula $K_2S_2O_3 \cdot xH_2O$

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

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

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
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

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 dust mask type N95 (US) or type P1 (EN 143) respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid Color: White Form: Fine crystals

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Property	Value	At Temperature or Pressure
Molecular Weight	190.33 AMU	
pH	9.0 - 10.5	
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	1.507 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	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:1 M in H2O, 20°C complete, colorless	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong acids, Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Sulfur oxides, Potassium oxides.

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.

Section 12 - Ecological Information

EPAPA005001581

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. Dissolve 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 environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

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
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

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.

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: Yes
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

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from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.
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HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **POTASSIUM CHLORIDE**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: POTASSIUM CHLORIDE
Synonyms: None
Chemical Family: Inorganic Salt
Application: Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Potassium chloride	7447-40-7	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

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5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White to gray
Odor:	Odorless
pH:	9.2
Specific Gravity @ 20 C (Water=1):	1.99
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	72.8
Boiling Point/Range (F):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	25.5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.5

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 2430 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

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Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001588

FLINT HILLS RESOURCES®

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MATERIAL SAFETY DATA SHEET

1 CHEMICAL PRODUCT & COMPANY IDENTIFICATION

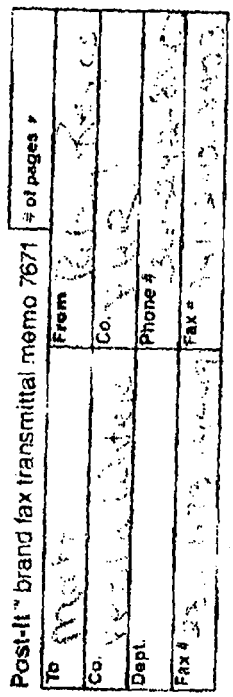
TRADE NAME(S)	**POTASSIUM FLUORIDE SOLUTION**
CAS NUMBER	Mixture
MSDS NUMBER	8061
PRODUCT CODE	ND
MANUFACTURER / SUPPLIER	Flint Hills Resources, LP 2825 Suntide Road (78409) P. O. Box 2608 Corpus Christi, TX 78403

TELEPHONE NUMBERS - 24 HOUR EMERGENCY ASSISTANCE

Chemtrec	800-424-9300
Flint Hills Resources, LP	361-241-4811

TELEPHONE NUMBERS - GENERAL ASSISTANCE

8-5 (M-F, CST)	361-241-4811
8-5 (M-F, CST) MSDS Assistance	316-828-7988



2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS Number	Concentration*	Exposure Limits / Health Hazards
POTASSIUM FLUORIDE	Mixture	15 - 25 %	as F 2.5 mg/m3 8-Hour TWA (OSHA) 2.5 mg/m3 8-Hour TWA (ACGIH)
WATER	7732-18-5	75 - 85 %	ND
POTASSIUM HYDROXIDE	1310-58-3	0 - 8 %	2 mg/m3 CEILING (ACGIH) 2 mg/m3 CEILING (OSHA)

*Values do not reflect absolute minimums and maximums; these values are typical which may vary from time to time.

COMPOSITION COMMENTS

This Material Safety Data Sheet is intended to communicate potential health hazards and potential physical hazards associated with the product(s) covered by this sheet, and is not intended to communicate product specification information. For product specification information, contact your Flint Hills Resources, LP representative.

EPAPA005001589

3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING!

HEALTH HAZARDS
MAY BE SEVERELY IRRITATING TO THE SKIN AND EYES
MAY BE IRRITATING TO THE RESPIRATORY TRACT
MAY CAUSE ALLERGIC SKIN OR RESPIRATORY TRACT REACTION
SEE "TOXICOLOGICAL INFORMATION" (SECTION 11) FOR MORE INFORMATION

FLAMMABILITY HAZARDS
NON-COMBUSTIBLE

REACTIVITY HAZARDS
STABLE

POTENTIAL HEALTH EFFECTS, SKIN

SEVERELY IRRITATING. Repeated or prolonged contact may result in drying, reddening, itching, pain, inflammation, cracking and possible secondary infection with tissue damage. May cause an allergic reaction in some individuals.

Skin contact may cause harmful effects in other parts of the body.

POTENTIAL HEALTH EFFECTS, EYE

SEVERELY IRRITATING. Direct contact may cause pain, tears, burns, sensitivity to light, swelling and possible corneal damage.

Can injure eye tissue. Effects may become more serious with repeated or prolonged contact.

POTENTIAL HEALTH EFFECTS, INHALATION

SEVERELY IRRITATING. Under normal conditions, inhalation is not expected to be a problem. However, respiratory tract irritation may occur if exposed to fumes or mists.

Overexposure to this material may cause systemic damage including target organ effects listed under "Toxicological Information" (Section 11).

POTENTIAL HEALTH EFFECTS, INGESTION

Swallowing this material may be harmful. Swallowing large amounts may cause death.

May cause severe irritation with intense burning of the mouth and throat followed by abdominal pain and distress, nausea, vomiting, and diarrhea.

Overexposure to this material may cause systemic damage including target organ effects listed under "Toxicological Information" (Section 11).

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4 FIRST AID MEASURES

SKIN

Immediately flush skin with plenty of water, for at least 15 minutes, while removing contaminated clothing and shoes. Get medical attention if irritation develops or persists.

Place contaminated clothing in closed container for storage until laundered or discarded. If clothing is to be laundered, inform person performing operation of contaminant's hazardous properties. Discard contaminated leather goods.

EYE

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. GET IMMEDIATE MEDICAL ATTENTION.

INHALATION

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen.

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION

INGESTION

Do not induce vomiting. Rinse mouth out with water.

If victim is conscious and alert, give 1-3 glasses of water or milk to dilute stomach contents.

Never give anything by mouth to an unconscious person. GET IMMEDIATE MEDICAL ATTENTION.

NOTES TO PHYSICIAN

General supportive therapy in the event of life-threatening complications may be more important than specific antidotes.

5 FIRE FIGHTING MEASURES

HAZARDOUS COMBUSTION PRODUCTS

Combustion may produce hazardous combustion products such as toxic gas.

EXTINGUISHING MEDIA

Material itself will not burn.

BASIC FIRE FIGHTING PROCEDURES

Use extinguishing agent suitable for type of surrounding fire.

Use water spray to cool adjacent structures and to protect personnel.

Firefighters must wear NIOSH approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

UNUSUAL FIRE & EXPLOSION HAZARDS

Material will not burn.

EPAPA005001591

Flash Point:	ND
Autoignition Temperature	ND
Flammability Limits in Air, Lower, % by Volume	ND
Flammability Limits in Air, Upper, % by Volume	ND

6 ACCIDENTAL RELEASE MEASURES

EMERGENCY ACTION

Eliminate and/or shut off ignition sources and keep ignition sources out of the area. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind. Isolate for 800 meters (1/2 mile) in all directions if tank, rail car or tank truck is involved in fire. Evacuate area endangered by release as required. (See Exposure Controls/Personal Protection, Section 8.)

ENVIRONMENTAL PRECAUTIONS

If material is released to the environment, take immediate steps to stop and contain release. Caution should be exercised regarding personnel safety and exposure to the released material. Notify local authorities and the National Response Center, if required.

SPILL OR LEAK PROCEDURE

Keep unnecessary people away. Isolate area for at least 50 meters (164 feet) to preserve public safety. For large spills, consider initial evacuation for at least 300 meters (1000 feet).

Keep ignition sources out of area and shut off all ignition sources. Absorb spill with inert material (e. g. dry sand or earth) then place in a chemical waste container. Large Spills: Dike far ahead of liquid spill for later disposal. Stop leak when safe to do so.

See Exposure Controls/Personal Protection (Section 8).

7 HANDLING & STORAGE

HANDLING

Ground lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or explosion. Use non-sparking tools. Do not cut, grind, drill, weld or reuse containers unless adequate precautions are taken against these hazards.

Do not eat, drink or smoke in areas of use or storage.

STORAGE

Store in tightly closed containers in a cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles. Avoid contact with strong oxidizers.

Empty containers may contain material residue. Do not reuse without adequate precautions.

Do not eat, drink or smoke in areas of use or storage.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS

Ventilation and other forms of engineering controls are the preferred means for controlling exposures.

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EYE PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

Keep away from eyes. Eye contact can be avoided by using chemical safety glasses, goggles, and/or face shield. Have eye washing facilities readily available where eye contact can occur.

SKIN PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

Prevent any skin contact with this material. Use appropriate chemical resistant gloves, clothing and eye/face protection.

Good personal hygiene practices such as properly handling contaminated clothing, using wash facilities before entering public areas and restricting eating, drinking and smoking to designated areas are essential for preventing personal chemical contamination.

RESPIRATORY PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

A NIOSH approved air purifying respirator with an appropriate cartridge or canister, such as an organic vapor cartridge, may be used in circumstances where airborne concentrations may exceed exposure limits. Protection provided by air purifying respirators is limited. 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.

9 PHYSICAL & CHEMICAL PROPERTIES

ODOR AND APPEARANCE

ODORLESS, CLEAR LIQUID

Boiling Point	> 212 °F (100 °C)
Specific Gravity	1.15 - 1.25 at 60/60 °F (15.6/15.6 °C)
Melting Point	ND
Percent Volatile	ND
Vapor Pressure	NA
Vapor Density	ND
Bulk Density	ND
Solubility in Water	COMPLETE
Octanol/Water Partn	ND
Volatile Organic	ND
Pour Point	ND
pH Value	11 (TYPICAL)
Freezing Point	ND
Viscosity	ND
Evaporation Rate	ND
Molecular Formula	KF+H20+KOH
Molecular Weight	58.10 as KF
Chemical Family	INORGANIC FLUORIDE
Odor Threshold	ND

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10 STABILITY & REACTIVITY

STABILITY/INCOMPATIBILITY

Incompatible with strong acids.

See precautions under Handling & Storage (Section 7).

HAZARDOUS REACTIONS/DECOMPOSITION PRODUCTS

Combustion may produce toxic gas.

11 TOXICOLOGICAL INFORMATION

ROUTES OF EXPOSURE

Inhalation, ingestion, skin and eye contact.

LD50

LD50: Potassium Fluoride, Oral, Rat, 245 mg/kg.

TOXICOLOGICAL DATA

INORGANIC FLUORIDE: Acute overexposure may result in metabolic acidosis, hypotension, tachycardia, hypocalcemia, hyperkalemia, and hypomagnesemia. Prolonged and repeated over-exposure may result in dental fluorosis (discoloration and mottling of the tooth enamel) and a serious systemic effects known as osteosclerosis, which involves calcification of the bones and ligaments resulting in stiffness and limitation of motion. Allergic dermatitis and asthma have also been reported. Studies in laboratory animals indicate that overexposure to inorganic fluoride may result in adverse renal, gastrointestinal, neuromuscular, cardiovascular and respiratory effects, depending upon the duration and concentration of exposure. Results of genotoxicity tests have been largely negative. Reproduction studies in rodents have demonstrated evidence of increased fetal resorption at high levels of exposure. Developmental studies in rodents have been largely negative. Significant adverse skeletal abnormalities were observed in chick embryos exposed to high levels of sodium fluoride. Fluoride salts may be absorbed through the placenta.

Exposure to this material may cause adverse effects or damage to the following organs or organ systems: bones, teeth, gastrointestinal tract, and cardiovascular system.

PRE-EXISTING CONDITIONS AGGRAVATED BY EXPOSURE

Pre-existing medical conditions which may be aggravated by exposure include disorders of the bones, teeth, gastrointestinal tract, and cardiovascular system.

12 ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

ND

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13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

This material, as supplied, when discarded or disposed of, is not a hazardous waste according to Federal Regulations (40 CFR 261) Under the Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user of the material to characterize and determine, at the time of disposal, whether the material is a hazardous waste subject to RCRA.

The transportation, storage, treatment and disposal of RCRA waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268 and 270 Disposal can occur only in properly permitted facilities. Check state and local regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Disposal of this material must be conducted in compliance with all federal, state and local regulations.

14 TRANSPORT INFORMATION

BILL OF LADING - BULK (U. S. DOT)

Potassium Fluoride Solution, 6.1, UN1812, PG III, RQ (Potassium Hydroxide)

BILL OF LADING - NON-BULK (U. S. DOT)

Potassium Fluoride Solution, 6.1, UN1812, PG III

U. S. Department of Transportation (DOT) Requirements

General Transportation Information for Bulk Shipments

Proper Shipping Name	Potassium Fluoride Solution		
Hazard Class	6.1	UN/NA Code	UN1812
Packaging Group	III		
Labels Required	Poison		
Placards Required	UN1812, Poison		
Reportable Quantity	See Regulatory Information (Section 15)		

General Transportation Information for Non-Bulk Shipments

Proper Shipping Name	Potassium Fluoride Solution		
Hazard Class	6.1	UN/NA Code	UN1812
Packaging Group	III		
Labels Required	Poison		
Placards Required	UN1812, Poison		
Reportable Quantity	See Regulatory Information (Section 15)		

COMMENTS

The above description may not cover shipping in all cases, please consult 49 CFR 100-185 for specific shipping information.

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15 REGULATORY INFORMATION

FEDERAL REGULATIONS

All ingredients are on the TSCA inventory, or are not required to be listed on the TSCA inventory.

This material, as supplied, contains potassium hydroxide a CERCLA Hazardous Substance as per 40 CFR Part 302.4. The reportable quantity for potassium hydroxide is 1000 pound(s), and is therefore subject to the release reporting requirements of CERCLA.

This material does not contain toxic chemicals (in excess of the applicable de minimis concentration) that are subject to the annual toxic chemical release reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313 (40 CFR 372).

Check local, regional or state/provincial regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Failure to report may result in substantial civil and criminal penalties.

STATE REGULATIONS

Based on available information this product does not contain any components or chemicals currently known to the State of California to cause cancer, birth defects or reproductive harm at levels which would be subject to Proposition 65. Reformulation, use or processing of this material may affect its composition and require re-evaluation.

SARA 311/312 HAZARD CATEGORIES

Immediate Hazard:	X	Delayed Hazard:	X	Fire Hazard:	-	Pressure Hazard:	-
Reactivity Hazard:							

NFPA RATINGS

Health	2	Flammability	0	Reactivity	0	Special Hazards	-

HMIS RATINGS

Health	2*	Flammability	0	Reactivity	0

16 OTHER INFORMATION

DISCLAIMER

NOTICE: The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. However, an MSDS may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, expressed or implied, is made as to the accuracy or comprehensiveness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the material.

Current Revision Date 22-Apr-2005 Replaces Sheet Dated 05-Feb-2002

Completed By Flint Hills Resources Operations EH&S

EPAPA005001596

SIGMA-ALDRICH

Material Safety Data Sheet

Version 3.0
Revision Date 07/15/2007
Print Date 08/09/2007

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : **Potassium hydroxide**

Product Number : P1767
Brand : Sigma-Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Caustic potash

Formula : KOH
Molecular Weight : 56.11 g/mol

CAS-No.	EC-No.	Index-No.	Concentration [%]
Potassium hydroxide			
1310-58-3	215-181-3	019-002-00-8	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Toxic by ingestion
Corrosive

HMIS Classification

Health Hazard: 3
Flammability: 0
Physical hazards: 0

NFPA Rating

Health Hazard: 3
Fire : 0
Reactivity Hazard 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Material is extremely destructive to the tissue of the mucous membranes and upper

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	respiratory tract.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns. May cause eye irritation.
Ingestion	Toxic if swallowed. Causes burns.

4. 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
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Continue rinsing eyes during transport to hospital.Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	no data available
Ignition temperature	no data available

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
The product itself does not burn.Gives off hydrogen by reaction with metals.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Do not let product enter drains.

Methods for cleaning up
Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Storage
Keep container tightly closed in a dry and well-ventilated place.
Absorbs carbon dioxide (CO_2) from air.

Air sensitive. strongly hygroscopic

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Potassium hydroxide	1310-58-3	CEIL	2 mg/m3	1994-09-01	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
		CEIL	2 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A

Personal protective equipment

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).

Hand protection
Handle with gloves.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	13.5
Melting point	361 °C (682 °F)
Boiling point	1,320 °C (2,408 °F)
Flash point	no data available
Ignition temperature	no data available

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Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	1 hPa (1 mmHg) at 719 °C (1,326 °F) 1 hPa (1 mmHg) at 714 °C (1,317 °F)
Density	2.044 g/cm3
Water solubility	soluble

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions. Heat of solution is very high, and with limited amounts of water, violent boiling may occur

Conditions to avoid
Do not heat above melting point.

Materials to avoid
Nitro compounds, Organic materials, Magnesium, Copper, Water, reacts violently with:, Metals, Light metals, Contact with aluminum, tin and zinc liberates hydrogen gas. Contact with nitromethane and other similar nitro compounds causes formation of shock-sensitive salts., vigorous reaction with:, Alkali metals, Halogens, Azides, Anhydrides

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions.
Potassium oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - 273 mg/kg

Irritation and corrosion

Skin - rabbit - Severe skin irritation - 24 h

Eyes - rabbit - Eye irritation - 24 h

Sensitisation

no data available

Chronic exposure

no data available

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin	May be harmful if absorbed through skin. Causes skin burns.
Eyes	Causes eye burns. May cause eye irritation.
Ingestion	Toxic if swallowed. Causes burns.

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Ecotoxicity effects

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Toxicity to fish LC50 - Gambusia affinis (Mosquito fish) - 80 mg/l - 96 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations.Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 1813 Class: 8 Packing group: II
Proper shipping name: Potassium hydroxide, solid

IMDG
UN-Number: 1813 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: POTASSIUM HYDROXIDE, SOLID
Marine pollutant: No

IATA
UN-Number: 1813 Class: 8 Packing group: II
Proper shipping name: Potassium hydroxide, solid

15. REGULATORY INFORMATION

OSHA Hazards
Toxic by ingestion, Corrosive

TSCA Status
On TSCA Inventory

DSL Status
All components of this product are on the Canadian DSL list.

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: 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
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Potassium hydroxide	1310-58-3	1989-12-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Potassium hydroxide	1310-58-3	1989-12-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Potassium hydroxide	1310-58-3	1989-12-01

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California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth, or any other reproductive defects.

16. OTHER INFORMATION

Further information
Copyright 2007 Sigma-Aldrich Co. 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 Co., 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.

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OSHA MATERIAL SAFETY DATA SHEET
SENSIENT FLAVORS INC.

(b) (4)

[redacted]

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(b) (4)

[redacted]

(b) (4)

[redacted]

Material Safety Data Sheet

Catalog Number: 151955
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 151955

Product name: PROPIONIC ACID

Synonyms: Propionic Acid, Ethanecarboxylic Acid, Methylacetic Acid, Propanoic Acid
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
PROPIONIC ACID	79-09-4	90 - 100%	10 ppm TWA	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: The product causes burns of eyes, skin and mucous membranes, Flammable, Harmful to flora, fauna, soil organisms and aquatic organisms.

Category of Danger:
Corrosive , STENCH , Lachrymator, Flammable , Dangerous for the environment

Principle routes of exposure: Skin
Inhalation: Vapors or dusts will cause burns of respiratory passages.
Ingestion: Can burn mouth, throat, and stomach
Skin contact: Causes skin burns
Eye contact: Causes eye burns
Vapors extremely irritating to eyes an respiratory tract

ANSI Classification Corrosive, Irritant - eye, severe
Statements of hazard CAUSES BURNS TO SKIN AND EYES
VAPORS OR MISTS CAN IRRITATE OR BURN THE RESPIRATORY TRACT.
Flammable
CAUSES EYE IRRITATION.
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician. If swallowed, DO NOT induce vomiting. Get medical attention immediately. In case of contact, flush eyes with running water for at least 15 inutes. Consult a physician for irritation or any other symptom.

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Precautions - ANSI Label Avoid contact with skin, eyes and clothing Wash thoroughly after handling. Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not breathe vapors or spray mist Do not swallow. Avoid contact with skin and eyes Do not breathe vapors or spray mist

4. FIRST AID MEASURES

General advice: Take off contaminated clothing and shoes immediately.
Inhalation: If fumes from reactions are inhaled, move to fresh air immediately. Call a physician immediately Move to fresh air Consult a physician
Skin contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician Remove and wash contaminated clothing before re-use Rinse immediately with plenty of water and seek medical advice Wash off immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Do not induce vomiting without medical advice. Do not induce vomiting. Call a physician immediately.
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. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes Call a physician immediately
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Carbon dioxide (CO2), Dry powder, Foam, Water may be ineffective.
Specific hazards:	combustible material Flammable
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	50 °C (closed cup and DIN 51755)
Autoignition temperature:	485 °C (DIN 51794)

NFPA rating:

NFPA Health:	3
NFPA Flammability:	2
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Remove all sources of ignition. Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Technical measures/storage conditions:	Keep containers tightly closed in a cool, well-ventilated place. Keep away from heat and sources of ignition
Incompatible products:	Oxidising and spontaneously flammable products

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: Goggles
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless, oily; pungent, disagreeable, rancid odor
Physical state:	Liquid
Formula:	C3H6O2
Molecular weight:	74.08
Melting point/range:	22.4 °C
Boiling point/range:	140.7 - 141.6 °C
Density:	.992 g/cm3 at 20 °C
Vapor pressure:	5 hPa at 20 °C
Evaporation rate:	No data available
Vapor density:	2.56 (air = 1)
Solubility (in water):	Completely miscible
Flash point:	50 °C (closed cup and DIN 51755)
Autoignition temperature:	485 °C (DIN 51794)

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Forms explosive mixture with air. Incompatible with sulfuric acid, strong bases, ammonia, aliphatic amines, alkanolamines, isocyanates, alkylene oxides, epichlorohydrin, oxidizers.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
PROPIONIC ACID	UE5950000	Oral LD50 Rat : 2600 mg/kg Dermal LD50 Rabbit : 500 uL/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
arcinogenic effects:	No data is available on the product itself.

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Mutagenic effects: No data is available on the product itself.
Reproductive toxicity: No data is available on the product itself.

Components	NIOSH - Health Effects	NIOSH - Target Organs
PROPIONIC ACID	Mild irritation of the eyes, skin, and mucosal surfaces	eyes, skin, respiratory system

12. ECOLOGICAL INFORMATION

Mobility: No data available
Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
PROPIONIC ACID	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
PROPIONIC ACID	1	Not Listed	LC50 (96 hr) fathead minnow: 4740 mg/L. Cond: Flow-through, 24.7 °C, pH 7.60, 40.5 mg/L CaCO3.

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
PROPIONIC ACID	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
PROPIONIC ACID	Not Listed	indicator 0; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
PROPIONIC ACID	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.
Contaminated packaging: Do not re-use empty containers
Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: 1848

DOT:
Proper shipping name: Propionic acid
IATA Hazard Label(s): Corrosive

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Hazard Class	8 - Corrosive materials
Packing group:	III

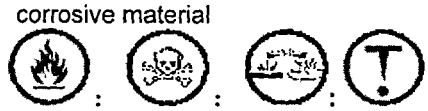
Emergency Response Guide Number (ERG): 132

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
PROPIONIC ACID	RQ = 5000 pounds (2270 kg)

TDG (Canada):

WHMIS hazard class:

B2 flammable liquids
D1b toxic materials
D2b toxic materials
E corrosive material



IMDG/IMO

Proper shipping name:	Propionic acid
IMDG - Hazard Classifications	IMDG class or division = 8
IMDG - Regulated Substances	UN1848

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
PROPIONIC ACID	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
PROPIONIC ACID	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Canada NDSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	273-079-4
Inventory - Japan:	2-602
Korean KECL:	KE-14210
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
PROPIONIC ACID	Not Listed	[present]	sn 1599	environmental hazard

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Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
PROPIONIC ACID	[present]	Toxic, Flammable	Not Listed	600 ug/m³ HLV; 0.2 ppmv HLV

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
PROPIONIC ACID	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001617

Material Safety Data Sheet PROPYL ALCOHOL 16-70600	Page: 1 of 3 Date Issued: 4/4/05

1. Chemical Product and Company Information

Penta International Corp.
50 Okner Parkway
Livingston, NJ 07039

WEB PAGE: WWW.PENTAMFG.COM
E-MAIL: SALES@PENTAMFG.COM

Company Contact:
Emergency Contact: CHEMTREC

Telephone Number: (973)740-2300
Telephone Number: (800)424-9300 24-hrs

Product Name: PROPYL ALCOHOL
Product Code: 16-70600

Molecular Formula: C3 H8 O

Molecular Weight: 60.09
CAS#: 71-23-8
FEMA#: 2928

2. Hazardous Ingredient(s)

Contains: SEE ABOVE

3.Physical Properties

Physical State: LIQUID
Odor: ALCOHOL
Color: COLORLESS TO PALE YELLOW
Solubility in Water: SOLUBLE
Boiling Point (°C): 97
Vapor Pressure (mm Hg @ 20°C): 19.29
Specific Gravity @ 25C (H20=1.0): 0.804

% Volatile: 100
Melting Point (°C): -127
Vapor Density (Air = 1): 2.1
Refractive Index @ 20C: N/A
Water Content: N/A
Alcohol Content: N/A

4.Physical Hazard Data

Hazard: FLAMMABLE LIQUID
Shipping Name: N-PROPANOL
Flash Point (°F): 77
L.F.L: 2.1%

3,UN1274,PGIII
Method Used: CC
U.F.L: 13.7%

Extinguishing Media: Carbon Dioxide; Dry Chemical; Universal Type Foam

Special Fire Fighting Procedures: Evacuate unprotected and untrained personnel. Trained firefighting personnel should be equipped with self-contained breathing apparatus and full protective gear.

Unusual Fire, Explosion and Stability Hazards: SEALED CONTAINERS MAY BUILD UP PRESSURE AT HIGH TEMPERATURES. IF POSSIBLE KEEP CONTAINERS COOL WITH A WATER SPRAY. EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

5. Health Hazard Data

Carcinogenicity:

NTP: NO OSHA: NO IARC MONOGRAPH: NO

OSHA PEL: 200 ppm, 500 mg/m3 ACGIH TLV: NOT ESTABLISHED

Acute Toxicity Data:

ORAL LD50: 1.87 - 6.5 g/kg RAT

DERMAL LD50: 4.0 g/kg RABBIT

INHALATION LC50: >20,000 ppm/1hr RAT

Health Hazards (Acute and Chronic):

Skin Contact: MAY CAUSE IRRITATION

Inhalation: NOT ESTABLISHED

Eye Contact: MAY CAUSE IRRITATION

Ingestion: NOT ESTABLISHED

Other Effects: HIGH CONCENTRATIONS MAY CAUSE DROWSINESS AND IRRITATION OF EYES AND RESPIRATORY SYSTEM.

The health hazard information is based on laboratory animal test data for the individual components of this product in their pure form as provided under 29 CFR 1910.1200 (d)(5)(ii). The user should consider the relevancy of this information in a manner consistent with its particular purpose.

6. Emergency First Aid Procedures

Eyes: IMMEDIATELY FLUSH EYES WITH LARGE QUANTITIES OF COLD CLEAN WATER FOR AT LEAST 15 MINUTES. CALL A PHYSICIAN IMMEDIATELY.

Skin: WASH WITH SOAP AND WATER. FLUSH WITH LARGE QUANTITIES OF WATER. IF IRRITATION PERSISTS CALL A PHYSICIAN.

Inhalation: REMOVE TO FRESH AIR AND CALL A PHYSICIAN IF NECESSARY.

Ingestion: ADMINISTER WATER OR MILK TO DILUTE. CONTACT A PHYSICIAN OR LOCAL POISON CONTROL CENTER IMMEDIATELY. **DO NOT** INDUCE VOMITING.

7. Reactivity Data

This material presents no significant hazard. Hazardous Polymerization will not occur and it will not react violently with water.

Contact with highly reactive chemical oxidants should be avoided. If burned this product will produce carbon monoxide and/or carbon dioxide.

8. Personal Protection

Eyes: IN GENERAL, THE USE OF SAFETY GLASSES IS RECOMMENDED. IF THE MATERIAL IS TO BE HANDLED IN A MANNER WHERE SPLASHING MAY OCCUR, THE USE OF SPLASH GOGGLES OR FACE SHIELD IS RECOMMEND.

Respiratory: IN WELL VENTILATED AREAS RESPIRATORY PROTECTION IS NOT NORMALLY REQUIRED. IN CONFINED, POORLY VENTILATED AREAS THE USE OF NIOSH-APPROVED RESPIRATORY PROTECTION MAYBE REQUIRED OR IF MATERIAL IS RATED TOXIC BY INHALATION.

Equipment and Apparel: THE USE OF CHEMICAL RESISTANT GLOVES IS RECOMMENDED. ACCEPTABLE INDUSTRIAL HYGIENE PRACTICES SHOULD BE MAINTAINED. LIMIT EXPOSURE TO PRODUCT WHENEVER POSSIBLE. WASH AFTER ANY CONTACT. THOROUGHLY WASH ANY CONTAMINATED CLOTHING OR SHOES.

Ventilation: VENTILATION MEETING ACGIH STANDARDS SHOULD BE EMPLOYED.

9. Storage and Handling

IT IS RECOMMENDED THAT THIS MATERIAL BE STORED IN TIGHT FULL CONTAINERS IN A COOL, DRY PLACE AWAY FROM LIGHT.

10. Spill, Release and Waste Disposal Procedures

REMOVE ANY SOURCES OF FLAME OR SPARKS. IF IN A CONFINED AREA NIOSH APPROVED RESPIRATORY PROTECTION MAY BE REQUIRED. ABSORB SPILLS ON VERMICULITE OR OTHER SUITABLE ABSORBENT MATERIAL AND REMOVE TO AN APPROVED DISPOSAL CONTAINER. DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

11. Disclaimer

Material Safety Data Sheet prepared by: **Penta**

The information in this MSDS was obtained from current and reliable sources. However, the data is provided without any warranty, expressed or implied, regarding its correctness or accuracy. Since the conditions for use, handling, storage and disposal of this product are beyond Penta's control, it is the responsibility of the user both to determine safe conditions for use of this product and to assume liability for loss, damage, or expense arising out of the products improper use. No warranty expressed or implied regarding the product described herein will be created by or inferred from any statement or omission in this MSDS. Various federal, state, or provincial agencies may have specific regulations concerning the transportation, handling, storage, use, or disposal of this product which may not be reflected in this MSDS. The user should review these regulations to ensure full compliance.

Material Safety Data Sheet
The Dow Chemical Company

Product Name: PROPYL CELLOSOLVE(TM) SOLVENT

Issue Date: 06/06/2006
Print Date: 12 Jun 2006

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name
PROPYL CELLOSOLVE(TM) SOLVENT

COMPANY IDENTIFICATION
The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

Customer Information Number: 800-258-2436

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 989-636-4400
Local Emergency Contact: 989-636-4400

2. Hazards Identification

Emergency Overview
Color: Colorless
Physical State: Liquid
Odor: mild, sweet
Hazards of product:

WARNING! Combustible liquid and vapor. Causes eye irritation. Harmful if absorbed through skin. May cause skin irritation. May be harmful if inhaled. Vapor explosion hazard. Vapors may travel a long distance; ignition and/or flash back may occur. Isolate area. Keep upwind of spill. Stay out of low areas.

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

Potential Health Effects
Eye Contact: May cause severe eye irritation. May cause moderate corneal injury. Effects may include pain, marked redness and swelling.
Skin Contact: Prolonged contact may cause skin irritation with local redness.
Skin Absorption: Prolonged or widespread skin contact may result in absorption of harmful amounts.

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Inhalation: Prolonged excessive exposure may cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract (nose and throat). Observations in animals include: Red-coloured urine.
Ingestion: 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.
Effects of Repeated Exposure: In animals, effects have been reported on the following organs: blood (hemolysis) and secondary effects on the kidney and liver. Human red blood cells have been shown to be significantly less sensitive to hemolysis than those of rodents and rabbits.
Birth Defects/Developmental Effects: Has been toxic to the fetus in lab animals at doses toxic to the mother.

3. Composition Information

Component	CAS #	Amount
Ethylene glycol monopropyl ether	2807-30-9	> 99.0 %

4. First-aid measures

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.
Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Seek medical attention if symptoms occur or irritation persists. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.
Inhalation: Move person to fresh air; if effects occur, consult a physician.
Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.
Notes to Physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.
Medical Conditions Aggravated by Exposure: Excessive exposure may aggravate preexisting liver and kidney disease. Repeated excessive exposure may aggravate preexisting blood disease (anemia).

5. Fire Fighting Measures

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.
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. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. 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.
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). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire

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from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.
Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. 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.
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.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Small spills: Absorb with materials such as: Non-combustible material. Clay. Zorb-all®. Wash the spill site with large quantities of water. Large spills: Dike area to contain spill. 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.
Personal Precautions: Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Isolate area. Keep unnecessary and unprotected personnel from entering the area. No smoking in area. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Vapor explosion hazard. Keep out of sewers. Refer to Section 7, Handling, for additional precautionary measures.
Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Material may float on water and any runoff may create an explosion or fire hazard if ignited.

7. Handling and Storage

Handling
General Handling: No smoking, open flames or sources of ignition in handling and storage area. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Electrically ground and bond all equipment. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation.
Other Precautions: 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. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage
Minimize sources of ignition, such as static build-up, heat, spark or flame. Keep container closed. Store in the following material(s): Carbon steel. Stainless steel. Do not store in: Aluminum. Copper. Galvanized iron. Galvanized steel.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Ethylene glycol monopropyl ether	Dow IHG	TWA	20 ppm SKIN
	Dow IHG	STEL	60 ppm SKIN

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A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.
It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

Personal Protection

Eye/Face Protection: Use chemical goggles.
Skin 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. Safety shower should be located in immediate work area. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). 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.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required, use an approved air-purifying or positive-pressure supplied-air respirator depending on the potential airborne concentration. For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure air line with auxiliary self-contained air supply. The following should be effective types of air-purifying respirators: Organic vapor cartridge.
Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

9. Physical and Chemical Properties

Physical State	Liquid
Color	Colorless
Odor	mild, sweet
Flash Point - Closed Cup	57 °C (135 °F) *ASTM D93*
Flammable Limits In Air	**Lower:** 1.3 %(V) *Literature* **Upper:** 15.8 %(V) *Literature*
Autoignition Temperature	235 °C (455 °F) *Literature*
Vapor Pressure	1.6 mmHg @ 20 °C *Literature*
Boiling Point (760 mmHg)	150 °C (302 °F) *Literature* .
Vapor Density (air = 1)	3.6 *Literature*
Specific Gravity (H2O = 1)	0.912 20 °C/20 °C *Literature*
Freezing Point	-90 °C (-130 °F) *Literature*
Melting Point	No test data available
Solubility in Water (by weight)	100 % @ 20 °C
pH	No test data available
Molecular Weight	104 g/mol *Literature*
Octanol/Water Partition Coefficient	0.08 *Estimated*

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Evaporation Rate (Butyl Acetate = 1)	0.2 *Literature*
Dynamic Viscosity	2.7 cps @ 20 °C *Literature*

10. Stability and Reactivity

Stability/Instability
Thermally stable at typical use temperatures.
Conditions to Avoid: Do not distill to dryness. Product can oxidize at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Hazardous Polymerization
Will not occur.

Thermal Decomposition
Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Ketones. Organic acids.

11. Toxicological Information

Acute Toxicity
Ingestion
LD50, Rat, male 3,089 mg/kg
Skin Absorption
LD50, Rat 876 mg/kg
LD50, Guinea pig 1,000 - 5,000 mg/kg
Inhalation
LC50, 6 h, Vapor, Rat, male > 2,132 ppm
Sensitization
Skin
Did not cause allergic skin reactions when tested in guinea pigs.
Repeated Dose Toxicity
In animals, effects have been reported on the following organs: blood (hemolysis) and secondary effects on the kidney and liver. Human red blood cells have been shown to be significantly less sensitive to hemolysis than those of rodents and rabbits.
Developmental Toxicity
Has been toxic to the fetus in lab animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

12. Ecological Information

CHEMICAL FATE

Movement & Partitioning
Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).
Henry's Law Constant (H): 1.47E-8 atm*m3/mole; 25 °C Estimated
Partition coefficient, n-octanol/water (log Pow): 0.08 Estimated
Partition coefficient, soil organic carbon/water (Koc): 1 Estimated

Persistence and Degradability
Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).

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Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
2.16E-11 cm3/s		Estimated

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
13 %	66 %	100 %	

Chemical Oxygen Demand: 1.94 mg/mg
Theoretical Oxygen Demand: 2.15 mg/mg

ECOTOXICITY

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, fathead minnow (Pimephales promelas): > 1,000 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, water flea Daphnia magna: > 5,000 mg/l
Toxicity to Micro-organisms
EC50; bacteria, Growth inhibition: > 1,000 mg/l

13. Disposal Considerations

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. DOW HAS 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

DOT Non-Bulk
NOT REGULATED

DOT Bulk
Proper Shipping Name: FLAMMABLE LIQUID, NOS
Technical Name: ETHYLENE GLYCOL MONOPROPYL ETHER
Hazard Class: 3 **ID Number:** UN 1993 **Packing Group:** PG III

IMDG
Proper Shipping Name: FLAMMABLE LIQUID, NOS
Technical Name: ETHYLENE GLYCOL MONOPROPYL ETHER
Hazard Class: 3 **ID Number:** UN1993 **Packing Group:** PG III
EMS Number: F-E,S-E

ICAO/IATA
Proper Shipping Name: FLAMMABLE LIQUID, NOS
Technical Name: ETHYLENE GLYCOL MONOPROPYL ETHER
Hazard Class: 3 **ID Number:** UN1993 **Packing Group:** PG III
Cargo Packing Instruction: 310
Passenger Packing Instruction: 309

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This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. 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

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

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Component	CAS #	Amount
Ethylene glycol monopropyl ether	2807-30-9	>= 99.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:
The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Ethylene glycol monopropyl ether	2807-30-9	>= 99.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:
To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)
This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

European Inventory of Existing Commercial Chemical Substances (EINECS)
The components of this product are on the EINECS inventory or are exempt from inventory requirements.

US. 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.

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16. Other Information

Product Literature

Additional information on this product may be obtained by calling your Dow Chemical Company sales or customer service contact. Ask for a product brochure.

Hazard Rating System

NFPA	Health	Fire	Reactivity
	2	2	0

Recommended Uses and Restrictions

Dow recommends that you use this product in a manner consistent with the listed use. If your intended use is not consistent with Dow's stated use, please contact Dow's Customer Information Group. An oxygenated solvent - For industrial conversion as a raw material for manufacture of articles or goods. For industrial formulation for inclusion in a final product. For industrial use as a process aid. For industrial formulation as a process control material. For industrial consumption as a process raw material. For industrial consumption as a component of a reaction system.

Revision

Identification Number: 1982 / 1001 / Issue Date 06/06/2006 / Version: 4.1
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation

The Dow Chemical Company 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.

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Material Safety Data Sheet

Propyl formate, 96+%

ACC# 01483

Section 1 - Chemical Product and Company Identification

MSDS Name: Propyl formate, 96+%
Catalog Numbers: AC329980000, AC329980050, AC329981000, AC329985000
Synonyms: Propyl methanoate; Formic acid propyl ester
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
110-74-7	Propyl formate	96+%	203-798-0

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available.
Target Organs: Central nervous system, respiratory system, eyes, skin.

Potential Health Effects
Eye: Causes eye irritation. Causes redness and pain.
Skin: Causes skin irritation. Causes redness and pain. May be harmful if absorbed through the skin.
Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.
Inhalation: May cause respiratory tract irritation. May be harmful if inhaled.
Chronic: Not available.

Section 4 - First Aid Measures

Eye: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

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Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Get medical aid. Wash mouth out with water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Flammable liquid and vapor.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: -4 deg C (24.80 deg F)
Autoignition Temperature: 450 deg C (842.00 deg F)
Explosion Limits, Lower:2.4
Upper: 7.8
NFPA Rating: 2 - health, 3 - flammability, 0 - instability

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Cover with sand, dry lime or soda ash and place in a closed container for disposal. Remove all sources of ignition. Use a spark-proof tool.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use spark-proof tools and explosion proof equipment. Avoid breathing dust, vapor, mist, or gas. Avoid contact with eyes, skin, and clothing. Take precautionary measures against static discharges. Avoid ingestion and inhalation.
Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Propyl formate	none listed	none listed	none listed

OSHA Vacated PELs: Propyl formate: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Not available.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless
Odor: pungent odor
pH: 7
Vapor Pressure: 79 hPa @ 20 deg C
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: <30mPa.s @ 20 deg C
Boiling Point: 80.0 - 82.0 deg C @
Freezing/Melting Point:-93 deg C
Decomposition Temperature: Not available.
Solubility: 28 g/l @ 20°C
Specific Gravity/Density:0.906g/cm3
Molecular Formula:HCOOCH2CH2CH3
Molecular Weight:88.11

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, strong bases.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported

Section 11 - Toxicological Information

RTECS#:
CAS# 110-74-7: LR0175000
LD50/LC50:
CAS# 110-74-7:
Oral, mouse: LD50 = 3400 mg/kg;
Oral, rat: LD50 = 3980 mg/kg;

Carcinogenicity:

CAS# 110-74-7: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.
Environmental: No information available.
Physical: No information available.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	PROPYL FORMATES	No information available.
Hazard Class:	3	
UN Number:	UN1281	
Packing Group:	II	

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 110-74-7 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

Section 313 No chemicals are 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 Substances 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:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 110-74-7 can be found on the following state right to know lists: New Jersey, Pennsylvania, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

F

Risk Phrases:

R 11 Highly flammable.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 33 Take precautionary measures against static discharges.
S 9 Keep container in a well-ventilated place.

WGK (Water Danger/Protection)

CAS# 110-74-7: No information available.

Canada - DSL/NDSL

CAS# 110-74-7 is listed on Canada's DSL List.

Canada - WHMIS

WHMIS: Not available.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 8/16/1999

Revision #3 Date: 10/03/2005

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 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 Fisher 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 Fisher has been advised of the possibility of such damages.

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 10/12/2006
Date Updated: 02/05/2006
Version 1.4

Section 1 - Product and Company Information

Product Name	PROPYL PROPIONATE, 99%
Product Number	112267
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
PROPYL PROPIONATE	106-36-5	No

Formula	C6H12O2
Synonyms	Propanoic acid, propyl ester (9CI) * Propylester kyseliny propionove (Czech) * Propyl propanoate * Propyl propionate * n-Propyl propionate
RTECS Number:	UF7100000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable. Irritant.
Irritating to eyes, respiratory system and skin.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back.

FLASH POINT
67 °F 19 °C Method: closed cup

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Vapor may travel considerable distance to source of ignition and flash back. Flammable liquid. Emits toxic fumes under fire conditions.

EXPOSURE HAZARD(S)
Material: Irritant.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Keep away from heat, sparks, and open flame. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT
Other: Wear appropriate government approved respirator, chemical-resistant gloves, safety goggles, other protective clothing.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling. Wash contaminated clothing before

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reuse.

Section 9 - Physical/Chemical Properties

Appearance	Color: Very faintly yellow Form: Clear liquid	
Property	**Value**	**At Temperature or Pressure**
Molecular Weight	116.16 AMU	
pH	N/A	
BP/BP Range	120.0 - 122.0 °C	
MP/MP Range	- 76.0 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	4 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.881 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	67 °F 19 °C	Method: closed cup
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	1.393	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Materials to Avoid: Strong oxidizing agents, Strong bases, Strong reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Multiple Routes: Vapor or mist is irritating to the eyes, mucous membranes, and upper respiratory tract. May be harmful by inhalation, ingestion, or skin absorption.

SIGNS AND SYMPTOMS OF EXPOSURE

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

TOXICITY DATA

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Oral
Rat
10331 mg/kg
LD50
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Lacrimation. Behavioral:Somnolence (general depressed activity). Gastrointestinal:Hypermotility, diarrhea.

Inhalation
Mouse
24,000 mg/m3
LC50

Oral
Rabbit
3950 mg/kg
LD50

Skin
Rabbit
> 14128 mg/kg
LD50

Inhalation
Mammal
16,900 mg/m3
LC50

IRRITATION DATA

Skin
Rabbit
500 mg
24H
Remarks: Moderate irritation effect

Eyes
Rabbit
100 mg
Remarks: Moderate irritation effect

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Esters, n.o.s.
UN#: 3272
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid

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PIH: Not PIH

IATA
Proper Shipping Name: Esters, n.o.s.
IATA UN Number: 3272
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: Xn
Indication of Danger: Harmful.
R: 10-20
Risk Statements: Flammable. Harmful by inhalation.
S: 24
Safety Statements: Avoid contact with skin.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Flammable. Irritant.
Risk Statements: Irritating to eyes, respiratory system and skin.
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes

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: Yes
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.
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EPAPA005001639

pharmco-AAPER
SUBSIDIARIES OF COMMERCIAL ALCOHOLS, INC.
The Power of Three[3]

An ISO 9001:2000 Certified Company

Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300 or 202-483-7616

MATERIAL SAFETY DATA SHEETS

Part Number/Trade Name: PROPYL ACETATE
This MSDS is valid for all grades that start with catalog number 333

General Information

Company's Name: PHARMCO PRODUCTS, INC.
Company's Street: 58 VALE RD.
Company's City: BROOKFIELD
Company's State: CT
Company's Zip Code: 06804
Company's Emerg Ph #: (203) 740-3471
Company's Info Ph #: (203) 740-3471
Date MSDS Revised: Nishant-8/23/99

Safety Data Review Date: 8/23/99
Preparer's Company: PHARMCO PRODUCTS, INC.
Preparer's St Or P. O. Box: 58 VALE RD.
Preparer's City: BROOKFIELD
Preparer's State: CT
Preparer's Zip Code: 06804

Ingredients/Identity Information

Ingredient: ACETIC ACID, PROPYL ESTER; (NORMAL PROPYL ACETATE)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: AJ3675000
CAS Number: 109-60-4
OSHA PEL: 200 PPM
ACGIH TLV: 200 PPM;250 STEL

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, WATER WHITE LIQUID; ESTER ODOR.
Boiling Point: >210F,>99C
Vapor Pressure (MM Hg/70 F): 22.8 @ 20C
Vapor Density (Air=1): 3.3

Specific Gravity: 0.875 (H*2O=1)
Evaporation Rate And Ref: 4.5
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: 100

Fire and Explosion Hazard Data

Flash Point: 45.0F,7.2C
Flash Point Method: TCC
Lower Explosive Limit: 1.6%
Extinguishing Media: MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).
Special Fire Fighting Proc: USE NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT (FP N). WATER SPRAY MAY BE INEFT, BUT MAY BE USED TO COOL CLSD CNTNRS. IF WATER IS USED, USE FOG NOZZS.
Unusual Fire And Expl Hazrds: FLAMMABLE! KEEP AWAY FROM HEAT, SPARKS & OPEN FLAME.

Reactivity Data

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Stability: YES
Cond To Avoid (Stability): KEEP AWAY FROM HEAT, SPARKS & OPEN FLAME.
Materials To Avoid: STRONG OXIDIZERS SUCH AS PERMANGANATE.
Hazardous Decomp Products: CARBON MONOXIDE FROM BURNING.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: IRRITATION TO MUCOUS MEMBRANES. NARCOSIS. LIQUID MAY CAUSE SKIN & EYE IRRITATION. HARMFUL IF SWALLOWED. INHALATION MAY CAUSE DIZZINESS & NAUSEA. NOTE:TOLUENE APPEARS ON THE NAVY LISTING OF OCCUPATIONAL CHEMICAL REPRODUCTIVE HAZARDS. SEEK CONSULTATION FROM APPROPRIATE HEALTH PROFESSIONALS CONCERNING (EFTS OF OVEREXP)
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT
Signs/Symptoms Of Overexp: HLTH HAZ:LATEST HAZARD LIST INFO & SAFE HANDLING & EXPOSURE INFO (FP N).
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYE:FLUSH W/WATER FOR AT LEAST 15 MINUTES. SKIN:WASH W/SOAP & WATER. INHAL:REMOVE PATIENT TO FRESH AIR. INGEST:CALL MD IMMEDIATELY. DO NOT INDUCE VOMITING.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE ALL SOURCES OF IGNITION. AVOID BREATHING VAPOR. VENTILATE. REMOVE W/INERT ABSORBENT NON-SPARKING PRODUCTS.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: INCINERATE PER LOCAL, STATE & FEDERAL POLLUTION REGULATIONS.
Precautions-Handling/Storing: DO NOT STORE >120F. STORE LARGE AMOUNTS IN STRUCTURES MADE FOR NFPA CLASS IB LIQUIDS. CONTAINERS SHOULD BE GROUNDED WHEN POURING.
Other Precautions: AVOID FREE FALL OF LIQ. DO NOT FLAME CUT, BRAZE OR WELD. CONTAINS TOLUENE & ESTER SOLVENTS. FOR INDUSTRIAL USE ONLY. KEEP OUT OF REACH OF CHILDREN. WARNING! FLAMMABLE! VAPORS HARMFUL! LIQUID MAY CAUSE SKIN IRRIT. HARMFUL/FATAL IF SWALLOWED.

Control Measures

Respiratory Protection: NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).
Ventilation: NONE SPECIFIED BY MANUFACTURER.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS (FP N).
Other Protective Equipment: EYE WASH FOUNTAIN & DELUGE SHOWER WHICH MEET ANSI DESIGN CRITERIA (FP N). OTHER PROT EQUIP AS NEEDED TO LIMIT EXPOSURE.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

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DOT: n-Propyl Acetate, 3, UN1276, PG II

Disposal Data

Refer to applicable regional, state and federal codes.

Label Data

Chronic Hazard: YES
Signal Word: DANGER!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: EXTREMELY FLAMMABLE. ACUTE:IRRITATION TO MUCOUS MEMBRANES. NARCOSIS. LIQUID MAY CAUSE SKIN & EYE IRRITATION. HARMFUL IF SWALLOWED. INHALATION MAY CAUSE DIZZINESS & NAUSEA. CHRONIC:TOLUENE APPEARS ON THE NAVY OCCUPATIONAL CHEMICAL REPRODUCTIVE HAZARDS LIST (FP N).
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y

The information contained herein is based on data considered to be accurate. However, no warranty is expressed regarding the accuracy of these data or the results to be obtained from the use thereof. It is the user's obligation to determine the conditions of safe use of the product.

EPAPA005001642

Material Safety Data Sheet

Catalog Number: 151957
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 151957

Product name: PROPYLENE GLYCOL

Synonyms: 1,2-Propanediol; 1,2-Dihydroxypropane; Methylethylene glycol; Trimethyl glycol
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
PROPYLENE GLYCOL	57-55-6	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause irritation to the eyes, skin and respiratory system., Combustible material

Category of Danger:
Irritant

Principle routes of exposure: Skin
Inhalation: Irritating to respiratory system
Ingestion: Irritating to mouth, throat and stomach
Skin contact: Irritating to skin.
Eye contact: Contact with eyes may cause irritation

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard May Cause Eye, Skin and Respiratory Tract irritation.
COMBUSTIBLE MATERIAL AND VAPOR.
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid breathing vapors. Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure.

4. FIRST AID MEASURES

EPAPA005001643

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	May flame on exposure to heat or fire. Explosive in the form of vapor when exposed to heat or flame. May react with hydrofluoric acid + nitric acid + silver nitrate to form the explosive silver fulminate. Flammable
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	103 °C (closed cup)
Autoignition temperature:	400 °C at 1013 hPa

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Remove all sources of ignition. Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:

ROOM TEMPERATURE
DESICCATE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place. Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves

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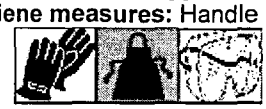
Skin and body protection: Impervious clothing
Eye protection: Goggles
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.



9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Clear and colorless; viscous, practically odorless; hygroscopic (absorbs moisture from the air)
Physical state:	Liquid
Formula:	C3-H8-O2
Molecular weight:	76.11
Melting point/range:	-60 °C
Boiling point/range:	187.9 °C at 1013 hPa
Density:	1.04 g/cm3 at 20 °C
Vapor pressure:	.11 hPa at 20 °C
Evaporation rate:	0.005 (butyl acetate = 1)
Vapor density:	2.62 (air = 1)
Solubility (in water):	Completely miscible
Flash point:	103 °C (closed cup)
Autoignition temperature:	400 °C at 1013 hPa

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Incompatible with strong acids, caustics, aliphatic amines, isocyanates, strong oxidizers.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
PROPYLENE GLYCOL	TY2000000	Oral LD50 Rat : 20 gm/kg Oral LD50 Mouse : 22 gm/kg Dermal LD50 Rabbit : 20800 mg/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	A primary irritant.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility: No data available

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Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
PROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
PROPYLENE GLYCOL	1; Fussnote 14	Not Listed	LC50 (24 hr) goldfish:>5000 mg/L.:;LC50 (48 hr) guppy:>10000 mg/L.:

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
PROPYLENE GLYCOL	Not Listed	EC50 (30 min) Photobacterium phosphoreum:710 mg/L Microtox test.:	EC50 (48 hr) water flea:>10000 mg/L.:

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
PROPYLENE GLYCOL	Not Listed	indicator 2; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
PROPYLENE GLYCOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.
Contaminated packaging: Do not re-use empty containers
Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
PROPYLENE GLYCOL	Not Listed

TDG (Canada):

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WHMIS hazard class: D2b toxic materials

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
PROPYLENE GLYCOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
PROPYLENE GLYCOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	200-338-0; C3H8O2
Inventory - Japan:	2-234
Korean KECL:	KE-29267
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
PROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed	[present]

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
PROPYLENE GLYCOL	Not Listed	Flammable	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
PROPYLENE GLYCOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

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State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

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Material Safety Data Sheet

MSDS No.: 61
Variant: U.S.A.-EN
Version No: 2.9
Validation Date: 06/07/2006

PYROLYSIS GASOLINE

SECTION 1: IDENTIFICATION

Product Name: PYROLYSIS GASOLINE

Product Number: 000000000000001910

Chemical Family: C4-C11 Aromatic Hydrocarbons

CAS Number: 64742-83-2

Chemical Name: Light steam-cracked naphtha

Synonyms: Py Gas, C5-C9 Gasoline, Drip Oil; Dripolene; Debutanized Aromatic Concentrate; DAC; Aromatic Concentrate

Manufacturer
Equistar Chemicals, LP
One Houston Center, Suite 700
1221 McKinney St.
P.O. Box 2583
Houston Texas 77252-2583

Business Contact
Customer Service
888 777-0232
Product Safety
800 700-0946

24 Hour Emergency Contact
CHEMTREC 800 424-9300
EQUISTAR 800-245-4532

SECTION 2 ; COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS #	EU Inventory	Concentration Wt.%*		Risk	Symbol
Benzene	71-43-2	200-753-7	0.1	<= 70.0	R11, C1, R45, M2, R46, R48/23/24/25, R65, R36/38	F, T
C5's and Lighter	68476-55-1	270-695-5		<= 45.0	None	None
Dicyclopentadiene	77-73-6	201-052-9		<= 30.0	R11, R20/22, R36/37/38, R51/53	F, Xn, N
Toluene	108-88-3	203-625-9	4.0	<= 25.0	R11, Rep3, R63, R48/20, R65, R38, R67	F, Xn
Indene	95-13-6	202-393-6	0.1	<= 15.0	None	None
Xylenes	1330-20-7	215-535-7	0.1	<= 15.0	R10, R20/21, R38	Xn
Ethylbenzene	100-41-4	202-849-4	0.1	<= 15.0	R11, R20	F, Xn
Styrene	100-42-5	202-851-5		<= 9.0	R10, R20, R36/38	Xn, Xi
Naphthalene	91-20-3	202-049-5		<= 5.0	R22, C3, R40, R50/53	Xn, N
1,3-Butadiene	106-99-0	203-450-8	0.1	<= 3.0	R45, R46, R12	F+, T

* Concentration of gaseous products or materials is given in Mole %

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Material Safety Data Sheet

MSDS No.: 61
Variant: U.S.A.-EN
Version No: 2.9
Validation Date: 06/07/2006

PYROLYSIS GASOLINE

Compositions given are typical values not specifications.

SECTION 3: HAZARD IDENTIFICATION

Emergency Overview

This material is HAZARDOUS by OSHA Hazard Communication definition.

Signal Word
DANGER!

Hazards
Flammable. Cancer Hazard Reproductive toxin. Vapors may form explosive mixtures with air. May cause irritation to skin, eyes, and respiratory tract. May be harmful if inhaled, swallowed or absorbed through the skin. May polymerize explosively when heated or involved in a fire.

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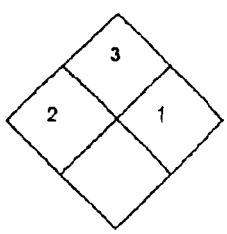

HMIS®

Health	*	2
Flammability		3
Reactivity		1

Physical State
Liquid

Color
Typically yellow. May range from clear to amber or brown.

Odor
Sweet aromatic.

Odor Threshold
No Data Available.

Potential Health Effects

Routes of Exposure
Inhalation Skin. Eye Ingestion

Signs and Symptoms of Acute Exposure
See component summary.

- *Benzene 71-43-2*

Benzene can cause irritation of the eyes, skin, and respiratory tract (especially the nose and throat). Exposure to high vapor concentrations may cause Central Nervous System (CNS) depression with symptoms such as nausea, dizziness, weakness, headache, loss of coordination, loss of consciousness, coma and death. Skin absorption may add significantly to the overall toxic effect.

- *C5's and Lighter 68476-55-1*

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Material Safety Data Sheet

MSDS No.: 61
Variant: U.S.A.-EN
Version No: 2.8
Validation Date: 05/07/2006

PYROLYSIS GASOLINE

Breathing mist or vapors may cause mucous membrane or upper respiratory tract irritation. May cause eye and skin irritation.

- *Dicyclopentadiene 77-73-6*

Headache, sneezing, and cough may occur. Dicyclopentadiene is an eye, skin, and respiratory tract irritant. Exposure to high vapor concentrations may cause Central Nervous System (CNS) depression with symptoms such as nausea, dizziness, weakness, headache, loss of coordination, loss of consciousness, coma and death. Ingestion of dicyclopentadiene would likely cause gastrointestinal tract irritation. Can be fatal if large amounts are inhaled or ingested.

- *Toluene 108-88-3*

Toluene is of slight acute toxicity, although inhalation exposure may cause dizziness and CNS depression, while ingestion may be fatal if aspiration into the lung occurs. Toluene may increase the sensitivity of the heart leading to potentially fatal cardiac sensitization. It is moderately irritating to skin and eye.

- *Indene 95-13-6*

May cause drowsiness and dizziness. Aspiration into the lungs may cause chemical pneumonia.

- *Xylenes 1330-20-7*

May be irritating to the eyes, skin, and respiratory system. Aspiration hazard. Ingestion of this material, followed by vomiting and aspiration of the more volatile components of this material into the lungs, may lead to chemical pneumonia and even death.

- *Ethylbenzene 100-41-4*

Moderate to severe eye irritant. Skin irritant. While skin absorption is a potential route of exposure, no adverse health effects are anticipated following accidental or incidental contact. Aspiration hazard. Inhalation hazard. Overexposure may cause coughing, shortness of breath, dizziness, central nervous system depression, intoxication and collapse. May lead to potentially fatal cardiac sensitization. Ingestion hazard. May produce symptoms of central nervous system depression including headache, dizziness, nausea, euphoria, loss of equilibrium, drowsiness, visual disturbances, fatigue, unconsciousness and respiratory arrest.

- *Styrene 100-42-5*

Moderate eye irritant. Moderate skin irritant. It may cause irritation to the respiratory tract and to other mucous membranes. CNS depressant. High concentrations of this substance may cause cardiac arrhythmias that may be fatal. Ingestion hazard. Aspiration hazard.

- *Naphthalene 91-20-3*

May be irritating to the eyes, skin and respiratory tract. Direct contact with the eye may cause corneal damage. May be toxic by all routes of exposure. Target organs for toxic effetes include the blood, liver, kidneys, eyes, and central nervous system (CNS). Symptoms of overexposure may include headache, restlessness, lethargy, vomiting, anorexia, anemia, diminished vision, and acute kidney failure. Individuals who have an inherited G6PD deficiency in their red blood cells may be particulary sensitive to the toxic effects of Naphthalene. Naphthalene can cross the placenta and harm the fetus

- *1,3-Butadiene 106-99-0*

May be irritating to the eyes, skin, and respiratory system. CNS depressant.

Skin
May be irritating to the skin. May be absorbed by the skin and produce toxic effects. Signs and symptoms of exposure may resemble those observed from inhalation.

Inhalation
High vapor concentrations may cause central nervous system (CNS) depression with symptoms such as nausea, dizziness, weakness, headache, loss of coordination, loss of consciousness, coma and death.

Eye
May be irritating to the eyes.

Ingestion
May cause irritation and produce toxic effects. Signs and symptoms of exposure may resemble those observed from inhalation.

Chronic Health Effects
See component summary.

- *Benzene 71-43-2*

Benzene is considered to be a cancer-causing agent. Benzene can destroy blood-forming cells in the bone marrow and is associated with leukemia and possibly other cancers. International Agency for Research on Cancer (IARC) has classified benzene as a human carcinogen.

- *C5's and Lighter 68476-55-1*

No known chronic health effects.

- *Dicyclopentadiene 77-73-6*

Prolonged and repeated exposure to vapors may cause damage to the CNS, lungs and kidneys.

- *Toluene 108-88-3*

Repeated exposure to high concentrations has been shown to cause neurological changes and hearing loss in animals, and in humans in abuse situations. Repeated or prolonged contact with skin may cause defatting and drying of the skin which may result in dermatitis. Possible systemic toxicity by skin absorption. May be irritating to the eyes and upper respiratory tract. May effect the central nervous system. May cause developmental toxicity.

- *Indene 95-13-6*

No known chronic health effects.

- *Xylenes 1330-20-7*

May cause dermatitis by defatting the skin from prolonged or repeated contact. May contribute to the development of diseases of the nervous system, liver and kidney. May be a reproductive hazard.

- *Ethylbenzene 100-41-4*

Possible human carcinogen. See section 11. May effect hearing. May cause dermatitis by defatting the skin from prolonged or repeated contact. Repeated or prolonged exposure may damage liver and kidneys. Has been shown to damage the liver, kidneys and lungs based on animal studies.

- *Styrene 100-42-5*

This material has been classified by IARC as a group 2B substance (possibly carcinogenic to humans). Chronic exposure may result in sensory effects including mild hearing loss, and minor impairment of color vision discrimination. May cause dermatitis by defatting the skin from prolonged or repeated contact.

- *Naphthalene 91-20-3*

Target organs for toxic effects of chronic exposure include the blood, the skin, the eyes, and the central nervous system. Symptoms of chronic overexposure may include dermatitis, anemia, sores on the eye or cloudiness of the eyeball, diseases involving the nerves or nervous system, and allergic skin reactions.

- *1,3-Butadiene 106-99-0*

Potential Cancer Hazard, see section 11. Not expected to cause sensitization by skin contact.

Conditions Aggravated by Exposure
Persons with disorders of the blood forming tissue, central nervous system, lymphatic system or liver disease should avoid exposure. Special precautions are nessesary for pregnant women and nursing mothers.

SECTION 4: FIRST AID MEASURES

General
Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. For specific information refer to the Emergency Overview in Section 3 of this MSDS.

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Skin
Immediately remove excess chemical and contaminated clothing; thoroughly wash contaminated skin with mild soap and water. If irritation persists after washing, seek medical attention. Thoroughly clean contaminated clothing before reuse; discard contaminated leather goods (gloves, shoes, belts, wallets, etc.).

Inhalation
Move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. When breathing is difficult, properly trained personnel may assist the affected person by administering oxygen. Keep the affected person warm and at rest. Get medical attention immediately.

Eye
Thoroughly flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation persists, seek medical attention.

Ingestion
DO NOT induce vomiting. If vomiting does occur, have victim lean forward to reduce risk of aspiration. Get medical attention immediately.

Note to Physician
Do not induce vomiting. However, if vomiting occurs spontaneously, maintain open airway. A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax. Gastrointestinal decontamination in accidental petroleum distillate ingestions is not recommended because of the severe aspiration hazard. Gastric lavage is indicated in those patients who require decontamination. Be sure that an endotracheal tube is in place prior to lavage; use cuffed tubes in patients over 7 years of age.

SECTION 5: FIRE FIGHTING MEASURES

Flammable Properties

Classification
OSHA/NFPA Class IB Flammable Liquid.

Flash Point:
< -40 °C (< -40 °F) closed cup

Auto-Ignition Temperature
498 °C (928.4 °F)

Lower Flammable Limit
1.3 vol%

Upper Flammable Limit
8 vol%

Extinguishing Media

Suitable: SMALL FIRE: Use dry chemicals, CO2, or foam. LARGE FIRE: Use water spray, water fog or foam. DO NOT use straight streams.

Protection of Firefighters

Protective Equipment/Clothing: Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters protective clothing will only provide limited protection.

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Fire Fighting Guidance: Vapors may travel long distances along the ground before reaching a source of ignition and flashing back. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Hazardous Combustion Products: Carbon oxides (CO, CO2)

SECTION 6: ACCIDENTAL RELEASE MEASURES

Release Response
Eliminate all sources of ignition. Stop leak if without risk. Use water spray or foam to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed.

SECTION 7: HANDLING AND STORAGE

Handling
Electrostatic charges may be generated as a result of flow or agitation. Do not handle near heat, sparks, or flame. Avoid contact with incompatible agents. Use only with adequate ventilation/personal protection. Avoid contact with eyes, skin and clothing. Do not enter storage area unless adequately ventilated. Metal containers involved in the transfer of this material should be grounded and bonded.

Storage
Keep containers tightly closed when not in use and store in a well-ventilated area. Isolate incompatible materials such as oxidizers. Containers should be clearly labeled. Metal containers used to store this material should be grounded.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

Personal Protection
Inhalation A respiratory protection program that meets OSHA's 29 CFR 1910.134 or ANSI Z88.2 requirements must be followed whenever workplace conditions warrant respirator use

Skin Appropriate protective clothing should be worn to prevent skin contact.

Eye Wear safety glasses as minimum eye protection. Conditions may warrant the use of chemical goggles and possibly a face shield. Consult your standard operating procedure or safety professional for advice. Use protective eye and face devices that comply with ANSI Z87.1-1987.

Additional Remarks
Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing/wash thoroughly before reuse. Shower after work using plenty of soap and water.

Occupational Exposure Limits

Component Name	Source / Date	Value	Type	Notation
Benzene	US (ACGIH) / 2005	0.5 ppm	8 HRS/TWA	Skin. BEI

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	US (ACGIH) / 2005	2.5 ppm	15 MIN/STEL	Skin. BEI
	US (OSHA) / 2004	1 ppm	8 HRS/TWA	No
	US (OSHA) / 2004	5 ppm	15 MIN/STEL	No
Dicyclopentadiene	US (ACGIH) / 2005	5 ppm	8 HRS/TWA	No
	US (OSHA) / 2005	N/L		
Toluene	US (ACGIH) / 2005	50 ppm	8 HRS/TWA	Skin. BEI
	US (OSHA) / 2004	200 ppm	8 HRS/TWA	No
	US (OSHA) / 2004	300 ppm	CEILING	No
Indene	US (ACGIH)	10 ppm	8 HRS/TWA	
Xylenes	US (ACGIH) / 2001	100 ppm	8 HRS/TWA	BEI
	US (ACGIH) / 2001	150 ppm	15 MIN/STEL	
	US (OSHA) / 2001	100 ppm	8 HRS/TWA	
Ethylbenzene	US (ACGIH)	100 ppm	8 HRS/TWA	BEI
	US (ACGIH)	125 ppm	15 MIN/STEL	BEI
	US (OSHA)	100 ppm	8 HRS/TWA	No
Styrene	US (ACGIH) / 2004	20 ppm	8 HRS/TWA	BEI
	US (ACGIH) / 2004	40 ppm	15 MIN/STEL	BEI
	US (OSHA) / 2004	100 ppm	8 HRS/TWA	No
	US (OSHA) / 2004	200 ppm	CEILING	No
Naphthalene	US (ACGIH)	10 ppm	8 HRS/TWA	
	US (ACGIH)	15 ppm	8 HRS/TWA	
	US (OSHA)	10 ppm	8 HRS/TWA	
1,3-Butadiene	US (ACGIH) / 2003	2 ppm	8 HRS/TWA	No
	US (OSHA) / 2003	1 ppm	8 HRS/TWA	No
	US (OSHA) / 2003	5 ppm	15 MIN/STEL	No

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquid. Typically yellow. May range from clear to amber or brown.

Odor: Sweet aromatic.

Odor Threshold: No Data Available.

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PYROLYSIS GASOLINE

pH: Not applicable.

Boiling Point/Boiling Range: >= 37.7 °C (99.86 °F)

Freezing Point/Melting Point: No Data Available.

Flash Point: < -40 °C (< -40 °F) closed cup

Auto-ignition: 498 °C (928.4 °F)

Flammability: OSHA/NFPA Class IB Flammable Liquid.

Lower Flammable Limit: 1.3 vol%

Upper Flammable Limit: 8 vol%

Explosive Properties: No Data Available.

Oxidizing Properties: No Data Available.

Vapor Pressure: 75 mm Hg @ 20 °C (68 °F) < 12 psia (RVP)

Evaporation Rate: No Data Available.

Relative Density: 0.8661(Water = 1)

Relative Vapor Density: 3.1 (Air = 1.0)

Viscosity: 32.6 mPa.s

Solubility (Water): Partially soluble in cold water.

Partition Coefficient (Kow): No Data Available.

Additional Physical and Chemical Properties: No additional information available.

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability
1,3-butadiene may react with oxygen to form unstable butadiene peroxides. Butadiene peroxides are thermally unstable, shock sensitive and may lead to the formation of popcorn polymer.

Conditions to Avoid
Avoid contact with strong oxidizers, excessive heat, sparks or open flame.

Substances to Avoid
Heat and oxidizers. Phenol, ethanol, chlorine dioxide, crotonaldehyde, nitric acid, oxygen and other strong oxidizers, and acetylide forming materials such as copper, magnesium, mercury, silver and monel. Contact may form violently explosive peroxides.

Decomposition Products
Excessive heating and/or incomplete combustion may produce carbon monoxide, carbon dioxide and other harmful substances.

Hazardous Polymerization
Polymerization may release heat.

Reactions with Air and Water
1,3-butadiene may react with oxygen to form unstable butadiene peroxides. Butadiene peroxides are thermally unstable,

shock sensitive and may lead to the formation of popcorn polymer.

SECTION 11: TOXICOLOGICAL INFORMATION

PRODUCT INFORMATION

Product Summary
See component summary.

COMPONENT INFORMATION

- *Benzene 71-43-2*

Acute Toxicity - Lethal Doses

LC50 (Inhl)	Rat	13,700 PPM	4 HOURS
LD50 (Oral)	Rat	3400 - 5960 MG/KG BWT	
LD50 (Skin)	Rabbit	> 8260 MG/KG BWT	

Irritation
Skin May be irritating to the skin.

Eye Severe eye irritant.

Target Organ Effects
Damages bone marrow. Eye. Skin. Benzene is known to cause toxicity to blood forming tissues after repeated, prolonged exposure in man. Damage may include decrease in blood cells, aplastic anemia or acute myelogenous leukemia. Chromosome aberrations have been observed in white blood cells and in bone marrow exposed to levels of benzene known to be associated with signs of chronic benzene poisoning. Studies in both experimental animals and humans indicate that benzene is carcinogenic, causes chromosomal aberrations, and damages bone marrow. The U.S. National Toxicology Program (NTP) and the International Agency for Research on Cancer (IARC) list Benzene as a 'human carcinogen'.

Repeated Dose Toxicity
The hematopoietic system is the primary target for benzene, irrespective of the route of exposure. Broadly similar effects are seen in rodents and humans, including bone marrow toxicity and reduced red- and white blood cell counts. Immunological functions are also depressed in mice following repeated exposure to low levels by inhalation or ingestion. Effects in other organ systems include alterations in behavior and brain biochemistry along with lesions of the ovary and testis, however the relevance of these findings to humans is unclear.

Reproductive Effects
Results from animal studies are inconsistent, with adverse effects on fertility, ovary and testis reported in mice following repeated inhalation exposure not replicated in rats exposed under similar conditions. No reliable human data are available, hence the relevance of these findings to human reproductive health is not known.

Developmental Effects
Results from animal studies clearly demonstrate that benzene is not a teratogen, however mild fetotoxicity (including lowered body weight, delayed ossification and sub-clinical hematological changes) have been observed in rodents exposed during pregnancy, generally in association with maternal toxicity. No reliable human data are available, hence the relevance of these findings to human reproductive health is not known.

Carcinogenicity

Benzene is a multi-site animal carcinogen, producing tumors in hematopoietic- and epithelial tissues after long term inhalation or oral exposure. Epidemiology studies confirm it is a human carcinogen, causing primarily acute non-lymphocytic leukemia. The International Agency for Research on Cancer (IARC) has evaluated this substance and placed it in Group 1 (carcinogenic to humans). The National Toxicology Program (NTP) has evaluated this substance and placed it in Group K: Known To Be A Human Carcinogen. OSHA has classified this material as TLV-A1: Confirmed Human Carcinogen.

- *C5's and Lighter 68476-55-1*

Target Organ Effects
Respiratory system. Skin.

- *Dicyclopentadiene 77-73-6*

Acute Toxicity - Lethal Doses

LC50 (Inhl)	Rat	372 PPM	4 HOURS
LD50 (Oral)	Rat	410 MG/KG	
	Rat	353 MG/KG	
LD50 (Skin)	Rabbit	5080 MG/KG	

Irritation
Skin Liquid is irritating to skin. Repeated contact with neat product may dry the skin causing cracking and/or fissuring.

Eye Irritation can range from slight to severe. Effects of eye irritation are reversible.

Target Organ Effects
Skin. Eye. Respiratory system. Central nervous system effects.

Repeated Dose Toxicity
Repeated inhalation exposure of rats to dicyclopentadiene (DCPD) at 5 ppm/6hr/13week, 35 ppm/7hr/18 week, and 20 mg/m3/4hr/26 week resulted in general depressed activity, weight loss or decreased weight gain, changes in liver and kidney weight, and caused nutritional and gross metabolic changes in sodium and phosphorous levels. Repeated inhalation exposure of rats at 250 ppm/6hr/2weeks, resulted in weight loss or decreased weight gain and death. In chronic exposure of rats exposed at 74 & 35 pm 7hr/day for 89 work days, kidney and lung damage was observed. Lung involvement was seen as chronic pnuemonia and bronchitis. No other dose related effect was observed in other organs examined.

Reproductive Effects
Dicyclopentadiene was evaluated for mutagenicity in the Salmonella/microsome preincubation assay using a standard NTP protocol. Dicyclopentadiene was tested at doses of 0, 3, 10, 33, 100, and 333ug/plate in four Salmonella typhimurium strains in the presence and absense of Aroclor-induced rat or hamster liver S9. Dicyclopentadiene was negative in these tests and the highest ineffective dose level tested without clearing of the background lawn in any Salmonella tester strain was 100 ug/plate.

Carcinogenicity
Not listed by IARC, NTP, or OSHA.

- *Toluene 108-88-3*

Acute Toxicity - Lethal Doses

LC50 (Inhl)	Rat	7500 PPM	4 HOURS
LD50 (Oral)	Rat	5,580 MG/KG BWT	
LD50 (Skin)	Rabbit.	> 5000 MG/KG BWT	

Irritation
Skin *Moderate skin irritant.*

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Material Safety Data Sheet

MSDS No.: 61
Variant: U.S.A.-EN
Version No: 2.9
Validation Date: 06/07/2006

PYROLYSIS GASOLINE

Eye May cause moderate irritation, including burning sensation, tearing, redness or swelling. Effects of eye irritation are reversible.

Target Organ Effects
Skin. Eye. Central nervous system effects. Respiratory system. Cardiac sensitization.

Repeated Dose Toxicity
No evidence of systemic toxicity was reported in rats exposed to 1.15 mg/l (300 ppm) toluene vapor for two years, while higher exposures were associated with inflammation and degeneration of nasal epithelial tissue. Rats exposed repeatedly to very high concentrations of toluene resulted in neurological changes and permanent hearing loss. Clinical case reports indicate the occurrence of serious and persistent changes (including tremor, ataxia, memory impairment and possible hearing loss) in humans following deliberate over-exposure to toluene in abuse situations. The relevance of these findings to low level occupational exposure to toluene is not known.

Reproductive Effects
Studies in animals demonstrate no histopathological lesions in testes or ovaries of rats and mice exposed to 9.4 mg/l (2500 ppm) toluene vapor for 14-15 weeks, and no loss of fertility in male rats after exposure to 7.5 mg/l (2000 ppm) for a similar period of time. Epididymal weights and sperm counts were decreased in one study, but the absence of any adverse effect on reproduction makes the functional relevance of these observations unclear. No reliable human data are available.

Developmental Effects
Studies in pregnant rats demonstrate that toluene is not a teratogen, however mild fetotoxicity (lower body weight, delayed ossification, delayed physical development) may occur in the absence of maternal toxicity at exposures in the range 1.9-2.8 mg/l (500-750 ppm). Other studies describe adverse effects on learning and cognitive functions in rat pups exposed to 4.5-6.7 mg/l (1200-1800 ppm) in utero, although it is unclear if end-points evaluated in these tests are directly relevant to humans.

Genetic Toxicity
In vitro and in vivo mutagenicity tests were negative.

Carcinogenicity
Inhalation studies in rats and mice demonstrate that toluene is not a carcinogen. It has been used extensively as a solvent in rodent skin painting studies with occasional slight, increases in tumor incidence reported; an epigenetic mechanism (based on irritation rather than genotoxicity) may underpin these findings. Toluene is considered a Group 3 substance by IARC, not classifiable as to its carcinogenicity to humans.

- *Indene 95-13-6*

Acute Toxicity - Lethal Doses

LC50 (Inhl)	Rat	14 GM/M3	

- *Xylenes 1330-20-7*

Acute Toxicity - Lethal Doses

LC50 (Inhl)	Rat	5000 PPM	4 HOURS
LD50 (Oral)	Rat	4300 MG/KG	
LD50 (Skin)	Rabbit	>1700 MG/KG	

Acute Toxicity - Effects
Ingestion May cause CNS depression, gastric discomfort, and vomiting. This material is an aspiration hazard

Irritation
Skin Moderate skin irritant. May cause dermatitis by defatting the skin from prolonged or repeated contact

Eye This material is expected to be a mild eye irritant. Xylenes are irritating to the eyes with the potential to cause conjunctivitis and corneal opacity.

Target Organ Effects
Central nervous system effects. Skin. Eye. Lung.

Carcinogenicity
Not listed by IARC, NTP, or OSHA.

- *Ethylbenzene 100-41-4*

Acute Toxicity - Lethal Doses

LC50 (Inhl)	Mouse	4000 PPM
LD50 (Oral)	Rat	3500 - 4700 MG/KG BWT
LD50 (Skin)	Rabbit	> 15,000 MG/KG BWT

Acute Toxicity - Effects
Inhalation This substance is postulated to increase the sensitivity of the myocardium to endogenous catecholamines resulting in cardiac arrhythmias that in turn may be fatal. Myocardial sensitization has been reported for inhalation abuse as well as oral ingestions, the latter however a rare or atypical finding. May produce symptons of central nervous system depression including headache, dizziness, nausea, loss of sense of balance, drowsiness, visual disturbances, unconsciousness and sense of balance, drowsiness, visual dissturbances, unconsciousness and death.

Skin Contact While skin absorption is a potential route of exposure, no adverse health effects are anticipated following accidental or incidental contact.

Irritation
Skin This product is expected to be an skin irritant. Not expected to be a sensitizer. Prolonged or repeated contact may cause skin to become dry or cracked.

Eye Moderate to severe eye irritant.

Target Organ Effects
Eye. Skin. Cardiac sensitization. Exposure may cause irregularities in heart beat and sensitization to adrenaline and catecholamine-like drugs. Central nervous system effects. Respiratory system. Has been shown to damage the liver, kidneys and lungs based on animal studies.

Repeated Dose Toxicity
No adverse effects were present in rats or mice exposed to 1000 ppm (4.3 mg/l) ethylbenzene vapor for up to 13 weeks. Longer-term exposure resulted in an increased incidence of chronic progressive nephropathy (CPN) in kidneys from rats inhaling 750 ppm (3.3 mg/l) for up to two years. Since CPN is a spontaneous age-related condition specific to rodents, these findings are of doubtful relevance to humans. Mice exposed chronically under similar conditions responded with changes in the lung, liver and thyroid. Specialist investigations provide evidence of hearing loss in rats following repeated (sub-acute) exposure to concentrations of 400 ppm (1.7 mg/l) and above, however similar changes were not present in guinea pigs exposed under comparable conditions. The relevance of these findings to low level human occupational exposure is not known.

Reproductive Effects
No adverse effect on reproduction was found when male and female rats were exposed to ethylbenzene prior to mating and during pregnancy. Histopathological examination of reproductive tissue from rats, mice and rabbits has generally revealed no adverse changes following sub-chronic- or chronic inhalation exposure to high vapor concentrations. An increased incidence of testicular tumors in F344 male rats exposed to 750 ppm (3.3 mg/l) ethylbenzene vapor for 2 years is considered of doubtful relevance to reproductive toxicity.

Developmental Effects
Decreased fetal body weight and an increased occurrence of skeletal and other variations were reported in the presence of concurrent maternal toxicity (CNS effects, decreased body weight, liver enlargement) when female rats were exposed to ethylbenzene concentrations of 1000 ppm (4.3 mg/l) or above throughout pregnancy. The relevance of these findings to low level human occupational exposure is not known.

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Genetic Toxicity
No increase in micronuclei or hepatic UDS was observed in mice after treatment with ethylbenzene in vivo. It was not genotoxic in microbial systems, nor did it induce chromosomal aberrations or sister chromosome exchanges in mammalian cells in vitro. Inconsistent results were obtained for mutation at the TK+/- locus in L5178Y cells, although the overall response was suggestive of a positive effect. Since the weight of evidence indicates that ethylbenzene is not genotoxic these findings in L5178Y cells were unexpected and their relevance unknown.

Carcinogenicity
The carcinogenic potential of ethylbenzene after inhalation exposure has been investigated in two recent regulatory guideline studies performed by NTP. Male rats exposed to 750 ppm (3.3 mg/l) over 2 years showed an increased incidence of testicular interstitial cell adenoma, a common tumor present also in a large majority of the untreated males included in the study. High level exposure was also linked with an increased incidence of kidney tumors in both sexes; the appearance of these lesions was strongly associated with the development of Chronic Progressive Nephropathy, a spontaneous age-related disease of rats with no equivalent counterpart in humans. Male mice exposed to 750 ppm ethylbenzene for 2 years responded with an increased incidence of lung tumors, while the incidence of liver tumors was increased in females. Mechanistic studies suggest that these lesions in the mouse developed secondary to enhanced cell proliferation in these tissues, while the weight of evidence from mutagenicity testing also indicates that a non-genotoxic mechanism was involved. Listed by IARC as possibly carcinogenic in humans (Group 2B).

- *Styrene 100-42-5*

Acute Toxicity - Lethal Doses

LCLo	Mouse	500 PPM	6 HOURS
LD50 (Oral)	Rat	~ 5000 MG/KG	
	Mouse	316 MG/KG	

Irritation
Skin Moderate skin irritant. No significant signs or symptoms indicative of any health hazard are expected to occur as a result of skin absorption exposure. Not expected to be a sensitizer. Repeated or prolonged contact with skin may cause dermatitis.

Eye Moderate eye irritant. Effects of eye irritation are reversible.

Target Organ Effects
Cardiac sensitization. Nervous system. Nasal cavity. Lung. Eye. Skin.

Repeated Dose Toxicity
Results from repeat-dose toxicity studies demonstrate that the mouse is highly sensitive to styrene-induced toxicity, with hyperplasia and fibrosis in lung tissue and atrophy and degeneration of nasal olfactory epithelium after chronic exposure. Mild nasal changes were also observed in the rat. Mechanistic studies demonstrate greater formation of locally toxic products in mouse nose and lung, and provide a metabolic basis for these species differences in susceptibility (negligible metabolism likely in human respiratory tract). Specialist investigations provide evidence of mild, permanent hearing loss in rats exposed repeatedly to very high concentrations of styrene (2.6 mg/l; 600 ppm), but no consistent evidence of neurological or behavioral changes. Minor impairment of color discrimination has been reported in workers occupationally exposed to styrene, however the magnitude of the change is small suggesting it is of negligible toxicological or clinical significance.

Reproductive Effects
Results from reproductive toxicity studies in rats exposed via drinking water or inhalation have shown that styrene is not selectively toxic to the testis or ovary, nor does it adversely affect fertility or litter parameters. Histopathological examination of reproductive tissue from rats and mice revealed no adverse changes following sub-chronic or chronic inhalation exposure. Studies in male workers exposed to styrene provide no evidence of a link between internal body burden and reproductive function.

Developmental Effects

Results from animal studies demonstrate that styrene is not a teratogen, nor is it fetotoxic at sub-maternally-toxic treatment levels. No selective effects on nervous system development have been reported. Some indication of developmental delay was observed in pups from dams exposed to 500 ppm styrene (equivalent to 300 mg/kg bwt), however these findings were attributed to decreased pup body weight rather than a selective effect on the offspring. The available human data provides no evidence of an effect of styrene on the unborn child.

Genetic Toxicity
The genotoxic potential of styrene has been investigated extensively. While results from in vitro tests were mostly negative, occasional positive findings have been reported presumably reflecting conversion of styrene to styrene oxide. In vivo studies in rats, mice and hamsters generally show no increase in chromosomal aberrations or micronuclei after single or repeated inhalation, oral or intraperitoneal exposure, however simultaneous assessment of sister chromatid exchanges resulted in a weakly positive result in some of these same studies. Investigations of genetic damage in exposed worker populations provide no consistent or conclusive evidence for the genotoxicity of styrene in humans.

Carcinogenicity
The carcinogenic potential of styrene has been investigated in several rodent bioassays, including two recent inhalation regulatory guideline studies using rats and mice. Results for the rat provide no evidence of carcinogenicity, whereas data from the mouse indicate an increase in late-onset tumors in the lung (no other organ affected). These tumors occurred in the presence of hyperplasia and inflammatory changes which were not observed in rats. Mechanistic studies demonstrate that mouse lung converts styrene to a locally-toxic metabolite, capable of causing chronic inflammation and hyperplasia. Pulmonary metabolism is negligible in rat lung and virtually undetectable in human lung. These findings indicate that a non-genotoxic mechanism was responsible for the species-specific, tissue-specific tumors found in the mouse. Listed by IARC as possibly carcinogenic to humans (Group 2B), based on limited evidence of carcinogenicity in humans and experimental animals. OSHA has classified this material as TLV-A4: Not Classifiable as a Human Carcinogen.

- *Naphthalene 91-20-3*

Acute Toxicity - Lethal Doses

LC50 (Inhl)	Rat	>340 MG/M3	4 HOUR
LD50 (Oral)	Rat	490 MG/KG	

Irritation
Eye May cause eye irritation.

Carcinogenicity
The National Toxicology Program (NTP) has evaluated this substance and placed it in Group R: Reasonably Anticipated To Be A Human Carcinogen. OSHA has classified this material as TLV-A4: Not Classifiable as a Human Carcinogen.

- *1,3-Butadiene 106-99-0*

Acute Toxicity - Lethal Doses

LC50 (Inhl)	Rat	285 MG/L	4 HOURS
	Mouse	267 MG/L	4 HOURS

Acute Toxicity - Effects
Inhalation Signs of respiratory tract irritation (cough and difficulty breathing), CNS depression (fatigue, dizziness, headache, collapse, coma and death) and possible cardiac sensitization may occur after exposure to high vapor concentrations.

Ingestion There are no known reliable studies regarding toxicity in humans or animals after oral exposures.

Skin Contact There are no known reliable studies regarding systemic toxicity in humans or animals after dermal exposures. There are no known reliable studies regarding sensitization in test animals. However, human experience suggests that it is unlikely to cause allergic skin conditions.

Irritation

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Skin Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite. There are no known reliable studies regarding systemic toxicity in humans or animals after dermal exposures. There are no known reliable studies regarding sensitization in test animals. However, human experience suggests that it is unlikely to cause allergic skin conditions.

Eye Vapor may be irritating to the eye, especially at high concentrations.

Target Organ Effects
Respiratory system. Lymphohematopietic system. Gonads.

Repeated Dose Toxicity
Butadiene is highly toxic in the mouse, producing lesions in a range of tissues (including ovary, testis, lung, liver, bone marrow, thymus, forestomach and heart) after repeated inhalation exposure. No comparable changes occurred in rats or other laboratory animal species, hence the relevance of these findings to humans is unclear.

Reproductive Effects
Testicular- and ovarian atrophy, and changes in sperm head morphology, have been reported in mice following repeated exposure to butadiene vapor, however no adverse effects on fertility or reproduction have been reported.

Developmental Effects
Results from animal studies demonstrate that butadiene is not a teratogen, however mild fetotoxicity (primarily retarded development) has been observed in rodents exposed to high levels of butadiene vapor during pregnancy. These effects generally occur at exposures that also produce maternal toxicity.

Genetic Toxicity
Butadiene is genotoxic in the mouse, and induces micronuclei, chromosomal aberrations and dominant lethal mutations after inhalation exposure. Studies to assess genetic damage in exposed worker populations have returned inconsistent or equivocal results.

Carcinogenicity
Animal data demonstrate marked species difference in carcinogenic response to butadiene. In the mouse, long term inhalation exposure is associated with an increased incidence of benign and malignant cancers in a wide range of tissues, whereas a more limited tumor profile is seen in the rat. Epidemiology studies suggest butadiene may be carcinogenic in humans with a concern for cancers of the lymphohematopoietic system. Listed by IARC as a probable human carcinogen (Group 2A). This listing is based on limited evidence of carcinogenicity in humans and sufficient evidence in experimental animals. Listed by NTP as known to be a human carcinogen in their Report on Carcinogens, Ninth Edition. This listing was based on sufficient evidence of carcinogenicity in humans, including epidemiologic and mechanistic information, to indicate a causal relationship between occupational exposure to 1,3-butadiene and excess mortality from lymphatic and hematopoietic cancers. OSHA has classified this material as TLV-A2: Suspected Human Carcinogen. Butadiene is genotoxic in the mouse, and induces micronuclei, chromosomal aberrations and dominant lethal mutations after inhalation exposure. Studies to assess genetic damage in exposed worker populations have returned inconsistent or equivocal results.

SECTION 12: ECOLOGICAL INFORMATION

PRODUCT INFORMATION

Ecotoxicity

See component summary.

Environmental Fate and Pathway

See component summary.

COMPONENT INFORMATION

EPAPA005001663

- *Benzene 71-43-2*

Ecotoxicity

When released to the environment benzene will volatilize rapidly. It is expected to be harmful to animals, waterfowl and aquatic life. Benzene may be dangerous if it enters water intakes. Operators of water intakes in the vicinity should be notified of water releases.

Acute toxicity to fish
LC50 / 96 HOUR rainbow trout 5.3 - 21.6 mg/l

LC50 / 96 HOUR fathead minnow 14.0 - 15.6 mg/l

LC50 / 96 HOUR guppy 28.6 mg/l

Acute toxicity to aquatic invertebrates
EC50 / 48 HOUR Daphnia magna. 10 mg/l

EC50 / 48 HOUR waterflea. 17.2 mg/l

Toxicity to aquatic plants
EC50 / 72 HOUR green algae (Selenastrum). 28 - 100 mg/l

Toxicity to microorganisms

Summary: No Data Available.

Chronic toxicity to fish
ELS NOEC / 32 DAY fathead minnow 1.6 mg/l

Chronic toxicity to aquatic invertebrates
EC50 / 7 DAY daphnia 11.6 mg/l

Environmental Fate and Pathway

If benzene is released to soil, it will be subject to rapid volatilization near the surface. Benzene that does not evaporate will be highly mobile in the soil and may leach to groundwater. If released to the atmosphere, it will exist predominantly in the vapor phase. Gas-phase benzene will not be subject to direct photolysis but it will react with photochemically produced hydroxyl radicals. Benzene is fairly soluble in water and is removed from the atmosphere by rain.

Persistance and Degradability
Biodegradation: BOD (manometric respiration test)= 62 - 100%, after 28 days Readily biodegradable in aerobic conditions. Negligible breakdown occurs under anaerobic conditions.
Bioaccumulation: BCF in fish ~ 10. This material is not expected to bioaccumulate.

Other Adverse Effects
When released to water, volatilization will result in substantial losses to the atmosphere with a calculated half-life in the troposhpere of approximately 13.4 days. A calculated Koc value to 134.1 l/kg does not indicate a significant potential for geoaccumulation.

- *C5's and Lighter 68476-55-1*

Ecotoxicity

No data available.

EPAPA005001664

Environmental Fate and Pathway

No data available.

- *Dicyclopentadiene 77-73-6*

Ecotoxicity

Dicyclopentadiene is moderately toxic to fish. Fish kills may be expected if large amounts reach aquatic systems. Due to the disagreeableodor and irritating properties of this material at low concentrations, mortality of larger, mobile animals and birds due to acute inhalation exposure in an open atmosphere is not expected. This material is classified as toxic to invertebrates.

Acute toxicity to fish
LC50 / 96 HOUR rainbow trout, 22.8 mg/l

LC50 / 96 HOUR Carp, 62.2 mg/l

Summary: This material is classified as harmful to fish.

Acute toxicity to aquatic invertebrates
LC50 / 48 HOUR waterflea, 6.9 mg/l

Summary: This material is classified as toxic to invertebrates.

Environmental Fate and Pathway

Persistance and Degradability
Stability in Water: Volatilization is the primary fate process in water; estimated half-life from a model river of 3.4 hours. Reaction with photochemically produced oxidants may also be important. Adsorption to suspended organic matter and sediment may be significant.

Stability in Soil: Volatilization from surface soil may be quite rapid, although this process may be slowed by dicyclopentadiene's adsorption to the soil. This compound is expected to display low mobility. Biodegradation and hydrolysis are not expected to be significant factors.

Biodegradation: This material is expected to be resistant to biodegradation.

Bioaccumulation: A Bioconcentration Factor (BCF) of 93.2 can be calculated for this compound; this indicates that dicyclopentadiene may bioconcentrate in fish and other aquatic organisms.

- *Toluene 108-88-3*

Ecotoxicity

This material is expected to be moderately toxic to aquatic species.

Acute toxicity to fish
LC50 / 96 HOUR salmon, coho, 55 mg/l

LC50 / 96 HOUR goldfish 22.8 mg/l

LC50 / 96 HOUR fathead minnow 31.7 mg/l

Acute toxicity to aquatic invertebrates
EC50 / 48 HOUR Daphnia magna, 11.5 - 14.9 mg/l

Toxicity to aquatic plants

Summary: No Data Available.

Toxicity to microorganisms

Summary: No Data Available.

Chronic toxicity to fish
NOEC / 40 DAY salmon 1.4 mg/l
Summary: Actual exposure time: 27 - 40 day.

Chronic toxicity to aquatic invertebrates
NOEC / 21 DAY Daphnia magna. 1.0 mg/l

NOEC / 7 DAY waterflea. 0.74 mg/l

Environmental Fate and Pathway

Volatilization from water surfaces is expected to be an important environmental fate process. Hydrolysis is not expected to be an important factor in the environmental fate process for this material.

Mobility
Transport between environmental compartments: The atmosphere is the main environmental compartment for the release of toluene. In water, volatilization will result in substantial losses to the atmosphere with a half-life of 1-2 days. A calculated Koc value of 37-160 indicates no significant potential for geoaccumulation.

Persistance and Degradability
Stability in Soil: Volatilization from moist soil surfaces is expected to be an important fate process of this material. The potential for volatilization from dry soil surfaces may exist

Biodegradation: Readily biodegradable in aerobic conditions.

Bioaccumulation: Log Kow (Fish) <3 This material is not expected to bioaccumulate.

Other Adverse Effects
If released to air, a vapor pressure of 28.4 mm Hg at 25 deg C indicates toluene will exist solely as a vapor in the ambient atmosphere. Vapor-phase toluene will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 3 days. Toluene may also be degraded in the atmosphere by reaction with nitrate radicals and ozone molecules, but these reactions are too slow to be environmentally important.

- *Indene 95-13-6*

Ecotoxicity

No data available.

Environmental Fate and Pathway

No data available.

- *Xylenes 1330-20-7*

Ecotoxicity

This material is classified as harmful to fish.

Acute toxicity to fish
LC50 / 96 HOUR rainbow trout. 13.5 mg/l

LC50 / 24 HOUR goldfish 13 mg/l

Environmental Fate and Pathway

This material is expected to exist solely as a vapor in the ambient atmosphere. The vapor-phase of this material is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals and ozone. Expected to have moderate mobility in soils. Volatilization from moist soil surfaces is expected. Volatilization from dry soil surfaces is expected.

Persistance and Degradability
Biodegradation: Biodegradable under aerobic and anaerobic conditions.
Bioaccumulation: This material is not expected to bioaccumulate.

- *Ethylbenzene 100-41-4*

Ecotoxicity

This material is classified as toxic to fish. This material is classified as toxic to invertebrates. This material is toxic to algae or higher aquatic plants. May exhibit chronic toxicity in specific invertebrates.

Acute toxicity to fish
LC50 / 96 HOUR rainbow trout. 4.2 mg/l

LC50 / 96 HOUR silverside minnow. 5.1 mg/l

LC50 / 96 HOUR guppy. 9.6 mg/l

Summary. This material is classified as toxic to fish.

Acute toxicity to aquatic invertebrates
EC50 / 48 HOUR Daphnia magna. 1.8 - 2.9 mg/l

EC50 / 48 HOUR Marine shrimp. 9.2 mg/l

Summary: This material is classified as toxic to invertebrates.

Toxicity to aquatic plants
EC50 / 72 HOUR green algae. 4.6 mg/l

EC50 / 96 HOUR green algae. 3.6 mg/l

EC50 / 96 HOUR Marine algae 7.7 mg/l

Summary. This material is toxic to algae or higher aquatic plants.

Toxicity to microorganisms
IC50 / 48 HOUR Sewage sludge 130 mg/l

Chronic toxicity to fish

Summary: No Data Available.

Chronic toxicity to aquatic invertebrates
IC50 / 7 DAY daphnia 3.3 mg/l
Summary: (reproduction)

NOEC / 7 DAY daphnia 1.0 mg/l
Summary: (reproduction)

Summary: May exhibit chronic toxicity in specific invertebrates.

Environmental Fate and Pathway

Ethylbenzene's high volatility will lead to preferential partitioning from water and soil to the atmosphere. Environmental fate estimates predict that ethylbenzene will not presist in the atmosphere. It is subject to biodegradation in water and soil, but adsorption may slow the process in soils.

Mobility
Transport between environmental compartments: The atmosphere is the main environmental compartment for releases of ethylbenzene (half-life approx. 1 day). In water, volatilization to air and biodegradation will result in substantial losses, with an estimated half-life of approx. 0.1 - 13 days.

Persistance and Degradability
Biodegradation: Readily biodegradable in aerobic conditions.
Bioaccumulation: BCF = 1 - 15 This material is not expected to bioaccumulate.

- *Styrene 100-42-5*

Ecotoxicity

Toxic to fish, invertebrates and microorganisms, however, substantial aquatic exposure is not expected based on the volatile nature of this material.

Acute toxicity to fish
LC50 / 96 HOUR fathead minnow 4 - 10 mg/l

Acute toxicity to aquatic invertebrates
EC50 / 48 HOUR Daphnia magna, 4.7 mg/l

Toxicity to aquatic plants
EC50 / 72 HOUR green algae (Selenastrum), 4.9 mg/l

Toxicity to microorganisms
NOEC / 16 HOUR bacteria, 72 mg/l

Environmental Fate and Pathway

Mobility
Transport between environmental compartments: The atmosphere is the main environmental compartment for releases of styrene. In water, volatilization will result in substantial losses to the atmosphere with a half-life of approximately 4 hours. A calculated Koc value of 350 indicates no significant potential for geoaccumulation.

Persistance and Degradability
Biodegradation: Readily biodegradable in aerobic conditions.
Bioaccumulation: This material is not expected to bioaccumulate.

- *Naphthalene 91-20-3*

Ecotoxicity

Acute toxicity to fish
LC50 / 96 HOURS rainbow trout. 26 mg/l
Summary: Very toxic to aquatic organisms.

Acute toxicity to aquatic invertebrates
EC50 / 48 HOURS Daphnia magna, 21.9 mg/l

Environmental Fate and Pathway

Persistance and Degradability
Biodegradation: Biodegradable under aerobic conditions.

Bioaccumulation: Naphthalene has a moderate tendency to bioaccumulate although fish and microorganisms readily metabolize it.

- *1,3-Butadiene 106-99-0*

Ecotoxicity

Due to the physio-chemical characteristics of this material, no reliable test data are available.

Environmental Fate and Pathway

The atmosphere is the main environmental compartment for released butadiene where it will react rapidly with hydroxyl radicals (half-life 1 - 10 hr) and ozone (half-life 8 - 48 hr). In water, volatilization will result in substantial losses to the atmosphere with a half-life of about 4 hr. No standard biodegration tests are available.

Persistance and Degradability
Biodegradation: No standard biodegration tests are available.

Bioaccumulation: Low water solubility and high volatility indicate that bioaccumulation in aquatic systems is unlikely Estimated BCF = 10 - 13.

SECTION 13: DISPOSAL CONSIDERATIONS

This material is classified as a Hazardous Material by RCRA. Use only permitted transporters and disposal facilities and conform to all laws. Disposal should be conducted through a facility equipped with and operating an air emission control device in accordance with requirements of applicable Clean Air Act regulations.

SECTION 14: TRANSPORT INFORMATION

Special Requirements
If you reformulate or further process this material, you should consider re-evaluation of the regulatory status of the components listed in the composition section of this sheet, based on final composition of your product.

Proper Shipping Name	Petroleum distillates, n.o.s. (BENZENE, TOLUENE)
RQ	BENZENE XYLENE
ID No.	UN1268
Hazard Class	3
PG	II

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Material Safety Data Sheet

MSDS No.: 61
Variant: U.S.A.-EN
Version No: 2.9
Validation Date: 06/07/2006

PYROLYSIS GASOLINE

SECTION 15: REGULATORY INFORMATION

Regulatory Status

Country	Inventory		
Australia	AICS	X	X = All components are included or are otherwise exempt from inclusion on this inventory.
Canada	DSL	X	
Canada	NDSL		
China	IECS	X	
European Union	EINECS	X	
European Union	ELINCS		C = Contact Lyondell/Equistar by e-mail at productsafety@lyondell.com or productsafety@equistarchem.com for additional information.
European Union	NLP		
Japan	ENCS	X	
Korea	ECL	X	
Philippines	PICCS	X	
United States	TSCA	X	

If identified components of this product are listed under the TSCA 12(b) Export Notification rule, they will be listed below. Export notification required.

Dicyclopentadiene/ CAS# 77-73-6 Naphthalene / CAS# 91-20-3 TSCA section 4

SARA 302/304

This material contains a component(s) with known CAS numbers classified as hazardous substances subject to the reporting of CERCLA (40 CFR 302) and/or to the release reporting requirements of SARA (Section 302) based on reportable quantities (RQs).

Component	RQ
Benzene / CAS# 71-43-2	10 lbs
Dicyclopentadiene/ CAS# 77-73-6	100 lbs
Toluene / CAS# 108-88-3.	1,000 lbs
Xylene / CAS# 1330-20-7.	100 lbs
Ethylbenzene / CAS# 100-41-4.	1,000 lbs
Styrene / CAS# 100-42-5.	1,000 lbs
Naphthalene / CAS# 91-20-3	100 lbs
1,3-Butadiene / CAS# 106-99-0	10 lbs

SARA 311/312

Based upon available information, this material is classified as the following health and/or physical hazards according to Section 311 & 312:

Immediate/Health
Delayed (Chronic) Health Hazard.
Fire Hazard

SARA 313

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Material Safety Data Sheet

MSDS No.: 61
Variant: U.S.A.-EN
Version No: 2.9
Validation Date: 06/07/2006

PYROLYSIS GASOLINE

This material contains the following chemicals with known CAS numbers subject to the reporting requirements of SARA Title III, Section 313 and 40 CFR 372:

Component	Reporting Threshold
Ethylbenzene / CAS# 100-41-4	1.0%
Styrene / CAS# 100-42-5	0.1%
1,3-Butadiene / CAS# 106-99-0	0.1%
Xylene / CAS# 1330-20-7	1.0%
Toluene / CAS# 108-88-3	1.0%
Dicyclopentadiene/ CAS# 77-73-6	1.0%
Benzene / CAS# 71-43-2	0.1%
Naphthalene / CAS# 91-20-3	0.1%

State Reporting

This product contains the following ingredients for which the state of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute:

- Ethylbenzene, Carcinogen
- Naphthalene, Carcinogenic Hazard
- 1,3-Butadiene, Carcinogenic Hazard and Reproductive Toxin.
- Benzene, Carcinogenic Hazard, Male Reproductive Toxin and Developmental Toxin
- Toluene, Reproductive Toxin

SECTION 16: OTHER INFORMATION

Latest Revision(s)
Revised Section(s): 5 12 15 Updated Prop 65 Statement. June 18 2004 Revised Section(s): 9 Date of Revision: December 16 2005 Revised Section(s): 9 Flashpoint Date of Revision: February 17 2006 Revised Section(s): 2 9 April 11 2006 Revised Section(s): 1 2 9 10 Date of Revision: April 14 2006 Revised Section(s): 15 Date of Revision: May 1 2006 Revised Section(s): 3 Date of Revision: May 9 2006

DISCLAIMER OF RESPONSIBILITY

The information on this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with handling, storage, use, or disposal of this product. If the product is used as a component in another product, this MSDS information may not be applicable.

Numerical Data Presentation
The presentation of numerical data, such as that used for physical and chemical properties and toxicological values, is expressed using a comma (,) to separate digits into groups of three and a period (.) as the decimal marker. For example, 1,234.56 mg/kg = 1 234,56 mg/kg

Language Translations
This document may be available in languages other than English.

< end of document >

EQUISTAR
A Lyondell Company

Material Safety Data Sheet

MSDS No.: 61
Variant: U.S.A.-EN
Version No: 2.9
Validation Date: 06/07/2006

PYROLYSIS GASOLINE

LYONDELL

MATERIAL SAFETY DATA SHEET

QUAKER STATE ONE LUBE PENETRATING OIL

1. PRODUCT AND COMPANY IDENTIFICATION

MSDS Number: 26186
Version Date: 10/5/2005

Product Name: QUAKER STATE ONE LUBE PENETRATING OIL
Product Use: Lubricant
Synonyms: 5059596

Company Information
Pennzoil-Quaker State Canada Inc.
1101 Blair Road
Burlington, ON L7M 1T3
Canada

Phone Numbers
Medical Emergency: 1-800-546-6040
Transportation Emergency (USA): 1-800-424-9300
Transportation Emergency (International):
1-703-527-3887 (Call Collect)
MSDS Assistance: 1-800-546-6227
Fax On Demand: Not available.
Technical Assistance: 1-800-706-6655
Customer Service: 1-800-263-6200
Fax Number: 1-713-217-3181
Internet Address: www.MSDS.PZLQS.com

2. COMPONENT INFORMATION

Component	CAS No.	Weight Percent Range	Hazardous in Blend
LIQUIFIED PETROLEUM GAS	68476-86-8	10 - 30	Yes
BASE LUBRICATING OILS	MIXTURE	70 - 90	No
BUTYL CELLOSOLVE	111-76-2	1 - 5	Yes

This product meets the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Hazards:
Flammable/Combustible X **Acute Toxin** X **Chronic Toxin** X **Carcinogen** –
Pressure X **Reactive** – **Exposure Limit** – **Target Organ** – **Other** –

Other: No information available

3. HAZARDS IDENTIFICATION

Emergency and Hazards Overview
DANGER: FLAMMABLE (OR EXTREMELY FLAMMABLE). HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. CONTENTS UNDER PRESSURE.

NFPA Ratings: **Health** 1 **Flammability** 3 **Reactivity** 0

Primary Route of Exposure: **Skin** X **Inhalation** X **Eye** –

Health Effect Information

Eye Contact: Avoid eye contact. This product has not been tested for acute eye hazards. May be irritating to the eyes upon direct contact. Exposure to mists and vapors may be irritating to the eyes. These effects are transient, and complete recovery follows.

Skin Contact: This product may cause slight skin irritation upon direct contact. Prolonged or repeated skin contact may result in dryness, chapping, and reddening.

Inhalation: This product is not expected to pose an inhalation hazard under conditions of foreseeable use. Caution should be taken to minimize exposure to aerosols/mists of this product. Acute and chronic overexposures may be irritating to the respiratory tract. Inhalation of high concentrations of this product can cause central nervous system depression and narcosis. Severe intoxication may lead to drowsiness, dullness, numbness, and headache followed by dizziness, weakness, and nausea. While affected, the ability to perform skilled tasks is compromised. Exposure to extremely high concentrations may have anesthetic effects. Intentional misuse by deliberately concentrating and inhaling this product can be harmful or fatal.

Ingestion: Not applicable by this route of exposure. Ingestion is unlikely for aerosol products.

Medical Conditions Aggravated by Exposure: Drying and chapping may make the skin more susceptible to other irritants, sensitizers and disease.

Other: No information available

4. FIRST AID INFORMATION

Eye Contact: Immediately flush eyes with large amounts of water and continue flushing for 15 minutes or until irritation subsides. If irritation persists, seek medical attention.

Skin Contact: Wash contaminated area thoroughly with soap and water. Use a hand or skin lotion to prevent dryness. If redness or irritation occurs and persists, seek medical attention.

Inhalation: If victim exhibits signs of vapor intoxication remove to fresh air. If discomfort persists seek medical attention. If breathing has stopped or is irregular, administer artificial respiration and supply oxygen if it is available. If victim is unconscious, remove to fresh air and seek immediate medical attention.

Ingestion: Ingestion is unlikely for aerosol products. Accidental spraying into the mouth will not result in any harmful effects. No treatment is necessary under ordinary circumstances.

Notes to Physician: No information available

Other: No information available

5. FIRE AND EXPLOSION INFORMATION

Flammable Properties

Flash Point (aerosol concentrate): 172.4 F, 78 C **Test Method:** ASTM D 3828-81-Setaflash

Flame Extension: > 18", with flashback **Test Method:** CPSC 1500.45

Flammable Limits in Air

Upper Percent: No data available

Lower Percent: No data available

Autoignition Temperature: No data available **Test Method:** No information available

NFPA Classification: Level 3 Aerosol (NFPA 30B)

Extinguishing Media: Use water spray (fog), dry chemical, foam, or carbon dioxide.

Fire Fighting Measures

Special Fire Fighting Procedures and Equipment: Water may be ineffective but can be used to cool containers exposed to heat or flame to prevent vapor pressure buildup and possible container rupture.

Unusual Fire and Explosion Conditions: DANGER! Contents are under pressure and can explode when exposed to heat or flames. Dense smoke may be generated while burning.

Hazardous Combustion By-Products: Carbon monoxide, carbon dioxide, and other oxides may be generated as products of combustion.

Other: No information available

6. ACCIDENTAL RELEASE MEASURES

Personnel Safeguards: Remove all sources of ignition. Provide adequate ventilation to remove vapors and mists. Consult Health Effect Information in Section 3, Personal Protection Information in Section 8, Fire and Explosion Information in Section 5, and Stability and Reactivity Information in Section 10.

Regulatory Notifications: No notification required

Containment and Clean up: No special cleanup procedures are necessary.

Other: No information available

7. HANDLING AND STORAGE INFORMATION

Handling: All ignition sources in the area should be controlled. See NFPA 30B, Code for the Manufacture and Storage of Aerosol Products. Contents under pressure and can explode when exposed to heat or open flame. DANGER! Do not puncture or incinerate.

Storage: Do not store at temperatures greater than 120 F.

Empty Container Warnings
Drums: Not applicable
Plastic: Not applicable

Other: For products used under the automobile hood, KEEP AWAY FROM BATTERY TERMINALS.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION INFORMATION

Exposure Limits and Guidelines

Component	CAS No.	Exposure Limit
LIQUIFIED PETROLEUM GAS	68476-86-8	OSHA - PEL: TWA 1000 ppm ACGIH - TLV: TWA 1000 ppm
BUTYL CELLOSOLVE	111-76-2	OSHA - PEL: TWA 50 ppm ACGIH - TLV: TWA 25 ppm

Personal Protective Equipment

Eye/Face Protection: Eye protection is not required under conditions of normal use. If material is handled such that it could be sprayed into eyes, wear plastic face shield or splash-proof safety goggles.

Skin Protection: Skin protection is not required under conditions of normal use. For prolonged or repeated exposures, use impervious clothing (boots, gloves, aprons, etc.) over parts of the body subject to exposure. Launder soiled clothes.

Respiratory Protection: Respiratory protection is not required under conditions of normal use. If excessive levels of mists or vapors are generated while using this product, use an organic vapor respirator. See Section 3, Health Effect Information, Inhalation.

Personal Hygiene: Consumption of food and beverage should be avoided in work areas where this product is present. Always wash hands and face with soap and water before eating, drinking, or smoking.

Engineering Controls / Work Practices

Ventilation: Adequate ventilation in accordance with good engineering practice must be provided to maintain concentrations below the specified exposure or flammable limits. Providing adequate ventilation to keep exposure levels below the permissible exposure limits or flammability limits will prevent any physiological effects.

If possible, use product outdoors, preferably upwind, to prevent eye and/or respiratory tract irritation.

Other: No information available

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Amber	
Odor: Aromatic	**Vapor Pressure:** No data available
Physical state: Aerosol	**Vapor Density (air=1):** > 1
pH: No data available	**Percent Volatile by Volume:** No data available
Boiling Point: No data available	**Volatile Organic Content:** 25
Melting Point: No data available	**Molecular Weight:** No data available
Specific Gravity: 0.82 - 0.85	**Average Carbon Number:** No data available
Pour Point: No data available	**Viscosity @ 100 F:** No data available
	Viscosity @ 40 C: No data available
Solubility in Water: Negligible in water	
Octanol / Water Coefficient: Log K_{ow} = No data available	

10. STABILITY AND REACTIVITY INFORMATION

Chemical Stability: Stable

Conditions to Avoid: Keep away from heat, sparks, open flames and other ignition sources.

Incompatible Materials to Avoid: May react with strong oxidizing agents.

Other: No information available

11. TOXICOLOGICAL INFORMATION

Primary Eye Irritation: No information available

Primary Skin Irritation: No information available

Acute Dermal Toxicity: No information available

Subacute Dermal Toxicity: No information available

Dermal Sensitization: No information available

Inhalation Toxicity: No information available

Inhalation Sensitization: No information available

Oral Toxicity: No information available

Mutagenicity: No information available

Carcinogenicity: No information available

Reproductive and Developmental Toxicity: No information available

Teratogenicity: No information available

Immunotoxicity: No information available

Neurotoxicity: No information available

Other: No information available

12. ECOLOGICAL INFORMATION

Aquatic Toxicity: No information available

Terrestrial Toxicity: No information available

Chemical Fate and Transport: No information available

Other: No information available

13. DISPOSAL INFORMATION

Regulatory Information: Dispose of residual products and empty containers responsibly.

Waste Disposal Methods: Waste material may be landfilled or incinerated at an approved facility.

Other: No information available

14. TRANSPORTATION INFORMATION

U.S. Department of Transportation (DOT)
Highway / Rail (Bulk): Not Applicable.
Highway / Rail (Non-Bulk): Consumer Commodity, ORM-D

For US shipments, US DOT law requires the shipper to determine the proper shipping description of the material that is being shipped. The shipping information and description contained in this section may not be suitable for all shipments of this material, but may help the shipper determine the proper shipping description for a particular shipment.

International Information

Vessel: IMDG Regulated: X **IMDG Not Regulated:** --
Air: ICAO Regulated: X **ICAO Not Regulated:** --

Other: No information available

15. Regulatory Information

Regulatory Lists Searched: The components listed in Section 2 of this MSDS were compared to substances that appear on the following regulatory lists. Each list is numerically identified. See Regulatory Search Results below.

Health & Safety: 10 - IARC carcinogen, 11 - NTP carcinogen, 12 - OSHA carcinogen, 15 - ACGIH TLV, 16 - OSHA PEL, 17 - NIOSH exposure limit, 20 - US DOT Appendix A, Hazardous substances, 22 - FDA 21 CFR Total food additives, 23 - NFPA 49 or 325

Environmental: 30 - CAA 1990 Hazardous air pollutants, 31 - CAA Ozone depletors, 33 - CAA HON rule, 34 - CAA Toxic substance for accidental release prevention, 35 - CAA Volatile organic compounds (VOC's) in SOCMI, 41 - CERCLA / SARA Section 302 extremely hazardous substances, 42 - CERCLA / SARA Section 313 emissions reporting, 43 - CWA Hazardous substances, 44 - CWA Priority pollutants, 45 - CWA Toxic pollutants, 46 - EPA Proposed test rule for hazardous air pollutants, 47 - RCRA Basis for listing - Appendix VII, 48 - RCRA waste, 49 - SDWA - (S)MCLs

International: 50 - Canada - WHMIS Classification of substance, 54 - Mexico - Drinking water - ecological criteria, 55 - Mexico - Wastewater discharges, 56 - US -TSCA Section (12)(b) - export notification

State Lists: 60 - CA - Proposition 65, 61 - FL - Substances, 62 - MI - Critical materials, 63 - MA - RTK, 64 - MA - Extraordinarily hazardous substances, 65 - MN - Hazardous substances, 66 - PA - RTK, 67 - NJ - RTK, 68 - NJ - Environmental hazardous substances, 69 - NJ - Special hazardous substances

Inventories: 80 - Canada - Domestic substances , 81 - European - EINECS, 82 - Japan - ENCS, 83 - Korea - Existing and evaluated chemical substances, 84 - US - TSCA , 85 - China Inventory

Regulatory Search Results:
BUTYL CELLOSOLVE: 15, 16, 17, 22, 23, 33, 35, 50, 61, 63, 65, 66, 67, 69, 80, 81, 82, 83, 84, 85
LIQUIFIED PETROLEUM GAS: 80, 81, 83, 84, 85

U.S. TSCA Inventory: All components of this material are on the US TSCA Inventory.

SARA Section 313: Consumer products are not regulated under SARA, Title III, Section 313.

IARC: No information available

SARA 311 / 312 Categories
Acute: X **Chronic:** X **Fire:** X **Pressure:** X **Reactive:** --
Not Regulated: --

Canadian WHMIS Classification
Class B - Flammable and Combustible Material, Division 5, Flammable Aerosols
Class D - Poisonous and infectious material, Division 2B, Toxic Material

European Union Classification
Hazard Symbols:
No information available

Risk Phrases:
No information available
Safety Phrases:
No information available

Other: No information available

16. OTHER INFORMATION

Health and Environmental Label Language

Front Label:
DANGER: FLAMMABLE (OR EXTREMELY FLAMMABLE). HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. CONTENTS UNDER PRESSURE.
Read carefully other cautions on back.

Back Label:
DANGER: Contains hydrocarbon solvents. Inhaling or ingesting can cause headache and nausea. Prolonged and repeated skin contact may cause drying of skin.
PRECAUTIONARY MEASURES: Do not puncture or incinerate container. Do not expose to heat or store at temperatures above 120 F. Keep away from heat, sparks, flames and other ignition sources. Exposure to heat may cause can to burst. Avoid breathing of mists and vapors. Use only in well ventilated areas. Avoid skin and eye contact. Wash thoroughly after handling.
FIRST AID: If swallowed, do not induce vomiting. Call physician immediately. For eye contact, wash thoroughly with water. If inhaled, breathe fresh air. If not breathing, give artificial respiration. Call physician immediately.

Use only as directed. Intentional misuse by deliberately concentrating and/or inhaling can be harmful or fatal.

KEEP OUT OF REACH OF CHILDREN.

Note: For automotive products used near engine, add on top of back panel: Keep away from battery terminals.

MSDS Revisions
Previous Version Date: Not applicable, this MSDS is the first version.

Previous Version Information
No information available

Other
No information available

Prepared By:
Pennzoil-Quaker State Company
Environmental, Safety, Health, & DOT Compliance
P.O. Box 2967
Houston, TX 77252-2967 USA

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Oxid L.P.
101 Concrete Street, Houston, Texas 77012
(Phone) 713-924-6400 (Fax) 713-923-7922

MATERIAL SAFETY DATA SHEET

TEROL®

1. PRODUCT IDENTIFICATION

Chemical Name:	Polyester Polyol
Chemical Family:	Phthalic Acid Ester
Trade Name:	Terol® 198, 250
Revision Date:	November 01, 2004
EMERGENCY CONTACT:	713-924-6408 (Oxid 24-hr number) CHEMTREC 1-800-424-9300

2. HAZARDOUS COMPONENTS

CAS No.	Material or Component	Percentage
107-21-1	Ethylene Glycol	<1.0
123-91-1	1,4 – Dioxane	<0.1

3. HAZARDS IDENTIFICATION

Ingestion: Harmful if swallowed.

Skin: Substance may be mildly irritating to the skin.

Inhalation: At elevated temperatures vapor may cause irritation to the respiratory tract.

Eyes: Mildly irritating.

Special Medical Conditions By Exposure: None known

Exposure Limits: ACGIH Threshold Limit Value (TLV) – Polyester Polyol Not listed
Ethylene Glycol 50 ppm Ceiling
1,4-Dioxane 25 ppm (Skin)

OSHA Permissible Exposure Limit (PEL) – Polyester Polyol Not listed
Ethylene Glycol 50 ppm Ceiling
1,4-Dioxane 100 ppm (Skin)

Carcinogens: 1,4 Dioxane is carcinogenic to animals orally but not by inhalation. There is inadequate evidence of carcinogenicity of 1,4-Dioxane to humans.

For disclaimer of liability, see statement on Page 4

EPAPA005001681

4. FIRST AID MEASURES

Ingestion:	Get medical attention immediately. Never give water to an unconscious person.
Skin:	Remove soiled clothing and wash with soap and water. If irritation persists, seek medical attention.
Inhalation:	If symptomatic remove to fresh air. If symptoms persist seek medical attention.
Eyes:	Rinse immediately with water for 15 minutes. If irritation persists, seek medical attention.

5. FIRE FIGHTING MEASURES

Flash Point:	>200°F PMCC (93°C)
Flammable Limits in Air % by Volume:	N/A
Extinguishing Media:	Water, Foam, Carbon Dioxide or Dry Chemical
Unusual Fire and Explosion Hazard:	None Known

6. ACCIDENTAL RELEASE MEASURES

In Case of a Transportation Accident, Contact CHEMTREC at 1-800-424-9300.

In case of spills or release: Use appropriate personal protective equipment measures during clean-up. For small spills, use a solid absorbent and place in disposal container. For large spills, dike the area to facilitate salvage or disposal. Avoid run-off into storm sewers

7. HANDLING AND STORAGE

Storage and Handling: Product should be stored apart from oxidizing agents or other strong reactive materials.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Eye Protection:	Use safety glasses with side shields or chemical splash goggles
Hand Protection:	Wear rubber or neoprene gloves
Skin Protection:	Wear protective clothing
Respiratory Protection:	Have appropriate NIOSH-approved respirator available

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity:	1.20 @ 25°C (77°F)	Boiling Point:	>246°C (474.8°F)
Vapor Pressure (PSIA):	<0.1 @ 20°C (68°F)	pH:	5-7
Solubility In Water:	Miscible to 25%	Evaporation Rate (Butyl Acetate =1):	<1.0
Physical Description:	Dark Brown, viscous liquid, no odor		

For disclaimer of liability, see statement on Page 4

EPAPA005001682

10. STABILITY AND REACTIVITY

Conditions to Avoid: Heat sources, oxidizing agents

Hazardous Decomposition Products: On heating/burning releases carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

Polyester Polyol:	Not Determined		
Ethylene Glycol: (Acute)	LD50 oral rat	4700	mg/kg
	LD50 dermal rabbit	9530	mg/kg
1,4-Dioxane: (Acute)	LD50 oral rabbit	2000	mg/kg
	LD50 dermal rabbit	7600	mg/kg

12. ECOLOGICAL INFORMATION

There are no extensive ecological data available on the components of this product..

13. DISPOSAL CONSIDERATIONS

Incineration is the preferred method where permitted under appropriate federal, state, or local regulations. This product, when spilled or disposed of, is a non-hazardous solid waste as defined in Resource Conservation Recovery Act Regulations (40CFR261)..

14. TRANSPORT INFORMATION

The proper shipping name / hazard class may vary by packaging, properties, and mode of transportation.
Typical shipping names are:

ALL TRANSPORTATION MODES: This product is not regulated by the U. S. Department of transportation (DOT).

AIR TRANSPOIRATION:
(IATA / ICAO)

MARINE TRANSPORTATION:
(IMDG / IMO)

UN/ID NO.: Not applicable
HAZARD CLASS - PRIMARY: Not applicable
PACKING GROUP:
IATA PACKING INSTRUCTION:
IATA CARGO AIRCRAFT LIMIT:

FLASH POINT: >200°F PMCC

TECHNICAL NAME(s):
RQ LBS. (Per pkg.): Not Applicable
RQ COMPONENTS (s): Not Applicable
MARINE POLLUTANT (s): Not Applicable

For disclaimer of liability, see statement on Page 4

EPAPA005001683

15. REGULATORY INFORMATION

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CRF 472.

CAS No.	Material or Component	% by Weight
107-21-1	Ethylene Glycol	< 1.0
123-91-1	1,4-Dioxane	< 0.1

Toxic Substance Control Act: The components in this product are on the TSCA Inventory.

Canada's Domestic Substance List: For information concerning product status, please contact Oxid, L.P. Customer Service at 713/924-6401

16. OTHER INFORMATION

NFPA RATING: (NFPA 704 Rating: 0 - Insignificant 1 - Slight 2 - Moderate 3 - High 4 – Extreme)

Health: 1 Flammability: 1 Reactivity: 0

THIS INFORMATION MUST BE INCLUDED IN ALL MSDSs THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.

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The information provided herein is given in good faith, but no Warranty, express or implied, is made.

Rev 11/01/04

EPAPA005001684

Material Safety Data Sheet

Catalog Number: 195445
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 195445

Product name: POLYETHYLENE GLYCOL

Synonyms: Carbowax; PEG; Poly(Ethylene Oxide); Alkapol PEG-200
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
POLYETHYLENE GLYCOL	25322-68-3	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause irritation to the eyes, skin and respiratory system., Combustible material

Category of Danger:
Irritant

Principle routes of exposure: Skin
Inhalation: Irritating to respiratory system
Ingestion: Irritating to mouth, throat and stomach
Skin contact: Irritating to skin.
Eye contact: Contact with eyes may cause irritation

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard May Cause Eye, Skin and Respiratory Tract irritation.
COMBUSTIBLE MATERIAL AND VAPOR.
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Keep away from heat and flame. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid breathing vapors. Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure.

4. FIRST AID MEASURES

EPAPA005001685

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water for at least 15 minutes Call a physician immediately
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or `alcohol` foam.
Extinguishing media which must not be used for safety reasons:	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards:	combustible material
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	199 to 238 °C (open cup)
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment. Remove all sources of ignition.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place. Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing
Eye protection: Goggles

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Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Powder
Formula:	$(C_2H_4O)_x \cdot H_2O$
Molecular weight:	8000
Melting point/range:	No data available at this time.
Boiling point/range:	No Data available at this time.
Density:	1.1-1.2 g/ml
Vapor pressure:	<0.01 mmHg at 20 °C
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Soluble
Flash point:	199 to 238 °C (open cup)
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
POLYETHYLENE GLYCOL	TQ4027000	Oral LD50 Rat : 28 gm/kg Oral LD50 Mouse : 34 gm/kg Dermal LD50 Rabbit : >20 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	A primary irritant.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

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Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
POLYETHYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
POLYETHYLENE GLYCOL	1; Fussnote 11	Not Listed	LC50 (24 hr) goldfish:>5000 mg/L. (PEG 200, 400, 800).:

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
POLYETHYLENE GLYCOL	Not Listed	EC50 (15 min) Photobacterium phosphoreum:100,000 mg/L Microtox test (polymer unspecified).:	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
POLYETHYLENE GLYCOL	Not Listed	indicator 3; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
POLYETHYLENE GLYCOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
POLYETHYLENE GLYCOL	Not Listed

TDG (Canada):

WHMIS hazard class: D2b toxic materials

:

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IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
POLYETHYLENE GLYCOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
POLYETHYLENE GLYCOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
Inventory - Japan:	2-441; 7-129; 8-429
Korean KECL:	KE-20228
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
POLYETHYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
POLYETHYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
POLYETHYLENE GLYCOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

EPAPA005001689

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001690

MATERIAL SAFETY DATA SHEET

EVAL COMPANY OF AMERICA
2625 BAY AREA BOULEVARD (SUITE 300)
HOUSTON, TX 77058-1551
281-204-4610 (9am – 5pm CST)
281-474-1524 (After 5pm)

EMERGENCY TELEPHONE
800-424-9300 (Chemtrec)

NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)

[redacted]

MATERIAL SAFETY DATA SHEET

EVAL COMPANY OF AMERICA
2625 BAY AREA BOULEVARD (SUITE 300)
HOUSTON, TX 77058-1551
281-204-4610 (9am – 5pm CST)
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EMERGENCY TELEPHONE
800-424-9300 (Chemtrec)

NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)

[redacted]

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NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)

[redacted]

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NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)

[redacted]

MATERIAL SAFETY DATA SHEET

EVAL COMPANY OF AMERICA
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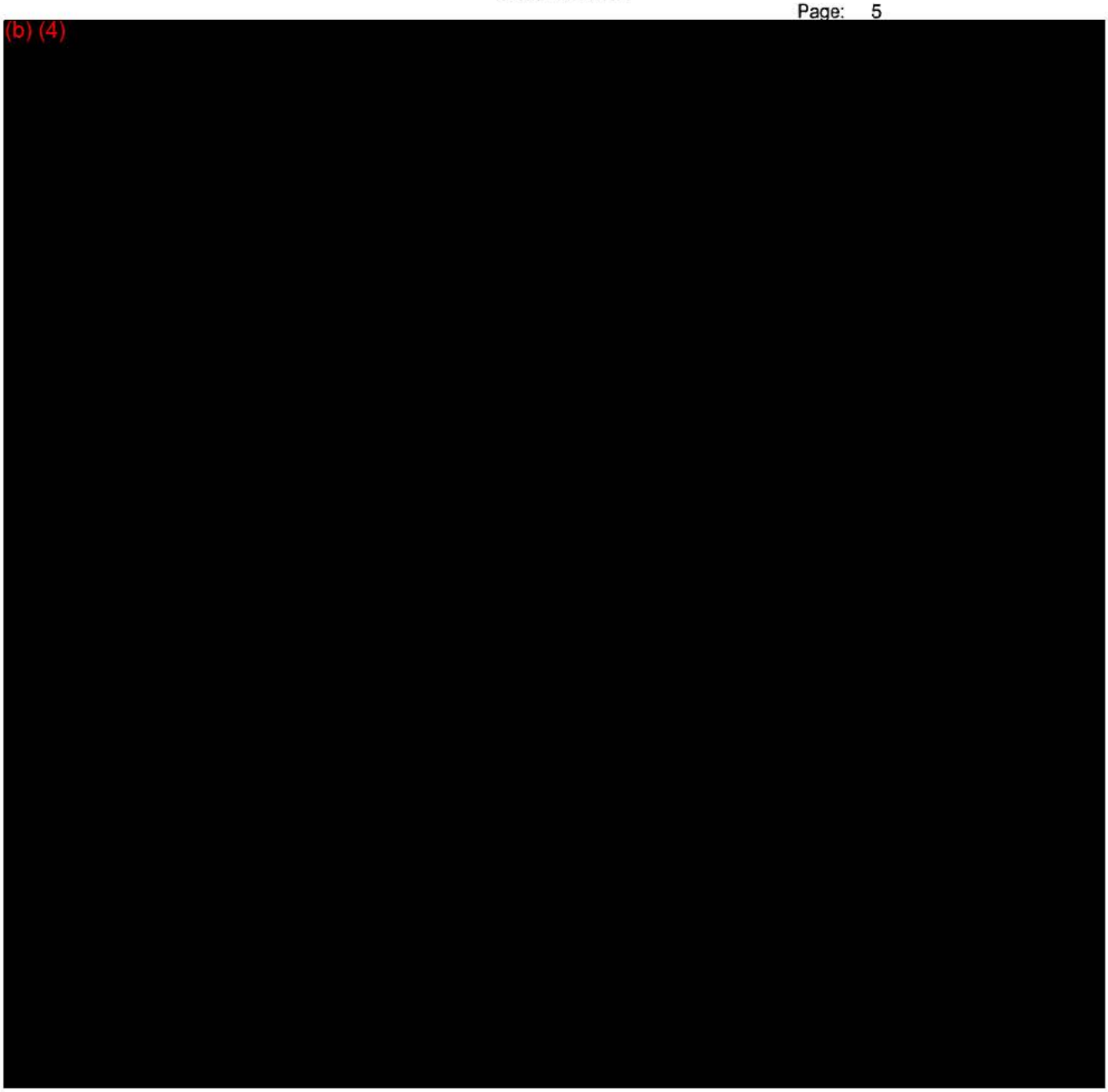
EMERGENCY TELEPHONE
800-424-9300 (Chemtrec)

NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)



MATERIAL SAFETY DATA SHEET

EVAL COMPANY OF AMERICA
2625 BAY AREA BOULEVARD (SUITE 300)
HOUSTON, TX 77058-1551
281-204-4610 (9am – 5pm CST)
281-474-1524 (After 5pm)

EMERGENCY TELEPHONE
800-424-9300 (Chemtrec)

NUMBER: SP292B
ISSUE DATE: December 13, 2004
SUPERSEDES:

(b) (4)

[redacted]

Material Safety Data Sheet

Catalog Number: 218150
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 218150

Product name: POLYPROPYLENE GLYCOL

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
POLYPROPYLENE GLYCOL	25322-69-4	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Harmful by inhalation, in contact with skin and if swallowed., Combustible material

Category of Danger:
Harmful

Principle routes of exposure: Skin
Inhalation: Harmful by inhalation.
Ingestion: Harmful if swallowed.
Skin contact: Harmful in contact with skin.
Eye contact: Risk of serious damage to eyes

Statements of hazard HARMFUL IF SWALLOWED. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR INHALED.
COMBUSTIBLE MATERIAL AND VAPOR.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Statement of First Aid If swallowed, do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.
Precautions - ANSI Label Do not taste or swallow. Wash thoroughly after handling. Keep away from heat and flame.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.

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Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards:	combustible material
Unusual hazards:	None known
Special protective equipment for firefighters:	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	199 to 227 °C (open cup)
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment. Remove all sources of ignition.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment.
Technical measures/storage conditions:	Keep containers tightly closed in a cool, well-ventilated place. Keep away from heat and sources of ignition
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless
Physical state:	Liquid
Formula:	(C3H6O)x•H2O
Melting point/range:	No data available at this time.
Boiling point/range:	No Data available at this time.
Density:	1.004 g/ml
Vapor pressure:	<0.01 mm Hg (20°C)
Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	No data available
Flash point:	199 to 227 °C (open cup)
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Incompatible with sulfuric acid, isocyanates, perchloric acid, oxidizers.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
POLYPROPYLENE GLYCOL	TR5600000	TR5250000:Polypropylene glycol (12/1/97) Oral LD50 Rat : >2 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

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Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
POLYPROPYLENE GLYCOL	Not Listed	indicator 3; Fully sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
POLYPROPYLENE GLYCOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
POLYPROPYLENE GLYCOL	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
POLYPROPYLENE GLYCOL	Not Listed	Not Listed

IMO-labels:

EPAPA005001700

15. REGULATORY INFORMATION

International Inventories

Components	
POLYPROPYLENE GLYCOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
Inventory - Japan:	7-129
Korean KECL:	KE-20270
Philippines PICCS:	Present

U.S. regulations:

Components	**California Proposition 65 -**	**Massachusetts Right to Know List:**	**New Jersey Right to Know List:**	**Pennsylvania Right to Know List:**
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	**Florida substance List:**	**Rhode Island Right to Know List:**	**Illinois - Toxic Air Contaminants**	**Connecticut - Hazardous Air Pollutants**
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	**SARA 313 Emission reporting/Toxic Release of Chemicals**	**CERCLA/SARA - Section 302 Extremely Haz**	**NTP:**	**IARC:**
POLYPROPYLENE GLYCOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001701

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 11/17/2006
Date Updated: 02/04/2006
Version 1.1

Section 1 - Product and Company Information

Product Name	POTASSIUM THIOSULFATE HYDRATE
Product Number	416983
Brand	ALDRICH
Company	Sigma-Aldrich Canada, Ltd
Address	2149 Winston Park Drive Oakville ON L6H 6J8 CA
Technical Phone:	9058299500
Fax:	9058299292
Emergency Phone:	800-424-9300

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
POTASSIUM THIOSULFATE HYDRATE	None	No

Formula $K_2S_2O_3 \cdot xH_2O$

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

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

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
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

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 dust mask type N95 (US) or type P1 (EN 143) respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid Color: White Form: Fine crystals

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Property	Value	At Temperature or Pressure
Molecular Weight	190.33 AMU	
pH	9.0 - 10.5	
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	1.507 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	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:1 M in H2O, 20°C complete, colorless	

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong acids, Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Sulfur oxides, Potassium oxides.

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.

Section 12 - Ecological Information

EPAPA005001704

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. Dissolve 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 environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

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
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

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.

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: Yes
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

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from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.
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HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **POTASSIUM CHLORIDE**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: POTASSIUM CHLORIDE
Synonyms: None
Chemical Family: Inorganic Salt
Application: Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Potassium chloride	7447-40-7	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store in a cool, dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	White to gray
Odor:	Odorless
pH:	9.2
Specific Gravity @ 20 C (Water=1):	1.99
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	72.8
Boiling Point/Range (F):	Not Determined

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	25.5
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	74.5

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 2430 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

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Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001711

FLINT HILLS RESOURCES*

UNCONTROLLED COPY

MATERIAL SAFETY DATA SHEET

1 CHEMICAL PRODUCT & COMPANY IDENTIFICATION

TRADE NAME(S)	**POTASSIUM FLUORIDE SOLUTION**
CAS NUMBER	Mixture
MSDS NUMBER	8061
PRODUCT CODE	ND
MANUFACTURER / SUPPLIER	Flint Hills Resources, LP 2825 Suntide Road (78409) P. O. Box 2608 Corpus Christi, TX 78403

TELEPHONE NUMBERS - 24 HOUR EMERGENCY ASSISTANCE

Chemtrec	800-424-9300
Flint Hills Resources, LP	361-241-4811

TELEPHONE NUMBERS - GENERAL ASSISTANCE

8-5 (M-F, CST)	361-241-4811
8-5 (M-F, CST) MSDS Assistance	316-828-7988

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Fax # | Fax #

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS Number	Concentration*	Exposure Limits / Health Hazards
POTASSIUM FLUORIDE	Mixture	15 - 25 %	as F 2.5 mg/m3 8-Hour TWA (OSHA) 2.5 mg/m3 8-Hour TWA (ACGIH)
WATER	7732-18-5	75 - 85 %	ND
POTASSIUM HYDROXIDE	1310-58-3	0 - 8 %	2 mg/m3 CEILING (ACGIH) 2 mg/m3 CEILING (OSHA)

*Values do not reflect absolute minimums and maximums; these values are typical which may vary from time to time.

COMPOSITION COMMENTS

This Material Safety Data Sheet is intended to communicate potential health hazards and potential physical hazards associated with the product(s) covered by this sheet, and is not intended to communicate product specification information. For product specification information, contact your Flint Hills Resources, LP representative.

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3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING!

HEALTH HAZARDS
MAY BE SEVERELY IRRITATING TO THE SKIN AND EYES
MAY BE IRRITATING TO THE RESPIRATORY TRACT
MAY CAUSE ALLERGIC SKIN OR RESPIRATORY TRACT REACTION
SEE "TOXICOLOGICAL INFORMATION" (SECTION 11) FOR MORE INFORMATION

FLAMMABILITY HAZARDS
NON-COMBUSTIBLE

REACTIVITY HAZARDS
STABLE

POTENTIAL HEALTH EFFECTS, SKIN

SEVERELY IRRITATING. Repeated or prolonged contact may result in drying, reddening, itching, pain, inflammation, cracking and possible secondary infection with tissue damage. May cause an allergic reaction in some individuals.

Skin contact may cause harmful effects in other parts of the body.

POTENTIAL HEALTH EFFECTS, EYE

SEVERELY IRRITATING. Direct contact may cause pain, tears, burns, sensitivity to light, swelling and possible corneal damage.

Can injure eye tissue. Effects may become more serious with repeated or prolonged contact.

POTENTIAL HEALTH EFFECTS, INHALATION

SEVERELY IRRITATING. Under normal conditions, inhalation is not expected to be a problem. However, respiratory tract irritation may occur if exposed to fumes or mists.

Overexposure to this material may cause systemic damage including target organ effects listed under "Toxicological Information" (Section 11).

POTENTIAL HEALTH EFFECTS, INGESTION

Swallowing this material may be harmful. Swallowing large amounts may cause death.

May cause severe irritation with intense burning of the mouth and throat followed by abdominal pain and distress, nausea, vomiting, and diarrhea.

Overexposure to this material may cause systemic damage including target organ effects listed under "Toxicological Information" (Section 11).

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4 FIRST AID MEASURES

SKIN

Immediately flush skin with plenty of water, for at least 15 minutes, while removing contaminated clothing and shoes. Get medical attention if irritation develops or persists.

Place contaminated clothing in closed container for storage until laundered or discarded. If clothing is to be laundered, inform person performing operation of contaminant's hazardous properties. Discard contaminated leather goods.

EYE

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. GET IMMEDIATE MEDICAL ATTENTION.

INHALATION

Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen.

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION

INGESTION

Do not induce vomiting. Rinse mouth out with water.

If victim is conscious and alert, give 1-3 glasses of water or milk to dilute stomach contents.

Never give anything by mouth to an unconscious person. GET IMMEDIATE MEDICAL ATTENTION.

NOTES TO PHYSICIAN

General supportive therapy in the event of life-threatening complications may be more important than specific antidotes.

5 FIRE FIGHTING MEASURES

HAZARDOUS COMBUSTION PRODUCTS

Combustion may produce hazardous combustion products such as toxic gas.

EXTINGUISHING MEDIA

Material itself will not burn.

BASIC FIRE FIGHTING PROCEDURES

Use extinguishing agent suitable for type of surrounding fire.

Use water spray to cool adjacent structures and to protect personnel.

Firefighters must wear NIOSH approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

UNUSUAL FIRE & EXPLOSION HAZARDS

Material will not burn.

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Flash Point:	ND
Autoignition Temperature	ND
Flammability Limits in Air, Lower, % by Volume	ND
Flammability Limits in Air, Upper, % by Volume	ND

6 ACCIDENTAL RELEASE MEASURES

EMERGENCY ACTION

Eliminate and/or shut off ignition sources and keep ignition sources out of the area. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind. Isolate for 800 meters (1/2 mile) in all directions if tank, rail car or tank truck is involved in fire. Evacuate area endangered by release as required. (See Exposure Controls/Personal Protection, Section 8.)

ENVIRONMENTAL PRECAUTIONS

If material is released to the environment, take immediate steps to stop and contain release. Caution should be exercised regarding personnel safety and exposure to the released material. Notify local authorities and the National Response Center, if required.

SPILL OR LEAK PROCEDURE

Keep unnecessary people away. Isolate area for at least 50 meters (164 feet) to preserve public safety. For large spills, consider initial evacuation for at least 300 meters (1000 feet).

Keep ignition sources out of area and shut off all ignition sources. Absorb spill with inert material (e. g. dry sand or earth) then place in a chemical waste container. Large Spills: Dike far ahead of liquid spill for later disposal. Stop leak when safe to do so.

See Exposure Controls/Personal Protection (Section 8).

7 HANDLING & STORAGE

HANDLING

Ground lines and equipment used during transfer to reduce the possibility of static spark-initiated fire or explosion. Use non-sparking tools. Do not cut, grind, drill, weld or reuse containers unless adequate precautions are taken against these hazards.

Do not eat, drink or smoke in areas of use or storage.

STORAGE

Store in tightly closed containers in a cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles. Avoid contact with strong oxidizers.

Empty containers may contain material residue. Do not reuse without adequate precautions.

Do not eat, drink or smoke in areas of use or storage.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS

Ventilation and other forms of engineering controls are the preferred means for controlling exposures.

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EYE PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

Keep away from eyes. Eye contact can be avoided by using chemical safety glasses, goggles, and/or face shield. Have eye washing facilities readily available where eye contact can occur.

SKIN PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

Prevent any skin contact with this material. Use appropriate chemical resistant gloves, clothing and eye/face protection.

Good personal hygiene practices such as properly handling contaminated clothing, using wash facilities before entering public areas and restricting eating, drinking and smoking to designated areas are essential for preventing personal chemical contamination.

RESPIRATORY PROTECTION: PERSONAL PROTECTION EQUIPMENT (PPE)

A NIOSH approved air purifying respirator with an appropriate cartridge or canister, such as an organic vapor cartridge, may be used in circumstances where airborne concentrations may exceed exposure limits. Protection provided by air purifying respirators is limited. 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.

9 PHYSICAL & CHEMICAL PROPERTIES

ODOR AND APPEARANCE

ODORLESS, CLEAR LIQUID

Boiling Point	> 212 °F (100 °C)
Specific Gravity	1.15 - 1.25 at 60/60 °F (15.6/15.16 °C)
Melting Point	ND
Percent Volatile	ND
Vapor Pressure	NA
Vapor Density	ND
Bulk Density	ND
Solubility in Water	COMPLETE
Octanol/Water Partn	ND
Volatile Organic	ND
Pour Point	ND
pH Value	11 (TYPICAL)
Freezing Point	ND
Viscosity	ND
Evaporation Rate	ND
Molecular Formula	KF+H2O+KOH
Molecular Weight	58.10 as KF
Chemical Family	INORGANIC FLUORIDE
Odor Threshold	ND

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10 STABILITY & REACTIVITY

STABILITY/INCOMPATIBILITY

Incompatible with strong acids.

See precautions under Handling & Storage (Section 7).

HAZARDOUS REACTIONS/DECOMPOSITION PRODUCTS

Combustion may produce toxic gas.

11 TOXICOLOGICAL INFORMATION

ROUTES OF EXPOSURE

Inhalation, ingestion, skin and eye contact.

LD50

LD50: Potassium Fluoride, Oral, Rat, 245 mg/kg.

TOXICOLOGICAL DATA

INORGANIC FLUORIDE: Acute overexposure may result in metabolic acidosis, hypotension, tachycardia, hypocalcemia, hyperkalemia, and hypomagnesemia. Prolonged and repeated over-exposure may result in dental fluorosis (discoloration and mottling of the tooth enamel) and a serious systemic effects known as osteosclerosis, which involves calcification of the bones and ligaments resulting in stiffness and limitation of motion. Allergic dermatitis and asthma have also been reported. Studies in laboratory animals indicate that overexposure to inorganic fluoride may result in adverse renal, gastrointestinal, neuromuscular, cardiovascular and respiratory effects, depending upon the duration and concentration of exposure. Results of genotoxicity tests have been largely negative. Reproduction studies in rodents have demonstrated evidence of increased fetal resorption at high levels of exposure. Developmental studies in rodents have been largely negative. Significant adverse skeletal abnormalities were observed in chick embryos exposed to high levels of sodium fluoride. Fluoride salts may be absorbed through the placenta.

Exposure to this material may cause adverse effects or damage to the following organs or organ systems: bones, teeth, gastrointestinal tract, and cardiovascular system.

PRE-EXISTING CONDITIONS AGGRAVATED BY EXPOSURE

Pre-existing medical conditions which may be aggravated by exposure include disorders of the bones, teeth, gastrointestinal tract, and cardiovascular system.

12 ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

ND

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13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

This material, as supplied, when discarded or disposed of, is not a hazardous waste according to Federal Regulations (40 CFR 261) Under the Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user of the material to characterize and determine, at the time of disposal, whether the material is a hazardous waste subject to RCRA.

The transportation, storage, treatment and disposal of RCRA waste material must be conducted in compliance with 40 CFR 262, 263, 264, 268 and 270 Disposal can occur only in properly permitted facilities. Check state and local regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Disposal of this material must be conducted in compliance with all federal, state and local regulations.

14 TRANSPORT INFORMATION

BILL OF LADING - BULK (U. S. DOT)

Potassium Fluoride Solution, 6.1, UN1812, PG III, RQ (Potassium Hydroxide)

BILL OF LADING - NON-BULK (U. S. DOT)

Potassium Fluoride Solution, 6.1, UN1812, PG III

U. S. Department of Transportation (DOT) Requirements

General Transportation Information for Bulk Shipments

Proper Shipping Name	Potassium Fluoride Solution		
Hazard Class	6.1	UN/NA Code	UN1812
Packaging Group	III		
Labels Required	Poison		
Placards Required	UN1812, Poison		
Reportable Quantity	See Regulatory Information (Section 15)		

General Transportation Information for Non-Bulk Shipments

Proper Shipping Name	Potassium Fluoride Solution		
Hazard Class	6.1	UN/NA Code	UN1812
Packaging Group	III		
Labels Required	Poison		
Placards Required	UN1812, Poison		
Reportable Quantity	See Regulatory Information (Section 15)		

COMMENTS

The above description may not cover shipping in all cases, please consult 49 CFR 100-185 for specific shipping information.

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15 REGULATORY INFORMATION

FEDERAL REGULATIONS

All ingredients are on the TSCA inventory, or are not required to be listed on the TSCA inventory.

This material, as supplied, contains potassium hydroxide a CERCLA Hazardous Substance as per 40 CFR Part 302.4. The reportable quantity for potassium hydroxide is 1000 pound(s), and is therefore subject to the release reporting requirements of CERCLA.

This material does not contain toxic chemicals (in excess of the applicable de minimis concentration) that are subject to the annual toxic chemical release reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313 (40 CFR 372).

Check local, regional or state/provincial regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Failure to report may result in substantial civil and criminal penalties.

STATE REGULATIONS

Based on available information this product does not contain any components or chemicals currently known to the State of California to cause cancer, birth defects or reproductive harm at levels which would be subject to Proposition 65. Reformulation, use or processing of this material may affect its composition and require re-evaluation.

SARA 311/312 HAZARD CATEGORIES

Immediate Hazard:	X	Delayed Hazard:	X	Fire Hazard:	-	Pressure Hazard:	-
Reactivity Hazard:							

NFPA RATINGS

Health	2	Flammability	0	Reactivity	0	Special Hazards	-

HMIS RATINGS

Health	2*	Flammability	0	Reactivity	0

16 OTHER INFORMATION

DISCLAIMER

NOTICE: The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. However, an MSDS may not be used as a commercial specification sheet of manufacturer or seller, and no warranty or representation, expressed or implied, is made as to the accuracy or comprehensiveness of the foregoing data and safety information, nor is any authorization given or implied to practice any patented invention without a license. In addition, no responsibility can be assumed by vendor for any damage or injury resulting from abnormal use, from any failure to adhere to recommended practices, or from any hazards inherent in the nature of the material.

Current Revision Date 22-Apr-2005 Replaces Sheet Dated 05-Feb-2002

Completed By Flint Hills Resources Operations EH&S

EPAPA005001719

D

MADISON CHEMICAL CO., INC.
3141 Clifty Drive • Madison, IN 47250

MATERIAL SAFETY DATA SHEET

HMIS: 2 / 2 / 0

NAME: **RESIN STRIP** **PRODUCT #** 804381

1. PRODUCT AND COMPANY IDENTIFICATION

EMERGENCY RESPONSE INFORMATION:

Company Offices:	812-273-6000	Weekdays
CHEMTREC:	800-424-9300	24-Hour Service
Steven T. Hale:	812-265-2703	Evenings and Weekends
David R. Goodman, Jr.:	812-273-6213	Evenings and Weekends

PREPARED DATE: 05/16/06 **PREPARED BY:** David M. Craft

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Gold colored liquid with a strong solvent odor. Vapor harmful! Avoid prolonged breathing of vapors. Avoid prolonged or repeated contact with skin. Harmful or fatal if swallowed.

POTENTIAL HEALTH EFFECTS:

EYES: Contacted areas may exhibit irritation.

SKIN: Contacted areas may exhibit irritation.

INGESTION: Harmful or fatal if swallowed.

INHALATION: May cause nasal and respiratory irritation, dizziness, drowsiness, headache and nausea.

CHRONIC EFFECTS / CARCINOGENICITY: This material contains no ingredient above de minimus concentrations known or suspected to cause cancer. Chronic overexposure to 2-butoxyethanol has apparently been found to cause liver and kidney injury, blood abnormalities, and gastrointestinal effects in laboratory animals.

POTENTIAL ENVIRONMENTAL EFFECTS: This material contains a toxic chemical listed under SARA Section 313. See Section 15.

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	SYNONYM	CAS NO.	% BY WEIGHT
Ethylene glycol phenyl ether	None	122-99-6	35
2-butoxyethanol	EGBE Ethylene glycol butyl ether	111-76-2	40
N-methyl-2-pyrrolidone	None	872-50-4	20

4. FIRST AID MEASURES

EYES: Immediately flush with large quantities of cool water continuously for at least 15 minutes. Call a physician.

SKIN: Immediately flush with large quantities of cool water continuously for at least 15 minutes. Call a physician. Remove contaminated clothing and shoes. Do not put contaminated clothing and shoes back on. Wash clothing and shoes thoroughly in soap and water; rinse repeatedly in clean water and dry before reuse.

INGESTION: Do not induce vomiting. Give water. Never give anything by mouth to an unconscious person. Call a physician.

INHALATION: Move subject to fresh air and get medical attention.

SIGNS AND SYMPTOMS OF EXPOSURE: Contacted areas may exhibit irritation. Overexposure to mists or vapors may cause dizziness, drowsiness, headache, or nausea.

PRIMARY ROUTE(S) OF ENTRY: Skin, eyes, inhalation.

N.A. = Not Available N.D. = Not Determined N.E. = None Established N.R. = Not Relevant

EPAPA005001721

NAME: **RESIN STRIP** **PRODUCT #** 804381

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:	**FLASH POINT (Method used):**	165°F (TOC, ASTM D 1310).
	FLAMMABLE LIMITS:	
	LEL:	N.D.
	UEL:	N.D.
EXTINGUISHING MEDIA:	Water fog, dry chemical, carbon dioxide, foam, and alcohol-resistant foam.	
FIRE FIGHTING INSTRUCTIONS:	Water spray should be used to cool fire exposed containers and/or to disperse unignited vapors. Use NIOSH/MSHA approved positive pressure self-contained breathing apparatus when any material is involved in a fire.	

6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	Contain liquid spills with sand and absorb on inert material. Avoid breathing vapors. Ventilate area. Eliminate all ignition sources. Dispose with solid waste. See Waste Disposal Method. Flush remainder to drain with water.

7. HANDLING AND STORAGE

PRECAUTIONS:	Store away from heat, sparks, flame and strong oxidizing agents. Keep containers closed when not in use.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:	As necessary to avoid inhalation and contact.
RESPIRATORY PROTECTION:	In absence of proper environmental control, use NIOSH / MSHA approved organic vapor respirator where airborne exposure is excessive.
SKIN PROTECTION:	Impermeable type gloves. Other equipment as required to avoid contact.
EYE PROTECTION:	Goggles and faceshield necessary.
GENERAL HYGIENE CONSIDERATIONS:	Eyewash facility and emergency shower should be in close proximity.

EXPOSURE GUIDELINES:

CHEMICAL IDENTITY	CAS NO.	OSHA PEL	ACGIH TLV
Ethylene glycol phenyl ether	122-99-6	N.E.*	N.E.*
2-butoxyethanol	111-76-2	25 ppm (skin)	20 ppm
N-methyl-2-pyrrolidone	872-50-4	N.E.**	N.E.**

*Manufacturer recommends an exposure limit of 25 ppm skin.
**Manufacturer recommends 100 ppm.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE & ODOR:	Gold colored liquid with a strong solvent odor.		
BOILING POINT (°F.):	N.D.	**SPECIFIC GRAVITY (WATER = 1):**	0.96
VAPOR PRESSURE (mm Hg):	N.D.	**PERCENT VOLATILE BY VOLUME (%):**	N.D.
VAPOR DENSITY (Air = 1):	N.D.	**EVAPORATION RATE (_____ = 1):**	N.D.
SOLUBILITY IN WATER:	Moderate	**pH (100%):**	N.R.
FLASH POINT (Method used):	165°F (TOC, ASTM D 1310)		
LEL:	N.D.		
UEL:	N.D.		

10. STABILITY AND REACTIVITY

STABILITY:	Material is stable.
INCOMPATIBILITY (Materials to Avoid):	Strong oxidizing agents.
CONDITIONS TO AVOID:	Heat, sparks and open flame.
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon dioxide, carbon monoxide, nitrogen oxides.
HAZARDOUS POLYMERIZATION:	Will not occur.

N.A. = Not Available N.D. = Not Determined N.E. = None Established N.R. = Not Relevant

EPAPA005001722

NAME: **RESIN STRIP** **PRODUCT #** 804381

11. TOXICOLOGICAL INFORMATION

This material, as a whole, has not been tested. This material contains no ingredient above de minimus concentrations known or suspected to cause cancer. Chronic overexposure to 2-butoxyethanol has apparently been found to cause liver and kidney injury, blood abnormalities and gastrointestinal effects in laboratory animals. The injury to the liver and kidneys is believed to be secondary to red blood cell hemolysis, a known effect of 2-butoxyethanol in rodents. Humans are resistant to the hemolytic effects of 2-butoxyethanol and therefore the kidney and liver injury noted in animal studies is not considered relevant to human health hazard evaluation.

12. ECOLOGICAL INFORMATION

This material contains a glycol ether listed as a hazardous air pollutant under the Clean Air Act. This material contains a toxic chemical listed under SARA Section 313. See Section 15.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Normal for biodegradable glycol ethers and cyclic amines. Dispose in accordance with local, state and federal regulations.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING DESCRIPTION: Compound, cleaning, NOI, liquid. (This material is not a hazardous material under regulations of the U S Department of Transportation.)

15. REGULATORY INFORMATION

TSCA STATUS: All ingredients are listed on the TSCA inventory.

CERCLA REPORTABLE QUANTITY: None established.

SARA 311 / 312 HAZARD CLASSES:

X	Acute Health	X	Chronic Health
	Fire		Reactive
	Sudden Release of Pressure		

SARA 312 INFORMATION: Storage of 10,000 pounds or more requires filing a Tier 2 form. This material in not an extremely hazardous substance (EHS). Threshold planning quantity is 10,000 pounds.

SARA 313 INFORMATION: This material contains the following substances subject to the reporting requirements of Section 313 of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CATEGORY CODE	CAS NO.	% BY WEIGHT
Ethylene glycol phenyl ether	N230	122-99-6	35
2-butoxyethanol	N230	111-76-2	40

STATE REGULATORY INFORMATION:

CALIFORNIA (PROPOSITION 65): This material contains n-methyl-2-pyrrolidone, which California identified to cause reproductive toxicity.

16. OTHER INFORMATION

MSDS STATUS: Revised Sections 1, 3, 5, 9 and 16 on 05-26-06.

PRECAUTIONARY LABELING:

DANGER!

Vapor Harmful! Avoid prolonged breathing of vapor.
Avoid prolonged or repeated contact with skin.
Harmful or fatal if swallowed.
Contains ethylene glycol phenyl ether, 2-butoxyethanol, and n-methyl-2-pyrrolidone.

FOR INDUSTRIAL USE ONLY – KEEP OUT OF THE REACH OF CHILDREN

N.A. = Not Available N.D. = Not Determined N.E. = None Established N.R. = Not Relevant

EPAPA005001723

MATERIAL SAFETY DATA SHEET

Thank you for your interest in, and use of, this product. This product and all others supplied by Madison Chemical Co., Inc. can be used safely with proper protective equipment and proper handling practices consistent with label instructions and the MSDS. Before using any of this product, be sure to read the complete label and the Material Safety Data Sheet.

TERMS AND ABBREVIATIONS
Listed by Section

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

HMIS: - Hazardous Materials Identification System codes are a system developed by the National Paint and Coatings Association for rating the hazard potential of a chemical under normal workplace conditions. These risk assessments are indicated by a numerical rating given in each of three (3) hazard areas (Health / Flammability / Physical Hazard) ranging from a low of zero to a high of 4.

SECTION 2 – HAZARDS IDENTIFICATION

Chronic Effects are adverse effects that are most likely to occur from repeated exposure over a long period of time. A Carcinogen is a chemical listed by the National Toxicology Program (**NTP**), the International Agency for Research on Cancer (**IARC**) or the Occupational Safety and Health Administration (**OSHA**) as a definite or possible human cancer causing agent.

Potential Environmental Effects: Chemicals listed in this section have a CERCLA RQ, are considered a toxic chemical listed under SARA Section 313, or have other known environmental hazards.

CERCLA – Comprehensive Environmental Response, Compensation and Liability Act of 1980. This Act designates a Reportable Quantity (**RQ**) for hazardous substances and provides the notification requirements for releases or spills.

SARA Section 313 – Superfund Amendments and Reauthorization Act aka Emergency Planning and Community Right to Know Act (**EPCRA**)

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Chemical substances are listed that are determined to be potential health or physical hazards based on the criteria established in the OSHA Hazard Communication Standard – 29 CFR 1910.1200.
Chemical Abstract Services (**CAS**) Number – A universally accepted numbering system for chemical substances.

SECTION 4 – FIRST AID MEASURES

These are considered **EMERGENCY** procedures only; the exposed person should be examined by a physician as soon as possible. The Signs and Symptoms of Exposure listed here are **ACUTE** effects of the product. An Acute Effect is an adverse effect on the human body from a single exposure with symptoms developing almost immediately after exposure or within a relatively short time.

SECTION 5 – FIRE FIGHTING MEASURES

Flash Point refers to the temperature at which a liquid will give off enough flammable vapors to form an ignitable mixture with air near the surface of the liquid or within the test vessel. Flammable Limits refer to the range of gas or vapor concentration (as % by volume in air) which will burn or explode if an ignition source is present. **LEL** – Lower Explosive Limit; **UEL** – Upper Explosive Limit

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

MSHA – Mine Safety and Health Administration. **NIOSH** – National Institute for Occupational Safety and Health

The Time Weighted Average (**TWA**) is the airborne concentration at which most workers can be exposed without any expected adverse effects.

ACGIH – American Conference of Governmental Industrial Hygienists
TLV – Threshold Limit Value - A set of time weighted average exposure limits, established by **ACGIH**, for a normal 8-hour day and a 40-hour work-week.
OSHA – Occupational Safety and Health Administration
PEL – Permissible Exposure Limit – A set of time weighted average exposure values, established by **OSHA**, for a normal 8-hour day and a 40-hour work-week.
CEILING LIMIT – The concentration that should not be exceeded in the workplace during any part of the working exposure.
SKIN – Skin contact with substance can contribute to overall exposure.
THORACIC FRACTION – Applicable for those materials that are hazardous when deposited anywhere within the lung airways and the gas-exchange region.
STEL – Short Term Exposure Limit – Maximum concentration for a continuous 15 minute exposure period.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES
All physical properties listed on MSDS are typical values not specifications!

BOILING POINT – The approximate boiling point of liquids.
VAPOR PRESSURE – This refers to the pressure (usually measured in millimeters of mercury) of a vapor in equilibrium with its liquid form.
VAPOR DENSITY – This refers to the relative weight of a vapor or gas compared with an equal volume of air. As compared with air which is set at 1, vapors with less density or weight will rise and those with greater density or weight will sink.
SOLUBILITY IN WATER – A description of the amount of the product capable of dissolving in water.
SPECIFIC GRAVITY – This refers to the ratio of the density of the material to the density of water where water = 1.
PERCENT VOLATILE BY VOLUME – The percent of a liquid that evaporates at 65°F. to 75°F.
EVAPORATION RATE – Refers to the rate of change from the liquid state to the vapor state at ambient temperature and pressure in comparison to a given substance (e.g. water).
pH – A value representing the acidity or alkalinity of an aqueous solution (Highly Acidic pH = 1; Neutral pH = 7; Highly Alkaline pH = 14).

SECTION 10 – STABILITY AND REACTIVITY

STABILITY – This is to indicate stability under reasonably foreseeable conditions of storage, use or misuse.
INCOMPATIBILITY – Keep product away from listed substances or conditions to prevent hazardous reactions.
CONDITIONS TO AVOID – List of conditions that should be avoided for reasons of safety and performance.
HAZARDOUS DECOMPOSITION PRODUCTS – Breakdown products expected to be produced upon product decomposition by extreme heat or fire.
HAZARDOUS POLYMERIZATION – This indicates the tendency of the product's molecules to combine with themselves in a chemical reaction releasing excess pressure and heat.

SECTION 11 – TOXICOLOGICAL INFORMATION

Listed are any known chronic or carcinogenic data on specific ingredients.

SECTION 12 – ECOLOGICAL INFORMATION

Listed are any ingredients that have a CERCLA RQ and any ingredients that are listed under the Clean Air Act Amendments of 1990. The Act required EPA to establish regulations setting emission standards for Hazardous Air Pollutants (**HAPS**). If the product contains an ingredient listed under SARA Section 313 that is also stated here.

SECTION 14 – TRANSPORTATION INFORMATION

DOT (Department of Transportation) shipping description for the product.

SECTION 15 – REGULATORY INFORMATION

TSCA Status – Toxic Substances Control Act – A federal law requiring all commercial chemical substances to appear on an inventory maintained by the EPA.
CERCLA Reportable Quantity – The amount of the specific ingredient that, when released into the environment must be reported to the National Response Center, and other regulatory agencies.

SARA 311 / 312 Hazard Classes – The appropriate characteristics have an X in front of all that apply.
SARA 312 INFORMATION – All storage of 10,000 pounds or greater of non-Extremely Hazardous Substances (**EHS**) requires filing a Tier 2 form. Substances which are designated in SARA Title III to be Extremely Hazardous Substances will have a much lower threshold planning quantity. These reports go to emergency planning agencies.
SARA 313 INFORMATION – An ingredient listed in this section is subject to the reporting requirements of Section 313 of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. (Code of Federal Regulations).

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S

Material Safety Data Sheet

Catalog Number: 300027
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 300027

Product name: SEC-BUTYL ALCOHOL, CERTIFIED GRADE

Synonyms: (+) -2- Butanol; sec- Butyl Alcohol; sec- Butanol
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
SEC-BUTYL ALCOHOL	78-92-2	90 - 100%	100 ppm TWA	150 ppm TWA; 450 mg/m³ TWA

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Flammable, May cause irritation to the eyes, skin and respiratory system.

Category of Danger:
Flammable , Irritant

Principle routes of exposure: Skin
Inhalation: Irritating to respiratory system
Ingestion: Irritating to mouth, throat and stomach
Skin contact: Irritating to skin.
Eye contact: Contact with eyes may cause irritation

ANSI Classification Irritant - eye, skin, respiratory
Statements of hazard May Cause Eye, Skin and Respiratory Tract irritation.
Flammable
Statement of Spill or Leak - ANSI Label Contain and/or absorb spill with inert material (e.g. sand, vermiculite), then place in suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment.
Statement of First Aid In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Precautions - ANSI Label Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Avoid prolonged or repeated contact with the skin, eyes or respiratory tract. Wash thoroughly after exposure. Keep away from heat, sparks and flame. Keep containers closed. Use only with adequate ventilation. Avoid breathing vapors.

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4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Call a physician immediately Rinse immediately with plenty of water for at least 15 minutes
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Call a physician immediately Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Use dry chemical, CO2, water spray or "alcohol" foam, Water may be ineffective., Use dry chemical, CO2, water spray or `alcohol` foam.
Extinguishing media which must not be used for safety reasons:	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards:	Flammable High flammability. Explosion limits: lower explosion limit 1.7% (% by volume); upper limit 9.8%
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	24 °C (closed cup and NFT 60103)
Autoignition temperature:	406 °C at 1013 hPa

NFPA rating:

NFPA Health:	1
NFPA Flammability:	2
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Remove all sources of ignition. Use personal protective equipment.
Environmental precautions:	Do not flush into surface water or sanitary sewer system.
Methods for cleaning up:	Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep away from heat and sources of ignition Keep container tightly closed in a dry and well-ventilated place. Keep containers tightly closed in a cool, well-ventilated place.
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing
Eye protection: Goggles
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless; sweet odor
Physical state:	Liquid
Formula:	C4H10O
Molecular weight:	74.12
Melting point/range:	ca. -89 - -108 °C
Boiling point/range:	ca. 99 - 102 °C at 1013 hPa
Density:	3.29 kg/m^3 at 20 °C
Vapor pressure:	ca. 15.96 hPa at 20 °C (calculated)
Evaporation rate:	1.3 (butyl acetate = 1)
Vapor density:	2.55 (air = 1)
Solubility (in water):	Soluble
Flash point:	24 °C (closed cup and NFT 60103)
Autoignition temperature:	406 °C at 1013 hPa

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
SEC-BUTYL ALCOHOL	EO1750000	Oral LD50 Rat : 6480 mg/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	A primary irritant.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

Components	NIOSH - Health Effects	NIOSH - Target Organs
SEC-BUTYL ALCOHOL	Eye and skin irritation; narcosis in animals	eyes, CNS, skin, respiratory system

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12. ECOLOGICAL INFORMATION

Mobility: No data available
Bioaccumulation: No data available
Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
SEC-BUTYL ALCOHOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
SEC-BUTYL ALCOHOL	1	Not Listed	LC50 (24 hr) goldfish: 4300 mg/L.

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
SEC-BUTYL ALCOHOL	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
SEC-BUTYL ALCOHOL	Not Listed	indicator 0; Fully sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
SEC-BUTYL ALCOHOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.
Contaminated packaging: Do not re-use empty containers
Methods for cleaning up: Soak up with inert absorbent material.

14. TRANSPORT INFORMATION

UN/Id No: 1120

DOT:

Proper shipping name: Butanols
IATA Hazard Label(s): Flammable Liquid
Hazard Class 3 - Flammable liquid
Packing group: III

Emergency Response Guide Number (ERG): 129

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Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
SEC-BUTYL ALCOHOL	Not Listed

TDG (Canada):

WHMIS hazard class: B2 flammable liquids
D2a very toxic materials

IMDG/IMO

Proper shipping name: Butanols

IMDG - Hazard Classifications IMDG class or division = 3, 6.1, + (UN1986); 3, + (UN1987); 3 (UN3065)

IMDG - Potential Marine Pollutants UN1986 (flammable, toxic); UN1987

IMDG - Regulated Substances UN1987; UN1986 (flammable, toxic); UN3065 (alcoholic beverages)

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
SEC-BUTYL ALCOHOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
SEC-BUTYL ALCOHOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	201-158-5; C4H10O
Inventory - Japan:	2-3049
Korean KECL:	KE-03868
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
SEC-BUTYL ALCOHOL	Not Listed	[present]	sn 1645	environmental hazard

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
SEC-BUTYL ALCOHOL	[present]	Toxic, Flammable	Not Listed	6,100 ug/m^3 HLV; 2 ppmv HLV

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Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
SEC-BUTYL ALCOHOL	form R reporting required for 1.0% de minimis concentration	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

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D1405

TCI AMERICA Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	Flammable material; avoid heat and sources of ignition. **The health risks of this compound have not been fully determined.** **Exposure may cause irritation of the skin, eyes, and respiratory system.**	

Section I. Chemical Product and Company Identification

Chemical Name: **sec-Butyl Ether**
(DL- and meso- mixture) (stabilized with HQ)

Catalog Number	D1405
Synonym	2,2'-Oxybisbutane
Chemical Formula	$[CH_3CH_2CH(CH_3)]_2O$
CAS Number	6863-58-7

Supplier: TCI America
9211 N. Harborgate St.
Portland OR
1-800-423-8616

In case of Emergency Call: **Chemtrec®**
(800) 424-9300 (U.S.)
(703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
sec-Butyl Ether (DL- and meso- mixture) (stabilized with HQ)	6863-58-7	Min. 97.0 (GC)	Not available.	Mouse LC_{50} (inhalation) 130 gm/m³ /15M **Hydroquinone:** Rat LD_{50} (oral) 320 mg/kg

Section III. Hazards Identification

Acute Health Effects
No specific information is available in our data base regarding the toxic effects of this material for humans. However, exposure to any chemical should be kept to a minimum. Skin and eye contact may result in irritation. May be harmful if inhaled or ingested. Always follow safe industrial hygiene practices and wear proper protective equipment when handling this compound.

Chronic Health Effects
CARCINOGENIC EFFECTS : Not available.
MUTAGENIC EFFECTS : Not available.
TERATOGENIC EFFECTS : Not available.
Toxicity to the reproductive system: Not available.
There is no known effect from chronic exposure to this product. Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

Section IV. First Aid Measures

Eye Contact
Check for and remove any contact lenses. DO NOT use an eye ointment. Flush eyes with running water for a minimum of 15 minutes, occasionally lifting the upper and lower eyelids. Seek medical attention. Treat symptomatically and supportively.

Skin Contact
If the chemical gets spilled on a clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. Seek medical attention. Treat symptomatically and supportively. Wash any contaminated clothing before reusing.

Inhalation
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Seek medical attention. Treat symptomatically and supportively.

Ingestion
Remove dentures if any. Watch for an obstruction in the victim's mouth. Remove if possible what is causing the obstruction but do not force fingers or a hard object between the victim's teeth. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Seek immediate medical attention and, if possible, show the chemical label. Treat symptomatically and supportively.

Section V. Fire and Explosion Data

Flammability	Flammable.	Auto-Ignition	Not available.
Flash Points	Not available.	Flammable Limits	Not available.

Combustion Products
These products are toxic carbon oxides (CO, CO_2).

Fire Hazards
Reactive with strong oxidizers. Vapors may travel to source of ignition and flash back. Closed containers may explode from the heat of a fire. Highly flammable in presence of open flames and sparks, of heat.

Explosion Hazards
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
No additional information is available regarding the risks of explosion.

Continued on Next Page

EPAPA005001732

Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemicals, CO_2, alcohol foam or water spray. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Consult with local fire authorities before attempting large scale fire-fighting operations.

Section VI. Accidental Release Measures

Spill Cleanup Instructions	Flammable liquid, insoluble in water. Keep away from heat and sources of ignition. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition.

Section VII. Handling and Storage

Handling and Storage Information	FLAMMABLE. Reactive with strong oxidizers; may be ignited by heat, sparks, or flames. Vapors may travel to source of ignition and flash back. Closed containers may explode from heat of a fire. Empty containers may pose a fire risk. Evaporate residue under a fume hood if possible. Ground all equipment containing material. Keep away from heat and sources of ignition. Mechanical exhaust required. Avoid excessive heat and light. Do not breathe gas, fumes, vapor or spray. In case of insufficient ventilation, wear suitable respiratory equipment. If you feel unwell, seek medical attention and show the label when possible. Treat symptomatically and supportively. Avoid contact with skin and eyes. Always store away from incompatible compounds such as oxidizing agents.

Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. A MSHA/NIOSH approved respirator should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	Not available.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid.	Solubility	Not available.
Specific Gravity	0.76		
Molecular Weight	130.23	Partition Coefficient	Not available.
Boiling Point	121°C (249.8°F)	Vapor Pressure	Not available.
Melting Point	Not available.	Vapor Density	Not available.
Refractive Index	Not available.	Volatility	Not available.
Critical Temperature	Not available.	Odor	Not available.
Viscosity	Not available.	Taste	Not available.

Section X. Stability and Reactivity Data

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Avoid excessive heat and light.
Incompatibilities	Reactive with strong oxidizing agents.

Section XI. Toxicological Information

RTECS Number	EQ2220000
Routes of Exposure	*Ingestion. Inhalation.*
Toxicity Data	Mouse LC_{50} (inhalation) 130 gm/m^3/15M **Hydroquinone:** Rat LD_{50} (oral) 320 mg/kg
Chronic Toxic Effects	**CARCINOGENIC EFFECTS** : Not available. **MUTAGENIC EFFECTS** : Not available. ***TERATOGENIC EFFECTS*** : *Not available.* Toxicity to the reproductive system: Not available. There is no known effect from chronic exposure to this product. Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.
Acute Toxic Effects	No specific information is available in our data base regarding the toxic effects of this material for humans. However, exposure to any chemical should be kept to a minimum. Skin and eye contact may result in irritation. May be harmful if inhaled or ingested. Always follow safe industrial hygiene practices and wear proper protective equipment when handling this compound.

Continued on Next Page ***Emergency phone number (800) 424-9300***

Section XII. Ecological Information

Ecotoxicity	Not available.
Environmental Fate	Not available.

Section XIII. Disposal Considerations

Waste Disposal	Recycle to process, if possible. Consult your local or regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state, and local regulations when disposing of this substance.

Section XIV. Transport Information

DOT Classification	DOT CLASS 3: Flammable liquid.
PIN Number	UN1149
Proper Shipping Name	Dibutyl Ethers
Packing Group (PG)	III
DOT Pictograms	

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	This product is **ON** the EPA Toxic Substances Control Act (TSCA) inventory.
WHMIS Classification (Canada)	WHMIS CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
EINECS Number (EEC)	Not available.
EEC Risk Statements	R12- Extremely flammable.
Japanese Regulatory Data	Not available.

Section XVI. Other Information

Version 1.0
Validated on 1/23/1997.
Printed 2/9/2005.

Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. 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 chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.

EPAPA005001734

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name	:	**SHELLSOL 7 EC**
Uses	:	Industrial Solvent.
Product Code	:	Q3556
Manufacturer/Supplier	:	**Shell Chemicals Americas Inc.** PO Box 670 STN M CALGARY AB T2P 2J3 Canada
Telephone	:	1-888-791-4314
Fax	:	1-403-691-3555

This product is distributed by Canada Colors and Chemicals Limited
General Inquiry Phone Number: (416) 449-7750
24 Hour Emergency Phone Number (416) 444-2112
CCC Product Code: 284606
CCC Product Name: CANSOL/SHELLSOL 7EC

Emergency Telephone Number

CHEMTREC (24 hr)	:	1-800-424-9300
Canutec (24 hr)	:	1-613-996-6666

Other Information	:	SHELLSOL is a registered trademark used by companies of the Royal Dutch/Shell group of Companies.

2. COMPOSITION/INFORMATION ON INGREDIENTS

WHMIS Controlled Ingredients

Chemical Name	CAS No.	Conc. W/W
Solvent Naphtha (Petroleum), Light Aromatic	64742-95-6	7.00 %W
Solvent Naphtha (Petroleum), Medium Aliphatic	64742-88-7	93.00 %W

Contains Naphthalene, CAS # 91-20-3.
Contains Ethylbenzene, CAS # 100-41-4.
Contains 1,2,4 Tri-methyl-benzene, CAS# 95-63-6
Contains 1,3,5 Tri-methyl-benzene, CAS# 108-67-8

Refer to Chapter 8 for Occupational Exposure Guidelines.

3. HAZARDS IDENTIFICATION

WHMIS Class/Description	:	Class B3 Combustible Liquid
Routes of Exposure	:	Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.
Health Hazards	:	Vapours expected to be slightly irritating. Vapours may cause drowsiness and dizziness. May cause moderate

		irritation to skin. Repeated exposure may cause skin dryness or cracking. Vapours may be irritating to the eye. Harmful: may cause lung damage if swallowed. Possibility of organ or organ system damage from prolonged exposure; see Chapter 11 for details. Target organ(s): Auditory system. Cardiovascular system. Central nervous system (CNS).
Signs and Symptoms	:	Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. Auditory system effects may include temporary hearing loss and/or ringing in the ears.
Aggravated Medical Condition	:	Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Eyes. Skin. Respiratory system.
Safety Hazards	:	Combustible liquid. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire.
Environmental Hazards	:	Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

General Information	:	In general no treatment is necessary, however, obtain medical advice.
Inhalation	:	Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
Eye Contact	:	Flush eyes with water while holding eyelids open. Rest eyes for 30 minutes. If redness, burning, blurred vision, or swelling persist, transport to the nearest medical facility for additional treatment.
Ingestion	:	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.
Advice to Physician	:	Causes central nervous system depression. Dermatitis may result from prolonged or repeated exposure. Potential for chemical pneumonitis. Consider: gastric lavage with protected airway, administration of activated charcoal.

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5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	41 - 43 °C / 105 - 109 °F (Tagliabue Closed Cup)
Explosion / Flammability limits in air	:	0.5 - 6.0 %(V)
Auto ignition temperature	:	230 - 282 °C / 446 - 540 °F
Hazardous Combustion Products and Specific Hazards	:	Carbon monoxide may be evolved if incomplete combustion occurs. Will float and can be reignited on surface water. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

Protective Measures	:	Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas indicator.
Clean Up Methods	:	For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
Additional Advice	:	See Chapter 13 for information on disposal. Notify authorities if

any exposure to the general public or the environment occurs or is likely to occur. Vapour may form an explosive mixture with air.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Avoid contact with skin, eyes, and clothing. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Handle and open container with care in a well-ventilated area. Ventilate workplace in such a way that the Occupational Exposure Limit (OEL) is not exceeded. Do not empty into drains.

Storage : Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat. Bulk storage tanks should be diked (bunded). Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment. Storage Temperature: Ambient.

Product Transfer : Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling.

Recommended Materials : For containers, or container linings use mild steel, stainless steel. For container paints, use epoxy paint, zinc silicate paint.

Unsuitable Materials : Avoid prolonged contact with natural, butyl or nitrile rubbers.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Cumene	ACGIH	TWA	50 ppm		
Xylene, Mixed Isomers	ACGIH	TWA	100 ppm		
	ACGIH	STEL	150 ppm		

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1,3,5-Trimethyl benzene	ACGIH	TWA	25 ppm		
Naphthalene	ACGIH	TWA	10 ppm		
	ACGIH	STEL	15 ppm		
	ACGIH	SKIN_DES			Can be absorbed through the skin.
Benzene	ACGIH	TWA	0.5 ppm		
	ACGIH	STEL	2.5 ppm		
	ACGIH	SKIN_DES			Can be absorbed through the skin.
Stoddard Solvent	ACGIH	TWA	100 ppm		

Consult local authorities for acceptable exposure limits within their jurisdiction.

Additional Information : Skin notation means that significant exposure can also occur by absorption of liquid through the skin and of vapour through the eyes or mucous membranes. Wash hands before eating, drinking, smoking and using the toilet.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Eye washes and showers for emergency use.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers. The following information, while appropriate for the product is general in nature. The selection of Personal Protective Equipment will vary depending on the conditions of use.

Respiratory Protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point <65 °C (149 °F)] Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.

Hand Protection : Longer term protection: Nitrile rubber gloves Incidental contact/Splash protection: PVC or neoprene rubber gloves

Eye Protection : Chemical splash goggles (chemical monogoggles).

Protective Clothing : Use protective clothing which is chemical resistant to this material. Safety shoes and boots should also be chemical resistant.

Monitoring Methods : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure

		controls. For some substances biological monitoring may also be appropriate. Examples of sources of recommended air monitoring methods are given below or contact supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of analytical Methods http://www.cdc.gov/niosh/nmam/nmammenu.html Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha-slc.gov/dts/sltc/methods/toc.html Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hsl.gov.uk/search.htm
Environmental Exposure Controls	:	Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Light coloured. Liquid.
Odour	:	Hydrocarbon.
Odour threshold	:	Data not available.
pH	:	Not applicable.
Boiling point	:	154 - 210 °C / 309 - 410 °F
Freezing Point	:	Data not available.
Vapour pressure	:	0.09 - 0.56 kPa at 20.0 °C / 68.0 °F
Specific gravity	:	0.77 - 0.79
Water solubility	:	0.05 g/l Negligible.
n-octanol/water partition coefficient (log Pow)	:	> 4
Vapour density (air=1)	:	4.8
Stability	:	Stable.
Volatile organic carbon content		100.0 %
Evaporation rate (nBuAc=1)	:	0.1 (ASTM D 3539, nBuAc=1)

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
Hazardous Polymerisation	:	No
Sensitivity to Mechanical Impact	:	No
Sensitivity to Static Discharge	:	Yes

11. TOXICOLOGICAL INFORMATION

Basis for Assessment : Information given is based on product testing, and/or similar products, and/or components.

Routes of Exposure : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Routes of Exposure	Material	Values
Oral	Solvent Naphtha (Petroleum), Medium Aliphatic	LD 50: > 6,216 mg/kg, Rat
Dermal	Solvent Naphtha (Petroleum), Medium Aliphatic	LD 50: > 3,108 mg/kg, Rat
Inhalation	Solvent Naphtha (Petroleum), Medium Aliphatic	LC50: > 14.1 mg/l / 4 hours, Rat

Acute Oral Toxicity : Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

Acute Inhalation Toxicity : High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.
LC50 greater than near-saturated vapour concentration.

Skin Irritation : May cause moderate skin irritation (but insufficient to classify). Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis.

Eye Irritation : Essentially non-irritating to eyes.

Respiratory Irritation : Inhalation of vapours or mists may cause irritation to the respiratory system.

Sensitisation : Not a skin sensitiser.

Repeated Dose Toxicity : Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss. Cardiovascular system: chronic abuse of similar materials has been associated with irregular heart rhythms and cardiac arrest. Central nervous system: repeated exposure affects the nervous system. Kidney: caused kidney effects in male rats which are not considered relevant to humans

Mutagenicity : Not expected to be mutagenic.

Carcinogenicity : Limited evidence of carcinogenic effect. (Ethylbenzene, Naphthalene)

Material	:	Carcinogenicity Classification
Ethylbenzene	:	ACGIH Group A3: Confirmed animal carcinogen with unknown relevance to humans.
Ethylbenzene	:	IARC 2B: Possible carcinogen.
Naphthalene	:	ACGIH Group A4: Not classifiable as a human carcinogen.
Naphthalene	:	IARC 2B: Possible carcinogen.

Reproductive and Developmental Toxicity : Causes foetotoxicity in animals at doses which are maternally toxic.
Not expected to impair fertility.

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12. ECOLOGICAL INFORMATION

Acute Toxicity

Fish	:	Expected to be harmful: 10 < LC/EC/IC50 <= 100 mg/l
Aquatic Invertebrates	:	Expected to be harmful: 10 < LC/EC/IC50 <= 100 mg/l
Algae	:	Expected to be toxic: 1 < LC/EC/IC50 <= 10 mg/l
Microorganisms	:	Expected to be harmful: 10 < LC/EC/IC50 <= 100 mg/l
Mobility	:	Floats on water.
Persistence/degradability	:	Oxidises rapidly by photo-chemical reactions in air. Expected to be readily biodegradable.
Bioaccumulation	:	Has the potential to bioaccumulate.
Other Adverse Effects	:	In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
Container Disposal	:	Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and must be complied with.

14. TRANSPORT INFORMATION

Canadian Road and Rail Shipping Classification

UN/NA Number	UN 1268
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.
Class Division	3
Packing group	III
Shipping Description	PETROLEUM DISTILLATES, N.O.S., Class 3, UN 1268, PG III
Emergency Response Guide No	128

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

WHMIS Class/Description : Class B3 Combustible Liquid

16. OTHER INFORMATION

Material Safety Data Sheet

MSDS Version Number	:	2.
MSDS Effective Date	:	12-15-2005
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this (M)SDS is in accordance with the Controlled Product Regulations.
MSDS Prepared By	:	Product Stewardship; Shell Chemicals Americas Inc.; 1-888-791-4314
Uses and Restrictions	:	Industrial Solvent.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

ConocoPhillips

MATERIAL SAFETY DATA SHEET

Spent Sulfuric Acid

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Spent Sulfuric Acid
Synonyms:	Bayway - Spent Alkylation Acid Bayway - Spent Sulfuric Acid LAR - Spent Acid LAR - Spent Sulfuric Acid LAR - Sulfuric Acid, Alkylation (Spent) Wood River - Spent Alky Sulfuric Acid - 830294
Intended Use:	Spent acid
Responsible Party:	ConocoPhillips 600 N. Dairy Ashford Houston, Texas 77079-1175

Emergency Overview

24 Hour Emergency Telephone Numbers:
Spill, Leak, Fire or Accident Call CHEMTREC:
North America: (800) 424-9300
Others: (703) 527-3887 (collect)

California Poison Control System: (800) 356-3129

Health Hazards/Precautionary Measures: May cause severe eye and skin burns.Do not breathe vapor or mist. Use with ventilation adequate to keep exposure below recommended limits, if any. May be harmful or fatal if inhaled or swallowed. Do not get in eyes, on skin or on clothing. Wash thoroughly after handling. Do not taste or swallow. Wear appropriate personal protective equipment.

Physical Hazards/Precautionary Measures: Reacts violently with water and organic materials with evolution of heat. Liquid will not burn readily, but flammable vapors may be present. Avoid contact with clothing and other combustible material. Keep away from heat, sparks, flames, static electricity or other sources of ignition. Avoid contact with water.

Appearance:	Red to black
Physical Form:	Liquid
Odor:	Sour, acrid

NFPA 704 Hazard Class

Health: 3 **Flammability:** 3 (Hydrocarbon vapors, if present) **Instability:** 2 ***Legend:*** 0 (Least), 1 (Slight), 2 (Moderate), 3 (High), 4 (Extreme)

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS					
Component	**Concentration (wt %)**	**ACGIH:**	**OSHA:**	**NIOSH:**	**Other:**
Sulfuric Acid 7664-93-9	84-94	1 mg/m³ TWA 3 mg/m³ STEL	1 mg/m³ TWA	15 mg/m³ IDLH	—
Petroleum Hydrocarbons (Unknown Composition) NONE	5-10	5mg/m³ TWA 10 mg/m³ STEL 0.2 mg/m³ TWA	5 mg/m³ TWA 0.2 mg/m³ TWA	2500 mg/m³ IDLH 80 mg/m³ IDLH	as Oil Mist, if Generated Coal Tar Pitch Volatiles as Benzene Solubles CAS: 65996-93-2

NON-HAZARDOUS COMPONENTS					
Component	**Concentration (wt %)**	**ACGIH:**	**OSHA:**	**NIOSH:**	**Other:**
Soil/Sand NONE	3-4	10 mg/m³ (Total) TWA 3 mg/m³ (Resp.) TWA	15 mg/m³ (Total) TWA 5 mg/m³ (Resp.) TWA	NE	as Nuisance Dust, If Generated
Water (Process) 7732-18-5	3-4	NE	NE	NE	—

Note: 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.

1%=10,000 PPM.
NE=Not Established

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye: Corrosive. Contact may cause severe irritation, eye burns, and permanent eye damage.

Skin: Corrosive. Contact may cause severe irritation, skin burns, and permanent skin damage. No information regarding skin absorption, however, corrosivity of material suggests significant skin absorption will occur.

Inhalation (Breathing): Corrosive and highly toxic. May be harmful or fatal if inhaled. May cause severe irritation and burns of the nose, throat, and respiratory tract.

Ingestion (Swallowing): Corrosive. May be harmful or fatal if swallowed. May cause severe irritation and burns of the mouth, throat, and digestive tract.

Signs and Symptoms: Effects of overexposure may include severe irritation and burns of the mouth, nose, throat, respiratory, and digestive tract, nausea, vomiting, diarrhea, abdominal pain, wheezing, coughing, bronchitis (lung inflammation), chest pain, pulmonary edema (accumulation of fluids in the lungs), perforation of the stomach.

Cancer: There is inadequate information available on the cancer hazard of this material. However, a component is a possible cancer hazard (see Section 11).

Target Organs: Inadequate evidence available for this material. See Section 11 for target-organ toxicity information of individual components, if any.

Developmental: Inadequate data available for this material.

Other Comments: This material contains petroleum hydrocarbons of unknown composition. As a general class, petroleum hydrocarbons are only mildly irritating to the skin and eyes and have low acute toxicity. Symptoms of overexposure may include irritation of the respiratory and digestive tract, vomiting, diarrhea, and signs of nervous system depression (e.g., headache, dizziness, drowsiness, loss of coordination, and fatigue). Catalytic and thermocracked distillates can be more irritating and toxic (See Section 11).

Prolonged or repeated overexposure to acid mists has been reported to cause erosion of tooth enamel.
Sulfuric acid releases toxic and irritating fumes of sulfur oxides when heated.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin disorders, eye disorders, respiratory (asthma-like) disorders.

4. FIRST AID MEASURES

Eye: Immediately move victim away from exposure and into fresh air. If irritation or redness develops, flush eyes with clean water and seek immediate medical attention. For direct contact, immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 30 minutes. Seek immediate medical attention.

Skin: Immediately flush affected area(s) with large amounts of water while removing contaminated shoes, clothing, and constrictive jewelry. If skin surface is damaged, apply a clean dressing and seek immediate medical attention. If skin surface is not damaged, cleanse the affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops, seek immediate medical attention.

Inhalation (Breathing): Immediately move victim away from exposure and into fresh air. If respiratory symptoms or other symptoms of exposure develop, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): ***Do not induce vomiting. Corrosive material. Acid burns.*** If victim has any breathing difficulties, call for emergency help immediately. If victim is conscious and alert, immediately rinse mouth with water and dilute the ingested material by giving one glass of milk or water to drink; 1/2 glass to children under 5. Call a physician or poison center. If possible, do not leave victim unattended. ***Do not induce vomiting. Corrosive material.*** If victim has any breathing difficulties, call for emergency help immediately. If victim is conscious and alert, immediately rinse mouth with water and dilute the ingested material by giving one glass of milk or water to drink; 1/2 glass to children under 5. Call a physician or poison center. If possible, do not leave victim unattended.

Notes to Physician: This material is corrosive and may cause acid burns, including gastroesophageal perforation. Late complications of severe acid burns include esophageal, gastric, or pyloric strictures and stenosis.The possibility of sulfur dioxide exposure should be considered when evaluating respiratory symptoms associated with the inhalation of this material.

5. FIRE-FIGHTING MEASURES

Flammable Properties:

Flash Point:	< 100°F / 38°C
Test Method:	Test Method Unknown
OSHA Flammability Class:	Combustible liquid
LEL (vol % in air):	*No data*
UEL (vol % in air):	No data
Autoignition Temperature:	No data

Unusual Fire & Explosion Hazards: Liquid will not burn readily, but flammable vapors may be present. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Contact with common metals *can generate hydrogen, which can form flammable mixtures with air. Vapors are heavier than air and can accumulate in low areas. If* container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.Do not use water.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

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 with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof electrical equipment is recommended.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors (see Section 5). Spilled material may be absorbed into an appropriate absorbent material, such as soda ash.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-704 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames. Use good personal hygiene practices.

"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.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area "No Smoking or Open Flame." Store only in approved containers. 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 OSHA standards and appropriate fire codes.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional engineering controls may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified full face air purifying respirator with a Type 95 (R or P) particulate filter in combination with an acid gas cartridge may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a NIOSH approved self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode if there is potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Skin: The use of butyl rubber or Viton gloves is advised to prevent skin contact, possible irritation and skin damage (see glove manufacturer literature for information on permeability). Depending on conditions of use, apron and/or arm covers may be necessary.

Eye/Face: The use of a face shield and chemical goggles to safeguard against potential eye contact, irritation, or injury is recommended.

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse. It is recommended that impervious clothing be worn when skin contact is possible.

Suggestions for the use of specific protective materials are based on readily available published data. Users should check with specific manufacturers to confirm the performance of their products.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

Appearance:	Red to black
Physical Form:	Liquid
Odor:	Sour, acrid
Odor Threshold:	No data
pH:	1-2
Vapor Pressure (mm Hg):	<1
Vapor Density (air=1):	No data
Boiling Point/Range:	> 212°F / 100°C
Solubility in Water:	Complete
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity:	1.7-1.8
Bulk Density:	14.58 lbs/gal
Percent Volatile:	50%
Evaporation Rate (nBuAc=1):	No data
Flash Point:	< 100°F / 38°C
Test Method:	Test Method Unknown
LEL (vol % in air):	No data
UEL (vol % in air):	No data
Autoignition Temperature:	No data
Decomposition Temperature:	No data

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Corrosive to metal. Can react with common metals generating hydrogen gas. Water reactive. Contact with water can generate heat.

Conditions to Avoid: Heat will increase overall reactivity.

Materials to Avoid (Incompatible Materials): Highly reactive and capable of igniting finely divided combustible materials on contact. Extremely hazardous in contact with many materials, particularly carbides, chlorates, fulminates, nitrates, picrates, powdered metals, and other combustible materials. Contact with hypochlorites (e.g., chlorine bleach), sulfides, or cyanides will produce toxic gases. Water reactive. Reacts violently with water, alkaline materials, or organic materials with evolution of heat. Corrosive to metal. Attacks many metals, releasing hydrogen gas (see Section 5).

Hazardous Decomposition Products: Combustion can yield oxides of sulfur and sulfuric acid. Decomposes to water and sulfur trioxide above 644°F.

Hazardous Polymerization: May occur. Hydrocarbon contaminants in the spent acid may polymerize.

11. TOXICOLOGICAL INFORMATION

Chronic Data:

Sulfuric Acid 7664-93-9

Carcinogenicity: The International Agency for Research on Cancer (IARC) classified "strong inorganic acid mists containing sulfuric acid" as a Category I carcinogen (known human carcinogen) based upon epidemiology studies demonstrating excess pharyngeal and lung cancer in chronically exposed workers.

Petroleum Hydrocarbons (Unknown Composition) NONE

Carcinogenicity: Certain petroleum hydrocarbon mixtures such as crude oil, untreated vacuum distillates, catalytically cracked distillates, and untreated lube stocks have been shown to cause skin cancer in laboratory animals.

Target Organs: As a general rule, petroleum hydrocarbons are not notable for their ability to cause specific organ damage. However, certain distillates from catalytic and thermocracked processes have caused liver and kidney damage, developmental toxicity and/or male reproductive toxicity in laboratory animals.

Acute Data:

Sulfuric Acid 7664-93-9

Dermal LD50= No information available
Inhalation LC50= 510 mg/m^3 2 Hr. (Rat)
Oral LD50= 2140 mg/kg (Rat)

Petroleum Hydrocarbons (Unknown Composition) NONE
Dermal LD50= No information available
Inhalation LC50= No information available
Oral LD50= No information available

12. ECOLOGICAL INFORMATION

Not evaluated.

13. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, would be a RCRA "characteristic" hazardous waste due to the characteristic(s) of ignitability (D001), corrosivity (D002) and reactivity (D003). If the spilled or released material impacts soil, water, or other media, characteristic testing of the contaminated materials may be required prior to their disposal. Further, this material, once it becomes a waste, is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

14. TRANSPORT INFORMATION

U.S. Department of Transportation (DOT)
Shipping Description: Corrosive liquids, flammable, n.o.s.,(Sulfuric acid, Petroleum distillate), 8 (3), UN2920, II, **
Non-Bulk Package Marking: Corrosive liquids, flammable, n.o.s.,(Sulfuric acid, Petroleum distillate), UN2920
Non-Bulk Package Labeling: Corrosive, Flammable liquid
Bulk Package/Placard Marking: Corrosive/2920
Packaging - References: None, 173.202, 173.243
Hazardous Substance: **Enter the letters "RQ" if one or more hazardous substances is present in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) shown for the hazardouse substance. See Section 15 for RQ's.
Emergency Response Guide: 132

International Maritime Dangerous Goods (IMDG)
Shipping Description: UN2920, Corrosive liquids, flammable, n.o.s.,(Sulphuric acid, Petroleum distillate), 8 (3), II, (38° C)
Non-Bulk Package Marking: Corrosive liquids, flammable, n.o.s.,(Sulphuric acid, Petroleum distillate), UN2920
Labels: Corrosive, Flammable liquids
Placards/Marking (Bulk): Corrosive/2920
Packaging - Non-Bulk: P001
EMS: F-E, S-C

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)
UN/ID #: UN2920
Proper Shipping Name: Corrosive liquids, flammable, n.o.s.,(Sulphuric acid, Petroleum distillate)
Hazard Class/Division: 8
Packing Group: II
Subsidiary risk: 3
Non-Bulk Package Marking: Corrosive liquids, flammable, n.o.s.,(Sulphuric acid, Petroleum distillate), UN2920
Labels: Corrosive and Flammable liquid
ERG Code: 8F

	LTD. QTY	Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	Y808	808	812
Max. Net Qty. Per Package:	0.5 L	1 L	30 L

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	No
Pressure Hazard:	No
Reactive Hazard:	No

CERCLA/SARA - Section 313 and 40 CFR 372:
This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:
Sulfuric Acid.....7664-93-9..... 84-94%

EPA (CERCLA) Reportable Quantity (in pounds):
Sulfuric Acid.....7664-93-9.....1000

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):
This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:
-- None Known --

California Proposition 65:
Warning: This material may contain the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):
-- None Known --

Carcinogen Identification:
This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any.

TSCA:
All components are listed on the TSCA inventory.

U.S. Export Control Classification Number: EAR99

16. OTHER INFORMATION

Issue Date:	15-Sep-2006
Previous Issue Date:	17-Sep-2001
Product Code:	None
Revised Sections or Basis for Revision:	Composition (Section 2) Periodic review and update
Previous Product Code:	None
MSDS Code:	728010

Disclaimer of Expressed and implied Warranties:
The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material 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.

Material Safety Data Sheet

SULFIDIC CAUSTIC SOLUTION

SECTION 1 – Chemical Product and Company Identification
SECTION 2 – Composition, Information on Ingredients
SECTION 3 – Hazards Identification
SECTION 4 – First Aid Measures
SECTION 5 – Fire Fighting Measures
SECTION 6 – Accidental Release Measures
SECTION 7 – Handling and Storage
SECTION 8 – Exposure Controls and Personal Protection
SECTION 9 – Physical and Chemical Properties
SECTION 10 – Stability and Reactivity
SECTION 11 – Toxicological Information
SECTION 12 – Ecological Information
SECTION 13 – Disposal Considerations
SECTION 14 – Transport Information
SECTION 15 – Regulatory Information
SECTION 16 – Other Information

SECTION 1 – CHEMICAL PRODUCT and COMPANY IDENTIFICATION

1.1	Product Name	Sulfidic Caustic Solution
	Chemical Family	Inorganic Salt Solution
	Synonyms	NA (mixture)
	Formula	NA (mixture)
1.2	Manufacturer	CES Environmental Services, Inc. 4904 Griggs Road Houston, TX 77021 713-676-1460
1.3	Emergency Contact	Matt Bowman 713-826-1329 CHEMTREC 800-424-9300

SECTION 2 – COMPOSITION and INFORMATION ON INGREDIENTS

2.1 Chemical Ingredients (% by wt)

	Typical Analysis	
Sodium Sulfide (Na2S)	CAS#: 1313-82-2	2 – 15%
Sodium Hydroxide (NaOH)	CAS#: 1310-73-2	0 – 15%
Sodium Hydrosulfide (NaHS)	CAS# 16721-80-5	0 – 5%
Sodium Carbonate (Na2CO3)	CAS#: 497-19-8	0 – 4%
Water		remaining %

(See Section 8 for exposure guidelines)

SECTION 3 – HAZARDS IDENTIFICATION

NFPA: Health – 3 Flammability – 0 Reactivity – 1

EMERGENCY OVERVIEW

Warning: Solution is highly alkaline.
May evolve small amounts of hydrogen sulfide, a highly toxic gas.
EYE contact will cause marked eye irritation and possible corneal damage.
SKIN contact will result in irritation and possible corrosion of the skin.
INGESTION will irritate and burn the mouth, throat and the gastrointestinal tract; contact with stomach acid will cause hydrogen sulfide vapors to be released.
HEATING or ACID contact will cause hydrogen sulfide gas to evolve.

3.1 POTENTIAL HEALTH EFFECTS

EYE: Contact with the eyes will cause marked eye irritation and possibly severe corneal damage.

SKIN CONTACT: Contact with the skin will cause skin irritation or a burning sensation. Prolonged contact will result in corrosion of the skin.

SKIN ABSORPTION: Absorption is unlikely to occur.

INGESTION: Ingestion will result in severe burning and corrosion of mouth, throat and the gastrointestinal tract. If the ingested material contacts stomach acid, highly toxic hydrogen sulfide gas will be evolved.

INHALATION: Product solution and vapors contain some highly toxic hydrogen sulfide gas. Exposure to this gas causes headaches, nausea, dizziness and vomiting. Continued exposure can lead to loss of consciousness and death.

CHRONIC EFFECTS – CARCINOGENICITY: Not listed as a carcinogen by NTP, IARC or OSHA.

SECTION 4 – FIRST AID MEASURES

4.1 **EYES:** Immediately flush with large quantities of water for 15 minutes. Hold eyelids apart during irrigation to insure thorough flushing of the entire area of the eye. Obtain immediate medication.

4.2 **SKIN:** Immediately flush with large quantities of water. Remove contaminated clothing under a safety shower. Obtain immediate medical attention.

4.3 **INGESTION:** DO NOT INDUCE VOMITING. If victim is conscious, immediately give 2 to 4 glasses of water. if vomiting does occur, repeat fluid administration. Obtain immediate medical attention.

4.4 **INHALATION:** Remove victim form contaminated atmosphere. If breathing is labored, administer oxygen. If breathinghas ceased, clear airway and start mouth to mouth resuscitation. If heart has stopped beating, external heart massage should be applied. Obtain immediate medical attention.

SECTION 5 – FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

FLASH POINT: Not Flammable METHOD USED: NA

5.2 FLAMMABLE LIMITS: Hydrogen Sulfide LFL: 4% UFL: 44%

5.3 EXTINGUISHING MEDIA: Water spray or foam or as appropriate for combustion involved in fire.

5.4 FIRE and EXPLOSIVE HAZARDS: Solution is non-flammable. However if these solutions are exposed to heat or acids, hydrogen sulfide will be released and may form explosive mixtures with air (see above). Keep containers and/or storage vessels in fire area cooled with water spray. Heating may cause the release of hydrogen sulfide vapors.

5.5 FIRE FIGHTING EQUIPMENT: Because of the possible presence of toxic gases and the corrosive nature of the product, wear self-contained breathing apparatus, positive pressure, MSHA / NIOSH (approved or equivalent) and full protective gear.

SECTION 6 – ACCIDENTIAL RELEASE MEASURES

6.1 SMALL RELEASES: Isolate for 75 feet. Confine area to qualified response personnel. Wear proper Personnel Protective equipment (See Section 8). Confine release material by berming or diverting its path Absorb on sand, earth or other inert dry absorbent. Do not allow into sewer, storm drains or any waterway. Oxidize residual reactive sulfides with a weak (3-5%) hydrogen peroxide solution to stop the release of toxic hydrogen sulfide. Remove contaminated soil and dispose of in accordance with all governmental regulations.

6.2 LARGE RELEASES: Activate Emergency Response Plan procedures. Isolate release area for 500 feet. Confine area to qualified response personnel. Wear proper Personnel Protective Equipment (See Section 8). Shut off release, if safe to do so. Dike spill area to prevent runoff into sewers, drains (potential toxic and explosive mixtures of hydrogen sulfide in confined spaces) or surface waterways (potential aquatic toxicity). Recover as much of the solution as possible. Treat remaining material as a small release (See 6.1).

SECTION 7 – HANDLING and STORAGE

7.1 HANDLING: Wear proper protective equipment (See Section 8). Avoid breathing product vapors. Avoid contact with skin and eyes. Use only in a well ventilated area. Dilute product only in enclosed containers. Wash thoroughly after handling.

7.2 STORAGE: Store in well ventilated areas. Do not store combustibles in the area of storage vessels. Keep away from any sources of heat or flame. Store tote and smaller containers out of direct sunlight at moderate temperatures [<80 F (27 C)]. (See Section 10.4 for materials of construction)

SECTION 8 – EXPOSURE CONTROLS and PERSONAL PROTECTION

8.1 RESPIRATORY PROTECTION: Avoid breathing vapors. If TLV is exceeded, then use a full face respirator with organic vapor cartridges.

8.2 SKIN PROTECTION: Neoprene rubber gloves, chemical suit and boots should be worn to prevent contact with the liquid. Wash contaminated clothing prior to reuse. Contaminated leather shoes cannot be cleaned and should be discarded.

8.3 EYE PROTECTION: Chemical goggles and a full face shield.

8.4 EXPOSURE GUIDELINES:

	OSHA		ACGIH	
	TWA	STEL	TLV	STEL
Hydrogen Sulfide	20 ppm (ceiling)		10 ppm (ceiling)	

8.5 ENGINEERING CONTROLS: Use adequate exhaust ventilation to prevent inhalation of product vapors. Where feasible scrub process or storage vessel vapors with caustic solution. Maintain eye wash safety shower in areas where chemical is handled.

SECTION 9 – PHYSICAL and CHEMICAL PROPERTIES

9.1 APPEARANCE: Light to dark brown to green or red liquid.

9.2 ODOR: Hydrocarbon (mercaptan), possibly hydrogen sulfide (rotten egg) odor.

9.3 BOILING POINT: Not Determined

9.4 VAPOR PRESSURE: Not Determined

9.5 VAPOR DENSITY: (Air = 1.0) 1.17

9.6 SOLUBILITY IN WATER: Complete

9.7 SPECIFIC GRAVITY: 1.03 – 1.3 (8.59 – 10.83 lbs/gal)

9.8 pH : 11.5 – 13.5

9.9 VOLATILE: Not Determined

SECTION 10 – STABILITY and REACTIVITY

10.1 STABILITY: This is a stable material.

10.2 HAZARDOUS POLYMERIZATION: Will not occur.

10.3 HAZARDOUS DECOMPOSITION PRODUCTS: Heating product will evolve H2S gas. fire conditions will cause the production of sulfur dioxide. Hydrogen sulfide (4 – 44%) may form flammable mixtures with air.

10.4 INCOMPATIBILITY: Acids will cause the release of highly toxic hydrogen sulfide. Sulfidic caustic solution is not compatible with copper, zinc, aluminum or their alloys (i.e. bronze, brass, galvanized metals, etc.). Corrosive to steel above 150 F (65.5 C). These materials of

`ECTION 10 – STABILITY and REACTIVITY (Continued)

construction should not be used in handling systems or storage containers for this product. (See Section 7.2 Storage)

SECTION 11 – TOXICOLOGICAL INFORMATION

11.1 ORAL: Data not available.

11.2 DERMAL: Data not available.

11.3 INHALATION: INH-RAT LC 50: 444 ppm (hydrogen sulfide)

11.4 CHRONIC and CARCINOGENICITY: No evidence available.

11.5 TERATOLOGY: Data not available.

11.6 REPRODUCTION: Data not available.

11.7 MUTAGENICITY: Data not available.

SECTION 12 – ECOLOGICAL INFORMATION

None Available

SECTION 13 – DISPOSAL CONSIDERATIONS

If released to the environment for other than its intended purpose, this product contains some reactive sulfides but not a sufficient quantity to meet the definition of a D003, hazardous waste. The pH may be high enough to meet the definition of a corrosive waste, D002.

SECTION 14 – TRANSPORT INFORMATION

14.1 DOT SHIPPING NAME: Corrosive liquids, n.o.s.

14.2 DOT HAZARD CLASS: 8

14.3 UN/NA NUMBER: UN1760

14.4 PACKING GROUP: II

14.5 DOT PLACARD: Corrosive

14.6 DOT LABLE(s): Corrosive

14.7 IMO SHIPPING NAME: Sodium Hydroxide Solution

14.8 RQ (REPORTABLE QUANTITY): 1,000 lbs (454 Kg) 100% basis (Approx. 538 gals)

14.9 USCG BARGE CERTIFICATION: SSH (sodium sulfide, hydrosulfide solutions, H2S 15 ppm or less). SSI (sodium sulfide, hydrosulfide solutions, H2S greater than 15 ppm but less than 200 ppm).

SECTION 15 – REGULATORY INFORMATION

15.1 OSHA: This product is listed as a hazardous material under criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200.

15.2 SARA TITLE III. a. EHS (Extremely Hazardous Substance) List:

b. Sections 311 and 312 (Tier I, II) Categories:

Immediate (acute)	Yes
Fire	No
Sudden Release	No
Reactivity	Yes
Delayed (chronic)	No

c. Section 313 (Toxic Release Report-Form R): No

d. TPQ (Threshold Planning Quantity): No

15.3 CERCLA and SUPERFUND: RQ (Reportable Quantity) 1,000 lbs

15.4 TSCA (Toxic Substance Control Act) Inventory List: Yes

15.5 RCRA (Resource Conservation and Recovery Act) Status: Yes

15.6 WHMIS (Canada) Hazard Classification: E, D1

15.7 DOT HAZARDOUS MATERIAL: (See Section 14) Yes

15.8 CAA HAZARDOUS AIR POLLUTANT (HAP): No

SECTION 16 – OTHER INFORMATION

REVISIONS: The entire MSDS was reformatted to comply to ANSI Standard Z400.1-1993.

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND OSHA, ANSI, NFPA, DOT, ERG AND CHRIS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSAREY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE THE MATERIAL SAFETY DATA SHEET PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

MATERIAL SAFETY DATA SHEET

MSDS No. 104274
Current Date: 3/06/07

This document has been prepared to meet the requirements of the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200; the Canada's Workplace Hazardous Materials Information System (WHMIS) and, the EC Directive, 2001/58/EC.

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAMES: **SODA ASH BRIQUETTES**; **SODA ASH** (DENSE NATURAL, NATURAL DENSE); **SODA ASH LIGHT-ABSORPTA PLUS**; **SODA ASH** (NATURAL LIGHT, NATURAL LT GRADE 100-F); **SODA ASH SYNTHETIC GRADE** (SYNTHETIC LIGHT)

GENERAL USE: Glass manufacture, detergent manufacture, sodium chemicals and carbonate chemicals manufacture, pulp and paper, brine treatment, water hardness removal, pH adjustment in water or waste water, flue gas desulfurization, coal treatment, ion exchange resin regeneration.

This chemical is certified to ANSI/NSF Standard 60, Drinking Water

SUPPLIER: HARCROS CHEMICALS, INC.
5200 Speaker Road
Kansas City, KS 66106-1095

SUPPLIERS TELEPHONE NUMBER: 913-321-3131

TRANSPORTATION EMERGENCY TELEPHONE NUMBER: 1-800-424-9300

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

- White, odorless, granular solid.
- Product is non-combustible.
- Reacts with acids to release carbon dioxide gas and heat.
- Irritating to the eyes and continuous contact may irritate the skin.
- Not expected to be toxic to the environment, nor to aquatic organisms.

EPAPA005001758

POTENTIAL HEALTH EFFECTS: Direct contact with the product causes irritation of the eyes and continuous contact may cause skin irritation (red, dry, cracked skin). Excessive levels of airborne dust may irritate the mucous membranes and upper respiratory tract.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Wt.%	EC No.	EC Class
Sodium carbonate	497-19-8	99.8	207-838-8	Xi, R36

4. FIRST AID MEASURES

EYES: Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist as necessary.

SKIN: Wash with plenty of soap and water. Get medical attention if irritation occurs and persists.

INGESTION: Rinse mouth with water. Dilute by giving 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION: Remove to fresh air. If breathing difficulty or discomfort occurs and persists, obtain medical attention.

NOTES TO MEDICAL DOCTOR: While internal toxicity is low, irritant effects of high concentrations may produce corneal opacities, and vesicular skin reactions in humans with abraded skin only. Treatment is symptomatic and supportive.

5. FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Water, water fog, carbon dioxide (CO_2), dry chemical

FIRE / EXPLOSION HAZARDS: Not applicable

FIRE FIGHTING PROCEDURES: Wear full protective clothing and self-contained breathing apparatus.

FLAMMABLE LIMITS: Not applicable

HAZARDOUS COMBUSTION PRODUCTS: Fumes of sodium oxide.

EPAPA005001759

SENSITIVITY TO IMPACT: None

SENSITIVITY TO STATIC DISCHARGE: None

6. ACCIDENTAL RELEASE MEASURES

COMMENTS: PERSONAL PRECAUTIONS: Refer to Section 8 "Exposure Controls / Personal Protection"

CONTAINMENT: Prevent large quantities of this product from contacting vegetation or waterways; large spills could kill vegetation and fish

CLEAN-UP: This product, if spilled, can be recovered and re-used if contamination does not present a problem. Vacuum or sweep up the material. If the spilled product is unusable due to contamination, consult state or federal environmental agencies for acceptable disposal procedures and locations. See Section 13 "Disposal Considerations"

NOTIFICATION REQUIREMENTS: Federal regulations do not require notification for spills of this product. State and local regulations may contain different requirements; consult local authorities

7. HANDLING AND STORAGE

HANDLING: Use air conveying / mechanical systems for bulk transfer to storage. For manual handling o bulk transfer use mechanical ventilation to remove airborne dust from rail car, ship or truck. Use approved respiratory protection when ventilation systems are not available. Selection of respirators is based on the dust cloud generation. Keep material out of lakes, streams, ponds and sewer drains

STORAGE: Store in a cool dry area, away from acids.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Where possible, provide general mechanical and or local exhaust ventilation to prevent release of airborne dust into the work environment

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Appropriate eye and face protection equipment (ANSI Z87 approved) should be selected for the particular use intended for this material. Safety glasses with side shields are recommended

RESPIRATORY: Whenever dust in the worker's breathing zone cannot be controlled with ventilation or other engineering means, workers should wear respirators or dust masks approved by

EPAPA005001760

NIOSH/MSHA, EU CEN or comparable certification organization to protect them against airborne dust.

PROTECTIVE CLOTHING: Dry product is generally non-irritating to intact skin. However, this product can be irritating where skin has been damaged and can create skin irritation after long exposures when moisture is present. Under such conditions, gloves and long-sleeved clothing are recommended to minimize skin contact.

COMMENTS:
ADDITIONAL EXPOSURE GUIDELINES:

Federal guidelines treat the ingredient(s) in this product as a nuisance dust, as no product-specific guidelines have been issued for exposure. As with all nuisance dusts, worker breating zone concentrations should be measured by validated sampling and analytical methods. The following limits (OSHA and MSHA) apply to this material:

Particulates Not Otherwise Regulated:
OSHA (PEL / TWA): 15 mg/m³ (total dust); 5 mg/m³ (resp fraction)
MSHA (PEL / TWA): 10 mg/m³ (total dust)

The information noted above provides general guidance for handling this product. Specific work environments and material handling practices will dictate the selection and use of personal protection equipment (PPE).

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR:	Odorless
APPEARANCE:	White, granular solid.
AUTOIGNITION TEMPERATURE:	Not applicable
BOILING POINT:	Decomposes
COEFFICIENT OF OIL / WATER:	Not applicable
DENSITY / WEIGHT PER VOLUME:	(g/ml) Dense Grades = 0.86 - 1.12; Light Grades = 0.70 - 0.90
EVAPORATION RATE:	Not applicable (Butyl Acetate = 1)
FLASH POINT:	Non-combustible
FREEZING POINT:	851°C (1564°F)
ODOR THRESHOLD:	Not applicable
OXIDIZING PROPERTIES:	Not applicable
PERCENT VOLATILE:	Not applicable

EPAPA005001761

pH:	11.4 (1% solution)
SOLUBILITY IN WATER:	33.2 % maximum
SPECIFIC GRAVITY:	2.509 (water = 1)
VAPOR DENSITY:	Not Applicable
VAPOR PRESSURE:	Not applicable

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:	Contact with acids except under controlled conditions.
STABILITY:	Stable
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Reacts with acids with release of large volumes of carbon dioxide gas and heat.
HAZARDOUS DECOMPOSITION PRODUCTS:	Heated to decomposition, it emits fumes of sodium oxide.

COMMENTS:

Materials to Avoid : Aluminum powder, acids, fluorine, molten lithium

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS: Severe irritant (rabbit) [Toxicology 23:281 (1982)]

SKIN EFFECTS: Non-irritating to intact skin. Minor irritation may occur on abraded skin. [Toxicol. Appl. Pharmacol. 31:481 (1975)]

DERMAL LD_{50}: No data available for the product.

ORAL LD_{50}: 4,090 mg/kg (rat) [RTECS 1986]

INHALATION LC_{50}: 2.3 mg/l (2 h) (rat) [Environ, Res. 31:138 (1983)]

SENSITIZATION: 0.25% sodium carbonate: Non-sensitizing (human) [Toxicol. Appl. Pharmacol. 31:481 (1975)]

TARGET ORGANS: Eyes

ACUTE EFFECTS FROM OVEREXPOSURE: May cause severe irritation of the eyes, including corneal opacities. Dusts and mists may be irritating to the skin, mucous membranes and upper respiratory tract. No significant acute toxicological effects expected.

EPAPA005001762

CHRONIC EFFECTS FROM OVEREXPOSURE: No data available for the product.

CARCINOGENICITY:

NTP:	Not listed
IARC:	Not listed
OSHA:	Not listed
OTHER:	(ACGIH) Not listed

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: 96-hour LC_{50} = 265 - 565 mg/L (daphnia magnia) (low toxicity)
96-hour LC_{50} = 300 - 320 mg/L (bluegill sunfish) (low toxicity)

CHEMICAL FATE INFORMATION: Biodegradability does not apply to inorganic substances. No significant toxicity to aquatic organisms is expected.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: When this product is discarded or disposed of, as purchased, it is neither a characteristic nor a listed hazardous waste according to US Federal RCRA regulations (40 CFR 261). As a non-hazardous waste the material may be disposed of in a landfill in accordance with government regulations; check local or state regulations for applicable requirements prior to disposal. Any processing, usage, alteration, chemical additions to, or contamination of, the product may alter the disposal requirements. Under Federal regulations, it is the generator's responsibility to determine if a waste is a hazardous waste.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT)

PROPER SHIPPING NAME:	Not regulated
PRIMARY HAZARD CLASS / DIVISION:	Not applicable
UN/NA NUMBER:	None
LABEL(S):	Not applicable

EPAPA005001763

PLACARD(S):	Not applicable
MARKING(S):	Not applicable
ADDITIONAL INFORMATION:	Hazardous Substance/RQ: Not applicable 49 STCC Number: Not applicable

INTERNATIONAL MARITIME DANGEROUS GOODS (IMDG)

ADDITIONAL INFORMATION:	Not regulated

ADR - EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD

ADDITIONAL INFORMATION:	Not regulated

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) / INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

ADDITIONAL INFORMATION:	Not regulated

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355, APPENDIX A):
Not listed

SECTION 311 HAZARD CATEGORIES (40 CFR 370):
Immediate (Acute) Health Hazard

SECTION 312 THRESHOLD PLANNING QUANTITY (40 CFR 370):
The Threshold Planning Quantity (TPQ) for this product, if treated as a mixture, is 10,000 lbs; however, this product contains the following ingredients with a TPQ of less than 10,000 lbs.:
None

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):
Not listed

EPAPA005001764

CERCLA (COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT)

CERCLA DESIGNATION & REPORTABLE QUANTITIES (RQ) (40 CFR 302.4):
Not listed

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA INVENTORY STATUS (40 CFR 710):
Listed

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
RCRA IDENTIFICATION OF HAZARDOUS WASTE (40 CFR 261):
Waste Number: Refer to Section 13 "Disposal Considerations" for RCRA status.

CANADA

WHMIS (WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM):

Product Identification Number:	Not applicable
Hazard Classification / Division:	Toxic, Class D, Div. 2, Subdiv. B
Ingredient Disclosure List:	Listed

E NUMBERS:

E 500

EU EINECS NUMBERS:

011-005-00-2

INTERNATIONAL LISTINGS

Australia (AICS): Listed
Korea: KE-31380
Japan (ENCS): (1)-164
Philippines (PICCS): Listed
China: Listed

COMMENTS:

CLEAN WATER ACT (CWA) - SECTION 307 / 311
Not listed as a hazardous pollutant (40 CFR 116), nor as a toxic pollutant (40 CFR 401.15)

CLEAN AIR ACT (CAA) - SECTION 112
Not regulated under the chemical accident prevention provisoins (40 CFR 68)

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16. OTHER INFORMATION

HAZARD, RISK AND SAFETY PHRASE DESCRIPTIONS:

Sodium carbonate:

EC Symbols:	Xi	(Irritant)
EC Risk Phrases:	R36	(Irritating to eyes.)
EC Safety Phrases:	S2	(Keep out of the reach of children.)
	S22	(Do not breathe dust.)
	S26	(In case of contact with eyes, rinse immediately with plenty of water and seek medical advice)

HMIS

Health	2
Flammability	0
Physical Hazard	0
Personal Protection (PPE)	B

Protection - B (Safety glasses and gloves)

HMIS = Hazardous Materials Identification System

Degree of Hazard Code:
4 = Severe
3 = Serious
2 = Moderate
1 = Slight
0 = Minimal

NFPA

Health	2
Flammability	0
Reactivity	0
Special	None

No special requirements

NFPA = National Fire Protection Association

Degree of Hazard Code:
4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Insignificant

REVISION SUMMARY:

EPAPA005001766

Changes in information are as follows:
New format, as well as text changes and/or updates to one or more Sections of this MSDS.

The information provided in this Material Safety Data Sheet has been obtained from sources believed to be reliable. Harcros Chemicals, Inc. provides no warranties, either expressed or implied and assumes no responsibility for the accuracy or completeness of the data contained herein. This information is offered for your information, consideration, and investigation. You should satisfy yourself that you have all current data relevant for your particular use. Harcros Chemicals, Inc. knows of no medical condition other than those noted on this Material Safety Data Sheet, which are generally recognized as being aggravated by exposure to this product.

EPAPA005001767

GARY-WILLIAMS
ENERGY CORPORATION

Gary-Williams Energy Corp.
370 17th Street
Suite 5300
Denver, CO 80202

MATERIAL SAFETY DATA SHEET	October 20, 1999	MSDS NUMBER W-4005

EMERGENCY TELEPHONE NUMBERS	COMPANY	CHEMTREC
	405-665-6565	800/424-9300

I. PRODUCT IDENTIFICATION

PRODUCT	CHEMICAL NAME AND SYNONYMS
SLURRY	Catalytic Cracked Clarified Oil
CHEMICAL FAMILY	**FORMULA**
Residual Petroleum Hydrocarbon	C20 and above

National Fire Protection Association Hazard Rating Codes	HEALTH CODE	FIRE CODE	REACTIVITY CODE
Least - 0 Slight - 1 Moderate - 2 High - 3 Extreme - 4	1	1	0

II. SUMMARY OF HAZARDS

CAUTION! COMBUSTIBLE LIQUID AND VAPOR. HARMFUL IF INHALED AND MAY CAUSE DELAYED LUNG INJURY. SUSPECT CANCER HAZARD. Keep away from heat and flame. Avoid breathing oil mist. Use ventilation adequate to keep oil mist below recommended exposure limit. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

DOT Hazardous Material	DOT SHIPPING NAME AND NUMBER	DOT HAZARD CLASS
NO	N/A	N/A

III. HAZARDOUS COMPONENTS

INGREDIENT	% RANGE	PEL/TLV	HAZARD
Catalytic Cracked Clarified Oil (CAS # 64741-62-4)	100	Oil Mist TWA - 5 mg/m3 STEL - 10 mg/m3	Combustible Acute Health Chronic Health

EPAPA005001768

GARY-WILLIAMS
ENERGY CORPORATION

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IV. HEALTH INFORMATION

EXPOSURE BY ROUTE OF ENTRY	EXPOSURE CHARACTERISTICS AND FIRST AID	
INHALATION	EFFECTS	Chronic: May contain up to five percent 4 to 6 membered condensed ring aromatic hydrocarbons. Potential carcinogen.
	FIRST AID	Move exposed person to fresh air. If breathing has stopped, perform artificial respiration. Get medical attention as soon as possible.
SKIN	EFFECTS	Acute: Irritation, thermal burn Chronic: dermatitis, potential carcinogen
	FIRST AID	If clothing soaked, immediately remove clothing and wash skin with soap and water. Launder clothing before wearing. For thermal burn: cool, flush with water, wrap with sterile dressing and apply cold pack. Get medical attention promptly.
EYES	EFFECTS	Acute: Irritation, thermal burn
	FIRST AID	Immediately flush eyes with water for a minimum of 15 minutes, occasionally lifting the lower and upper lids. Get medical attention promptly.
SWALLOWING INGESTION	EFFECTS	Acute: Irritation
	FIRST AID	Call a physician immediately, ONLY induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person
Medical conditions Generally Agravated by Exposure	N/AV	

LISTED AS POTENTIAL CARCINOGEN OR CARCINOGEN	NOT LISTED ____ NATIONAL TOXICOLOGY PROGRAM_X__ INTERNATIONAL Agency for Research on Cancer _X___ OSHA _____

EPAPA005001769

GARY-WILLIAMS
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V. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION (NIOSH APPROVED RESPIRATORS SEE OSHA STD. 1910.134)

Up to 50 mg/m3, half-mask organic vapor respirator. Up to 250mg/m3, full-face organic vapor respirator or full-face supplied air respirator. Greater than 250 mg/m3, fire-fighting, or unknown concentration, self-contained breathing apparatus with positive pressure.

EYE	Safety glasses, chemical goggles or face shield as appropriate.
SKIN	Gloves: Nitrile, neoprene or other material resistant to fuel oil.

VENTILATION

Maintain local or dilution ventilation to keep air concentration below 5 mg/m3. Loading, unloading, tank gauging, etc., remain upwind. Request assistance of safety and industrial hygiene personnel in determining air concentrations.

VI. FIRE PROTECTION INFORMATION

FLASH POINT AND METHOD	AUTOIGNITION TEMPERATURE ESTIMATED	FLAMMABLE LIMITS % VOLUME ESTIMATED	LOWER	UPPER
Pensky-Martens 230+ 'F	700 'F	N/A		

EXTINGUISHING MEDIA

Carbon dioxide, dry chemical, or foam. Water stream may spread fire, use water spray only to cool containers exposed to fire. If leak or spill has not ignited, use water spray to disperse the vapors.

HAZARDOUS DECOMPOSITION PRODUCTS

Incomplete combustion can yield carbon monoxide and various hydrocarbons.

FIRE AND EXPLOSION HAZARDS

Can form combustible mixtures with air when heated.

STORAGE

Do not store with strong oxidizers. Store as OSHA Class IIIA combustible liquid.

HAZARDOUS POLYMERIZATION	STABILITY
WILL NOT OCCUR __X__ MAY OCCUR _____	STA__X__ UNSTABL _____

VII. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT	Reid VAPOR PRESSURE (RVP) at 100 'F	EVAPORATION (ETHYL ETHER = 1)
greater than 500 'F	ESTIMATED N/A	ESTIM N/A
PERCENT VOLATILE BY VOLUME (%) N/AV	AVG. MOLECULAR WEIGHT N/AV	APPEARANCE Dark Brown Viscous Fluid
ODOR Fuel Oil	DROP POINT Pour Point 20 to 50 'F	ESTIMATED VAPOR DENSITY (AIR = 1) N/A
SPECIFIC GRAVITY 1.07	VISCOSITY 200 to 300 cs at 122 'F	SOLUBILITY (G/100g WATER AT 20° C) Negligible

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VIII. ENVIRONMENTAL PROTECTION

SPILLS	Notify emergency response personnel. Evacuate area and remove ignition sources. Build dike to contain flow. Remove free liquid, do not flush to sewer or open water. Pick up with inert absorbent and place in closed container for disposal.
WASTE DISPOSAL	Utilize licensed waste disposal company. Consider recycling or incineration. Utilize permitted hazardous waste disposal site or industrial waste disposal site as appropriate.

ADDITIONAL INFORMATION

PREPARED BY	DATE PREPARED
Johnnie L. Ray	October 20, 1999

DISCLAIMER

The information and recommendations contained in this publication have been compiled from sources beleived to be reliable and to represent the best current opinion on the subject at the time of publication. Since we cannot anticipate or control the many different conditions under which this information or our products may be used, we make no gurantee that the recommendations will be adequate for all individuals or situations. Each user of the product described herein should determine the suitability of the described product for his particular purpose and should comply with all federal and state rules and regulations concerning the described product.

ABBREVIATIONS

CAS #	Chemical Abstracts Service Number
N/A	Not Applicable
N/AV	Not Available
ppm	Parts per million
PEL	Permissible Exposure Limit
TLV	Threshold Limit Value Both the OSHA PEL and the American Conference of Governmental Industrial Hygienists TLV were reviewed. Where a difference existed, the more restrictive of the two was selected.
STEL	Short Term Exposure Limit
TWA	Time-Weighted Average

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Material Safety Data Sheets Collection:

Sheet No. 3A
Sodium Hydroxide, 50% Liquid

Issued: 10/77 Revision: B, 11/91

Section 1. Material Identification

Sodium Hydroxide, 50% Liquid (NaOH), Description: Derived by electrolysis of sodium chloride brines, by reacting calcium chloride with sodium carbonate, or by electrolytic production using the diaphragm cell. Sodium hydroxide often contains minimal amounts of sodium chloride, sodium carbonate, sodium sulfate, sodium chlorate, iron, or nickel. Used in making plastics to dissolve casein; in treating cellulose in making rayon and cellophane; in explosives, dyestuffs, electrolytic extraction of zinc, reclaiming rubber, tin plating, oxide coating, etching and electroplating, laundering and bleaching, pulp and paper manufacture; in vegetable oil refining; in peeling fruits and vegetables in the food industry; to hydrolyze fats and form soaps; and in veterinary medicine as a disinfectant.

R 0
I 2
S 4
K 0

NFP

HM
H
F
R
PPC
* Se

Other Designations: CAS No. 1310-73-2; Aetznatron; Collo-Grillrein; Collo-Tapette; Feurs Rohp; Lewis-Red Devil Lye; soda lye; soda, lye solution; sodium hydrate solution; sodium hydroxide solution; white caustic solution.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

Cautions: Sodium hydroxide is moderately toxic by ingestion and inhalation and can be seriously corrosive to eyes, skin, and mucous membranes.

Section 2. Ingredients and Occupational Exposure Limits

Sodium hydroxide, ca 50% water solution

1990 OSHA PEL
Ceiling: 2 mg/m³

1991-92 ACGIH TLV
Ceiling: 2 mg/m³

1990 DFG (Germany) MAK
2 mg/m³

1990 IDLH Level
250 ppm

1990 NIOSH REL
Ceiling: 2 mg/m³

1985-86 Toxicity Data*
Monkey, eye: 1% solution applied over 24 hr produced severe irritation
Rabbit, eye: 1% solution applied to the eye caused severe irritation
Grasshopper, parenteral: 20 µl produced cytogenic mutations

* See NIOSH, *RTECS* (WB4905000), for additional irritation, mutation and toxicity data.

Section 3. Physical Data

Boiling Point: 284 °F (140 °C)
Freezing Point: 53.6 °F (12 °C)
Viscosity: 50 cP at 68 °F (20 °C)
pH (0.5 % solution): 13

Molecular Weight: 40.01
Specific Gravity: 1.53 at 77 °F (25 °C)
Water Solubility: Completely soluble in water
Other Solubilities: Soluble in alcohol, methanol and glycerol; insoluble in acetone and ether

Appearance and Odor: An odorless, clear liquid.

Section 4. Fire and Explosion Data

Flash Point: None reported	Autoignition Temperature: None reported	LEL: None reported	UEL: None reported

Extinguishing Media: Although noncombustible, when in contact with moisture or water sodium hydroxide, 50% liquid, can generate enough heat to ignite surrounding combustibles. If possible without risk, remove containers from area. Use extinguishing agents suitable for surrounding fire. For small fire, use dry chemical, carbon dioxide (CO_2), or regular foam. Avoid using water spray since water reacts with sodium hydroxide to generate substantial heat. If you must use water, be sure it is as cold as possible. For large fires, use fog or regular foam.

Unusual Fire or Explosion Hazards: Sodium hydroxide solution can become very hot when in contact with water.

Special Fire-fighting Procedures: Since fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Also, wear fully protective clothing. Structural firefighter protective clothing provides limited protection. Apply cooling water to sides of fire-exposed containers until fire is well out. *Do not* splatter or splash this material. Stay away from ends of tanks. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Sodium hydroxide solution is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Violent polymerization can occur when in contact with acrolein or acrylonitrile. Since sodium hydroxide readily absorbs water and carbon dioxide from air, keep containers tightly closed.

Chemical Incompatibilities: Since it generates large amounts of heat when in contact with water, sodium hydroxide may steam and splatter. It reacts with mineral acids to form corresponding salts, and with weak-acid gases like hydrogen sulfide, sulfur dioxide and carbon dioxide. Sodium hydroxide can be very corrosive to metals such as aluminum, tin, and zinc, as well as alloys such as steel, and may cause formation of flammable hydrogen gas. An increase in temperature and pressure occurs in closed containers when sodium hydroxide is mixed with acetic anhydride, glacial acetic acid, chlorohydrin, chlorosulfonic acid, ethylene cyanohydrin, glyoxal, oleum, 36% hydrochloric acid, 48.7% hydrofluoric acid, 70% nitric acid, or 96% sulfuric acid.

Conditions to Avoid: Avoid generation of sodium hydroxide mists, and contact with water, metals, and the chemicals listed above.

Hazardous Products of Decomposition: Thermal oxidative decomposition of sodium hydroxide can produce toxic sodium oxide (Na_2O) and peroxide (Na_2O_2) fumes.

Section 6. Health Hazard Data

Carcinogenicity: In 1990 reports, the IARC, NTP, and OSHA do not list sodium hydroxide as a carcinogen (see Chronic Effects).

Summary of Risks: Sodium hydroxide solution is toxic by mist inhalation, ingestion, or direct skin or eye contact. Damage is immediate and without prompt medical attention can become permanent. This strong, corrosive alkaline solution dissolves any living tissue it contacts.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Target Organs: Eyes, digestive tract, respiratory system, and skin.

Primary Entry Routes: Ingestion, inhalation, and skin and eye contact.

Acute Effects: Ingestion causes immediate burning of mouth, esophagus, and stomach; painful swallowing; excessive salivation; edematous (excess fluid in surrounding tissue) lips, chin, tongue, and pharynx covered with exudate (fluid oozed from swollen tissue); esophageal edema (swelling from fluid buildup in esophagus walls that can prevent swallowing within hours); edematous, gelatinous, and necrotic (localized tissue

Continue on next page

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Section 6. Health Hazard Data, *continued*

leath) mucous membranes; vomiting (sometimes coffee grounds-like material due to digestive hemorrhage); rapid, faint pulse; and cold, clammy kin. Death commonly occurs due to shock, asphyxia (oxygen loss due to interrupted breathing), or pneumonia by the second or third day after tion. Mist inhalation can cause many burns, temporary hair loss (in nasal passages since sodium hydroxide breaks down keratin), and ably pulmonary edema (fluid in lungs). Skin contact causes slippery, soapy feeling that is usually not painful for 3 min after contact—even hough skin damage begins immediately. It causes burns, keratin (hair and nails) destruction, and intracellular edema (excess fluid in skin cells), with damage progressing to severe burns, tissue corrosion, deep ulcerations, and permanent scarring if not washed off immediately. The cornea egins to corrode on contact. Disintegration and sloughing of conjunctival and corneal epithelium may progress to temporary or permanent orneal opacification (cloudiness, becoming impervious to light) or symblepharon (adhesion of lid to eyeball).

Chronic Effects: Dermatitis may result after repeated exposure to dilute solutions. Cases of squamous cell carcinoma (malignant tumors of pithelial origin) of the esophagus are reported 12 to 42 years after ingestion, although it is unclear whether the cancer resulted from scar rmation caused by tissue destruction or directly from the chemical's possible carcinogenicity.

FIRST AID: Emergency personnel should protect against contamination.

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical acility. *Do not* allow victim to keep his eyes tightly shut. *Warning!* Although splashed in only one eye, sodium hydroxide may affect the other ye's sight if prompt medical attention is not received. Consult a physician immediately.

Skin: *Quickly* remove contaminated clothing. Rinse with flooding amounts of cold water for at least 15 min. *Be aware* that this substance can ecome very hot when in contact with water. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have that *conscious and alert* person drink 1 to 2 lasses of water followed by vinegar or fruit juice to neutralize the poison. *Do not* induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Perform endoscopy in all suspected cases of sodium hydroxide ingestion. Perform blood analysis to determine if dehydration, cidosis, or other electrolyte imbalances have occurred.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, isolate hazard area, deny entry, and stay upwind of spills. Cleanup personnel should protect against vapor nhalation and skin or eye contact. Use water spray to disperse vapors but do not spray directly on spills. Absorb small liquid spills with fly ash or ement powder. Neutralize spill with vinegar or dilute acid. Perlite and Cellosolve WP 3H (hydroxyethyl cellulose) are recommended for vapor uppression and containment of 50% sodium hydroxide solutions. Place material in suitable container (sodium hydroxide corrodes steel at emperatures above 60 °C) for later disposal. For large wet spills, dike flow using soil, sand bags, foamed polyurethane, or foamed concrete to ontain for later disposal. Follow applicable OSHA regulations (29 CFR 1910.120).

Environmental Transport: In solid form, sodium hydroxide is not mobile, although it very easily absorbs moisture. Once liquid, sodium ydroxide rapidly leaches into the soil, possibly contaminating water sources.

Environmental Degradation: Ecotoxicity values (as 100% NaOH): TLm, mosquito fish, 125 ppm/96 hr (fresh water); TLm, bluegill, 99 mg/48 hr (tap water).

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

ted as a RCRA Hazardous Waste (40 CFR 261.22): Characteristic of corrosivity

d as a CERCLA Hazardous Substance* (40 CFR 302.4), Reportable Quantity (RQ): 1000 lb (454 kg) [* per Clean Water Act, Sec. 311 (b)(4)]

A Extremely Hazardous Substance (40 CFR 355): Not listed

ARA Toxic Chemical (40 CFR 372.65): Not listed

OSHA Designations

Sodium hydroxide is listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Since contact lens use in ndustry is controversial, establish your own policy.

Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if ecessary, wear a NIOSH-approved respirator. Select the respirator based on its suitability to provide adequate worker protection for the given vorking conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, eactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*

Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent any skin contact.

Ventilation: Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PEL and IDLH values Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.[103]

Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder contaminated work clothing before wearing. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, moking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Avoid physical damage to containers. Store in dry, well-ventilated area away from water, acids, metals, flammable iquids and organic halogens. Keep containers tightly closed since sodium hydroxide can decompose to sodium carbonate and carbon dioxide pon exposure to air. Since corrosion occurs easily above 140 °F (60 °C) not store or transport in aluminum or steel containers when tempera- ures are near this level. Store containers in rooms equipped with trapped floor drains, curbs, or gutters.

Engineering Controls: To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control hazardous airborne ontaminants and to maintain concentrations at the lowest practical level.

Other Precautions: Institute preplacement and periodic medical exams of exposed workers emphasizing the eyes, skin and respiratory tract. Consider a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Educate employees to the ossible hazards in using sodium hydroxide.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Sodium hydroxide, liquid *or* solution
Hazard Class: Corrosive material
...o.: UN1824
T Label: Corrosive
DOT Packaging Exceptions: 173.244
DOT Packaging Requirements: 173.249

IMO Shipping Name: Sodium hydroxide, solution
IMO Hazard Class: 8
ID No.: UN1824
IMO Label: Corrosive
IMDG Packaging Group: II

MSDS Collection References: 26, 38, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 139, 140, 143, 146, 148, 149, 153, 159, 161, 163
Prepared by: M Gannon, BA; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** W Silverman, MD; **Edited by:** JR Stuart, MS

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EPAPA005001773

Material Safety Data Sheet

Catalog Number: 218296
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 218296

Product name: SODIUM ALUMINATE

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
SODIUM ALUMINATE	N/A	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

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5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards: Burning produces irritant fumes.
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: Not determined
Autoignition temperature: Not determined
NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment.
Environmental precautions: Prevent product from entering drains.
Methods for cleaning up: Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor White
Physical state: Powder
Formula: AlNaO2
Molecular weight: 81.97011
Melting point/range: 1800°C
Boiling point/range: No Data available at this time.
Density: No data available
Vapor pressure: No data available

EPAPA005001775

Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	No data available
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
SODIUM ALUMINATE	Not Available	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
SODIUM ALUMINATE	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
SODIUM ALUMINATE	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
SODIUM ALUMINATE	Not Listed	Not Listed	Not Listed

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Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
SODIUM ALUMINATE	Not Listed	Not Listed	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
SODIUM ALUMINATE	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
SODIUM ALUMINATE	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
SODIUM ALUMINATE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components
SODIUM ALUMINATE
Inventory - United States TSCA - Sect. 8(b) Not Listed
Canada DSL Inventory List - Not Listed

U.S. regulations:

EPAPA005001777

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
SODIUM ALUMINATE	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
SODIUM ALUMINATE	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
SODIUM ALUMINATE	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001778

Material Safety Data Sheet

Sodium bromide

ACC# 21060

Section 1 - Chemical Product and Company Identification

MSDS Name: Sodium bromide
Catalog Numbers: AC205130000, AC205130010, AC205131000, AC246900000, AC246905000, S78369, S783691, S93358, NC9508240, NC9557408, S255-3, S255-500
Synonyms: NaBr.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7647-15-6	Sodium bromide	>99	231-599-9

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white crystalline powder.
Caution! May cause eye, skin, and respiratory tract irritation. Possible risk of harm to the unborn child. May cause central nervous system depression. Hygroscopic (absorbs moisture from the air).
Target Organs: Central nervous system.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation. Exposure to bromides may cause rashes, especially of the face (resembling acne) and boils.
Ingestion: May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure.
Inhalation: May cause respiratory tract irritation. May cause effects similar to those described for ingestion.

Chronic: May cause fetal effects. Chronic ingestion may cause bromism characterized by disturbances of the central nervous system, skin and digestive tract. Adverse reproductive effects have been reported in animals. May cause incoordination and mental disturbances.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treatment includes hydration, mild diuresis, and possible hemodialysis. Consider the use of ammonium chloride in divided doses with a diuretic.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower:N/A
Upper: N/A
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid breathing dust.
Storage: Store in a cool, dry place. Store in a tightly closed container. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium bromide	none listed	none listed	none listed

OSHA Vacated PELs: Sodium bromide: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: 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: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to minimize contact with skin.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder
Appearance: white
Odor: not available
pH: 5-8.8 (5% aq soln)
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not applicable.
Viscosity: Not available.
Boiling Point: 1390 deg C @ 760 mmHg
Freezing/Melting Point:755 deg C
Decomposition Temperature:800 deg C
Solubility: 95g/100 ml water (25°C)
Specific Gravity/Density:3.208
Molecular Formula: BrNa
Molecular Weight:102.89

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Dust generation, moisture.
Incompatibilities with Other Materials: Strong acids, bromine trifluoride.
Hazardous Decomposition Products: Hydrogen bromide, sodium oxide, bromine fumes.
Hazardous Polymerization: Has not been reported.

EPAPA005001781

Section 11 - Toxicological Information

RTECS#:
CAS# 7647-15-6: VZ3150000
LD50/LC50:
CAS# 7647-15-6:
Oral, mouse: LD50 = 7 gm/kg;
Oral, rat: LD50 = 3500 mg/kg;

Carcinogenicity:
CAS# 7647-15-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information available.
Teratogenicity: Two children born to a woman who ingested large amounts of bromides throughout both pregnancies had heights and head circumferences below the 5th percentile and a two year lag in bone ages when they were 7 and 8 years old (Opitz et al, 1972).
Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.
Mutagenicity: No information available.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7647-15-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313 No chemicals are 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 Substances 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:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 7647-15-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
Not available.
Risk Phrases:

Safety Phrases:
S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)
CAS# 7647-15-6: 1
Canada - DSL/NDSL
CAS# 7647-15-6 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2A.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List
CAS# 7647-15-6 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 12/12/1997
Revision #6 Date: 6/06/2006

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

R.T. Vanderbilt Company, Inc.
INDUSTRIAL MINERALS AND CHEMICALS

Material Safety Data Sheet

chemusa

Section I. Chemical Product and Company Identification

Product Name/ Trade Name	**SODIUM HYDROSULFIDE SOLUTION**	Code	38730
		CAS#	16721-80-5
Supplier	**R.T. VANDERBILT COMPANY, INC.** **30 WINFIELD STREET** **NORWALK, CT 06855**	In Case of Emergency	Call: (203) 853-1400
Synonym	sodium sulfhydrate, sodium bisulfide		
Chemical name	Not applicable.		
Chemical Family	Not available.		
Chemical Formula	Not applicable.		
Material Uses	Not available.		
TSCA Status	**TSCA 8(b) inventory: SODIUM HYDROSULFIDE SOLUTION**		

Section II. Composition and Information on Ingredients

Name	CAS #	% by Weight
sodium hydrosulfide	16721-80-5	45
water	7732-18-5	55

Section III. Hazards Identification

Emergency Overview	Amber liquid. Causes irritation and severe burns to the eyes and skin. Inhalation is irritating to the mucous membranes and respiratory system. Harmful if ingested. Releases hydrogen sulfide gas in contact with acids.

Section IV. First Aid Measures

Eye Contact	Check for and remove any contact lenses. Flush with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Seek medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion	Do not induce vomiting. Immediately give two glasses of water, a little at a time. Never give anything by mouth to an unconscious person. Call a physician. If vomiting occurs spontaneously, lower head below waist to prevent fluid from entering the lungs.

Continued on Next Page

Section V. Fire and Explosion Data

Flammability of the Product	Non-flammable.
Autoignition Temperature	Not applicable.
Flash Point	Not applicable.
Flammable Limits	Not applicable.
Products of Combustion	Not available.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions	Use dry chemical or CO2.
Special Remarks on Fire Hazards	Contact with acids will liberate poisonous, flammable hydrogen sulfide gas.
Special Remarks on Explosion Hazards	Not available.

Section VI. Accidental Release Measures

Small Spill	Absorb with an inert material and put the spilled material in an appropriate waste disposal. Warn personnel to move away.
Large Spill	Stop leak if without risk. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal.

Section VII. Handling and Storage

Storage	Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store in zinc, aluminum or copper containers.
Handling Procedures and Equipment	Avoid contact with eyes, skin, and clothing. Do not ingest. Avoid breathing vapors or spray mists.. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Keep from freezing.

Section VIII. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. If vapor or mist generation is likely, use NIOSH/MSHA approved combination acid gas and mist cartridge or canister respirator in accordance with 29 CFR 1910.134.
Personal Protection	Splash goggles. Lab coat. Gloves.
TLV / PEL	Not available.

Continued on Next Page

Section IX. Physical and Chemical Properties

Appearance	Amber. Liquid.
Molecular Weight	Not applicable.
pH (1% soln/water)	11.5 [Basic.]
Boiling/Condensation Point	126°C (258.8°F)
Melting Point	14.4°C (57.9°F)
Specific Gravity	129 (Water = 1)
Density	1.29 Mg/m^3 at 25°C (77°F)
Vapor Pressure	Not available.
Vapor Density	Not available.
Volatility	Not available.
Odor	Rotten eggs.
Evaporation Rate	0.36 (water) compared to (n-BUTYL ACETATE=1)
Viscosity	Not available.
Water/Oil Dist. Coeff.	Not available.
Solubility	Soluble in water.

Section X. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	Not available.
Incompatibility with Various Substances	Reactive with oxidizing agents, acids.
Corrosivity	Not available.
Special Remarks on Reactivity	Contact with acids will liberate hydrogen sulfide. Sodium hydrosulfide solution will attack zinc, aluminum, copper and alloys of the metals.

Section XI. Toxicological Information

Routes of Entry	Absorbed through skin. Eye contact. Inhalation. Ingestion
Toxicity to Animals	Acute oral toxicity (LD50): 96 mg/kg [Rat]. Acute dermal toxicity (LD50): 177 mg/kg [Rabbit]
Special Remarks on Toxicity to Animals	Not available.
Acute Effects	
Eye Contact	Causes irritation and may cause severe burns. Direct exposure to the eyes can cause irreversible damage, including blindness.
Skin Contact	Causes irritation and may cause burns. Material is considered corrosive and has the capability of being absorbed throught the skin producing the toxicity typical of hydrogen sulfide poisoning.
Sensitization	Not available.
Ingestion	Harmful if ingested. If ingested, gastric acidity would convert material to hydrogen sulfide gas. Material is corrosive and would produce burns of the stomach lining capable of causing severe injury and death.
Inhalation	Harmful if inhaled.

Continued on Next Page

Remarks	Irritation of the mucous membranes, eyes and respiratory tract is possible following exposure to the decomposition product, hydrogen sulfide gas, which is potentially lethal.
Chronic Effects on Humans	**CARCINOGENIC EFFECTS** Not available. **MUTAGENIC EFFECTS** Not available. **DEVELOPMENTAL TOXICITY** Not available. **REPRODUCTIVE TOXICITY** Not available. The substance is toxic to skin, central nervous system (CNS), eye, lens or cornea. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Remarks	Not available.

Section XII. Ecological Information

Ecotoxicity	Not available.
BOD and COD	Not available.
Products of Biodegradation	Not available.
Biodegradability	Not available.
Special Remarks on the Products of Biodegradation	Not available.

Section XIII. Disposal Considerations

Waste Information	RCRA Hazardous Waste, D002, D003 RQ 5000 lbs
Waste Stream	Not available.

Section XIV. Transport Information

DOT

Shipping name: RQ Corrosive liquid, toxic, n.o.s. (sodium hydrosulfide solution), UN 2922, 8 (6.1), PG II

Remarks	RQ 5000 lbs.
Maritime transportation	Not available.

Continued on Next Page

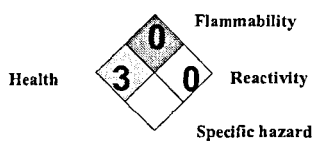
Section XV. Other Regulatory Information and Pictograms

Classification	HCS (USA)	Class: Irritating substance. Class: Corrosive material. Class: Toxic. OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
	Federal and State Regulations	Pennsylvania RTK: sodium hydrosulfide: (environmental hazard) Massachusetts RTK: sodium hydrosulfide New Jersey: sodium hydrosulfide TSCA 8(b) inventory: SODIUM HYDROSULFIDE SOLUTION SARA 302/304/311/312 hazardous chemicals: sodium hydrosulfide SARA 311/312 MSDS distribution - chemical inventory - hazard identification: sodium hydrosulfide: fire, immediate health hazard CERCLA: Hazardous substances.: sodium hydrosulfide: 5000 lbs. (2268 kg);
	Remarks	**Not available.**

Hazardous Material Information System (U.S.A.)

*	3
Fire Hazard	0
Reactivity	0
Personal Protection	j

National Fire Protection Association (U.S.A.)



Other regulatory specifications

EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

CEPA DSL: SODIUM HYDROSULFIDE SOLUTION

Australia (NICNAS): SODIUM HYDROSULFIDE SOLUTION

Korea (TCCL): SODIUM HYDROSULFIDE SOLUTION

Philippines (RA6969): SODIUM HYDROSULFIDE SOLUTION

Japan (MITI): SODIUM HYDROSULFIDE SOLUTION

Protective Clothing (Pictograms)

Section XVI. Other Information

References	Not available.
Other Special Considerations	Not available.

Validated by Erin A. Bendig on 1/10/2005.
Previous Validation Date: 1/26/2004.

Verified by Erin A. Bendig.

Printed 1/10/2005.

Information Contact **(203) 853-1400**
Corporate Risk Management Department

Notice to Reader

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Aqua Solutions, Inc
6913 Hwy 225
Deer Park, TX 77536

MATERIAL SAFETY DATA SHEET

Phone: (281) 479-2569
Chemtrec 800-424-9300
24 Hour Emergency Assistance

SECTION 1 IDENTIFICATION

Pr Nu	8435
Product Name	Silver Nitrate 0.050 Normal
Trade /Chemical Synonyms	
Formula	Not Applicable
RTECS	None
C.A.S. #	See below

Health:	1
Flammability:	0
Reactivity:	0

Hazard Rating:
Least 0 Slight 1 Moderate 2 High 3 Extreme 4

NA=Not Applicable NE=Not Established

SECTION 2 MIXTURE COMPONENTS

Sara 313	Component	CAS Numbe	%	Dim.	Exposure Limits
☐	Silver Nitrate	CAS# 7761-88-8	0.85%	W/V	OSHA PEL 0.01 mg(Ag)/m
☐	Water, Deionized ASTM Type II	CAS# 7732-18-5	Balance	V/V	None Established

SECTION 3 HAZARD IDENTIFICATION (SEE ALSO SECTION 11)

May be harmful if swallowed. May cause irritation. Avoid breathing vapors, or dusts. Use with adequate ventilation. Avoid contact with eyes, skin, and clothes. Wash thoroughly after handling.

SECTION 4 FIRST AID MEASURES

FIRST AID: SKIN: Remove contaminated clothing. Wash exposed area with soap and wa irritation persists, seek medical attention.

EYES: Wash eyes with plenty of water for at least 15 minutes, lifting lids occasionally. Seek Medical Aid. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen

INGESTION: If swallowed, induce vomiting immediately after giving two glasses of water. Never give anything by mouth to an unconscious person.

SECTION 5 FIRE FIGHTING MEASURES

Fire Extinguisher Type: Any means suitable for extinguishing surrounding fire

Fire / Explosion Hazards: None

Fire Fighting Procedure:

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and clothing.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Absorb spill with inert material, then place in a chemical waste container. Dispose of in a manner consistent with federal, local law.

SECTION 7 HANDLING AND STORAGE

Store in a cool dry place. Do not get in eyes, on skin, on clothing. Wash thoroughly after handling

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: None required

Ventilation: Local Exhaust ☑ Mechanical ☐

Protective Gloves: Gloves to prevent skin exposure *exposure as latex or vinyl*

Eye Protection: Splash Goggles

Other Protective Equipment: Wear appropriate clothing to prevent skin exposure

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Melting Point:	>2°C	**Percent Volatile by Volume:**	>98
Boiling Point:	100°C	**Evaporation Rate:**	Information not available
Vapor Pressure:	Information not available	**Evaporation Standard:**	
Vapor Density:	Information not available		
Solubility in Water:	Soluble	**Auto Ignition Temp:**	Not applicable
Appearance /Odors:	Clear, colorless, odorless liquid	**Lower Flamm. Limit in Air:**	Not applicable
Flash Point:	Not flammable		
Specific Gravity:	1	**Upper Flamm. Limit in Air:**	Not applicable

SECTION 10 STABILITY AND REACTIVITY INFORMATION

Stability: Stable

Conditions to Avoid: High temperatures, Light

Materials to Avoid: Halides, Ammonia, Phospahtes

Hazardous Decomposition Products: None known

Hazardous polymerization Will Not Occur

Conditions to Avoid: None known

SECTION 11 ADDITIONAL INFORMATION

Conditions aggravated/target organs: Persons with pre-existing skin, eye or respiratory disorders are more susceptible. Overexposure symptoms. Acute: Slight irritation to skin, eyes, mucous membranes, and GI tract. Stains skin. Chronic: Permanent discoloration of contacted skin.

DOT Classification:	Not Regulated

DOT Regulations may change from time to time. Please consult the most recent D.O.T. regulations.

Rev. No: 0.1 Date Entered: 8/1/2007 Approved: WPF Safety Dir.: WPF

The information herein is believed to be accurate and is offered in good faith for the user's consideration and investigation. No warranty either expressed or implied is made for the completeness or accuracy of the information whether originating from the above mentioned company or not. Users of this material should satisfy themselves by independent investigation of current scientific and medical knowledge that the material can be used safely.

Aqua Solutions, Inc
6913 Hwy 225
Deer Park, TX 77536

MATERIAL SAFETY DATA SHEET

Phone: (281) 479-2569
Chemtrec 800-424-9300
24 Hour Emergency Assistance

SECTION 1 IDENTIFICATION

Pr Nu	F6025
Product Name	Formaldehyde, 37%
Trade /Chemical Synonyms	
Formula	CH'O
RTECS	LP8925000
C.A.S. #	CAS# 50-00-0

Health:	3
Flammability:	2
Reactivity:	0

Hazard Rating:
Least 0 Slight 1 Moderate 2 High 3 Extreme 4

NA=Not Applicable NE=Not Established

SECTION 2 MIXTURE COMPONENTS

Sara 313	Component	CAS Numbe	%	Dim.	Exposure Limits
☑	Formaldehyde, 37%	CAS# 50-00-0	balance	V/V	OSHA TWA 0.75 ppm(0.9mg/m*f*), STEL 2 ppm(2.5mg/m*f*)
☑	Methanol (Methyl Alcohol) (Low Acetone)	CAS# 67-56-1	10 - 15	V/V	OSHA TWA 200 ppm, ACC STEL 250 ppm

SECTION 3 HAZARD IDENTIFICATION (SEE ALSO SECTION 11)

Keep away from heat and ignition sources. Harmful if swallowed. Avoid breathing vapors. Use with adequate ventilation. Avoid contact with eyes, skin, and clothes. Wash thoroughly after handling. Keep container closed.

SECTION 4 FIRST AID MEASURES

FIRST AID: CALL A PHYSICIAN. SKIN: In case of contact, immediately flush skin with wa' at least 15 minutes while removing contaminated clothing and shoes. Thoroughly cle. thing and shoes before reuse.

EYES: Wash eyes with plenty of water for at least 15 minutes, lifting lids occasionally. Seek Medical Aid. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen

INGESTION: If swallowed, induce vomiting immediately after giving two glasses of water. Never give anything by mouth to an unconcious person.

SECTION 5 FIRE FIGHTING MEASURES

Fire Extinguisher Type: Carbon Dioxide, dry chemical powder or appropriate foam

Fire / Explosion Hazards: Thermal decomposition produces highly toxic fumes.

Fire Fighting Procedure:

Use water spray to cool fire exposed containers. Wear self-contained breathing apparatus and proper clothing to prevent contact with skin & clothing.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Absorb spill with inert material, then place in a chemical waste container. Ventilate and wash spill site. Dispose of in a manner consistent with federal, local law.

SECTION 7 HANDLING AND STORAGE

Store in a cool dry well ventilated area out of direct sunlight. Keep away from heat and flame. Do not get in eyes, on skin, or on clothing.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: NIOSH/MSHA-approved respirator

Ventilation: Local Exhaust ☐ Mechanical ☑

Protective Gloves: NIOSH Approved Gloves

Eye Protection: Goggles and Face Shield

Other Protective Equipment: Wear appropriate clothing to prevent skin exposure

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Melting Point:	-118°C	**Percent Volatile by Volume:**	~100%
Boiling Point:	-3°F	**Evaporation Rate:**	N/E
Vapor Pressure:	6.3 mm Hg @ 70°C		
Vapor Density:	1.03	**Evaporation Standard:**	N/A
Solubility in Water:	Soluble	**Auto Ignition Temp:**	N/E
Appearance /Odors:	Clear liquid, strong odor	**Lower Flamm. Limit in Air:**	7%
Flash Point:	56°C		
Specific Gravity:	1.083	**Upper Flamm. Limit In Air:**	73%

SECTION 10 STABILITY AND REACTIVITY INFORMATION

Stability: Stable

Conditions to Avoid: Avoid contact with incompatible materials.

Materials to Avoid:

Hazardous Decomposition Products: Toxic fumes of: Carbon Monoxide, Carbon Dioxide

Hazardous polymerization Will Not Occur

Conditions to Avoid: None known

SECTION 11 ADDITIONAL INFORMATION

Toxic! Carcinogen! Flammable! Conditions aggravated/target organs: Persons with preexisting skin, eye or respiratory conditions may be more susceptible. Acute: May be fatal if inhaled, swallowed or absorbed through skin. Irritation or burns to skin, eyes, mucous membranes and upper respiratory tract. May cause allergic reactions, coughing, chest pains, pulmonary edema, GI tract disturbance. Effects may be delayed. Chronic: Carcinogen. Dermatitis, eye damage.

DOT Classification:	Formaldehyde Solution, 3, UN1198, PG III

DOT Regulations may change from time to time. Please consult the most recent D.O.T. regulations.

Rev. No: 2 Date Entered: 6/1/2007 Approved: WPF Safety Dir.: WPF

The information herein is believed to be accurate and is offered in good faith for the user's consideration and investigation. No warranty either expressed or implied is made for the completeness or accuracy of the information whether originating from the above mentioned company or not. Users of this material should satisfy themselves by independent investigation of current scientific and medical knowledge that the material can be used safely.

MSDS Number: **S4034** * * * * * *Effective Date: 05/04/07* * * * * * *Supercedes: 07/07/04*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone 908-859-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. and Canada
Chemtrec: 703-527-3887
NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYDROXIDE

1. Product Identification

Synonyms: Caustic soda; lye; sodium hydroxide solid; sodium hydrate
CAS No.: 1310-73-2
Molecular Weight: 40.00
Chemical Formula: NaOH
Product Codes:
J.T. Baker: 1508, 3717, 3718, 3721, 3722, 3723, 3728, 3734, 3736, 5045, 5565
Mallinckrodt: 7001, 7680, 7708, 7712, 7772, 7798

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hydroxide	1310-73-2	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

EPAPA005001792

POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White Stripe (Store Separately)

Potential Health Effects

Inhalation:
Severe irritant. Effects from inhalation of dust or mist vary from mild irritation to serious damage of the upper respiratory tract, depending on severity of exposure. Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.
Ingestion:
Corrosive! Swallowing may cause severe burns of mouth, throat, and stomach. Severe scarring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appear days after exposure.
Skin Contact:
Corrosive! Contact with skin can cause irritation or severe burns and scarring with greater exposures.
Eye Contact:
Corrosive! Causes irritation of eyes, and with greater exposures it can cause burns that may result in permanent impairment of vision, even blindness.
Chronic Exposure:
Prolonged contact with dilute solutions or dust has a destructive effect upon tissue.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing

EPAPA005001793

contaminated clothing and shoes. Call a physician, immediately. Wash clothing before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Hot or molten material can react violently with water. Can react with certain metals, such as aluminum, to generate flammable hydrogen gas.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Adding water to caustic solution generates large amounts of heat.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. Do not flush caustic residues to the sewer. Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal.
US Regulations (CERCLA) require 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.

7. Handling and Storage

EPAPA005001794

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Always add the caustic to water while stirring; never the reverse. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product. Do not store with aluminum or magnesium. Do not mix with acids or organic materials.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
2 mg/m3 Ceiling
- ACGIH Threshold Limit Value (TLV):
2 mg/m3 Ceiling

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
White, deliquescent pellets or flakes.

Odor:
Odorless.

Solubility:

EPAPA005001795

111 g/100 g of water.
Specific Gravity:
2.13
pH:
13 - 14 (0.5% soln.)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
1390C (2534F)
Melting Point:
318C (604F)
Vapor Density (Air=1):
> 1.0
Vapor Pressure (mm Hg):
Negligible.
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Very hygroscopic. Can slowly pick up moisture from air and react with carbon dioxide from air to form sodium carbonate.
Hazardous Decomposition Products:
Sodium oxide. Decomposition by reaction with certain metals releases flammable and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Sodium hydroxide in contact with acids and organic halogen compounds, especially trichloroethylene, may causes violent reactions. Contact with nitromethane and other similar nitro compounds causes formation of shock-sensitive salts. Contact with metals such as aluminum, magnesium, tin, and zinc cause formation of flammable hydrogen gas. Sodium hydroxide, even in fairly dilute solution, reacts readily with various sugars to produce carbon monoxide. Precautions should be taken including monitoring the tank atmosphere for carbon monoxide to ensure safety of personnel before vessel entry.
Conditions to Avoid:
Moisture, dusting and incompatibles.

11. Toxicological Information

Irritation data: skin, rabbit: 500 mg/24H severe; eye rabbit: 50 ug/24H severe; investigated as a mutagen.

--------\Cancer Lists\----------

EPAPA005001796

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SODIUM HYDROXIDE, SOLID
Hazard Class: 8
UN/NA: UN1823
Packing Group: II
Information reported for product/size: 300LB

International (Water, I.M.O.)

Proper Shipping Name: SODIUM HYDROXIDE, SOLID
Hazard Class: 8
UN/NA: UN1823
Packing Group: II
Information reported for product/size: 300LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------

EPAPA005001797

Ingredient	TSCA	EC	Japan	Australia
Sodium Hydroxide (1310-73-2)	Yes	Yes	Yes	Yes

\--------\Chemical Inventory Status - Part 2\--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Sodium Hydroxide (1310-73-2)	Yes	Yes	No	Yes

\--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	-------SARA 313------ List	Chemical Catg.
Sodium Hydroxide (1310-73-2)	No	No	No	No

\--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Sodium Hydroxide (1310-73-2)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: Yes (Pure / Solid)

Australian Hazchem Code: 2R
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **1**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and

EPAPA005001798

MSDS Number: **S4037** * * * * * *Effective Date:* ***08/02/07*** * * * * * *Supercedes:* ***10/28/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYDROXIDE SOLUTIONS (MORE THAN 10% NaOH)

1. Product Identification

Synonyms: Caustic soda solution; lye solution; sodium hydroxide liquid; sodium hydrate solution,Sodium Hydroxide Concentrate Solution StandARd®, Sodium Hydroxide, DILUT-IT® Analytical Concentrates, sodium hydroxide volumetric solutions
CAS No.: 1310-73-2
Molecular Weight: 40.00
Chemical Formula: NaOH in water
Product Codes:
J.T. Baker: 0337, 0338, 0339, 0342, 0344, 0392, 0896, 0897, 3719, 3725, 3727, 3729, 3735, 4689, 4690, 5000, 5661, 5666, 5668, 5669, 5671, 5672, 5674
Mallinckrodt: 6290, 7701, 7702, 7703, 7705, 7706, 7775, H369, H382, H385, V038, V679

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hydroxide	1310-73-2	10 - 60%	Yes
Water	7732-18-5	40 - 90%	No

EPAPA005001799

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White Stripe (Store Separately)

Potential Health Effects

Inhalation:
Severe irritant. Effects from inhalation of mist vary from mild irritation to serious damage of the upper respiratory tract, depending on severity of exposure. Symptoms may include sneezing, sore throat or runny nose. Severe pneumonitis may occur.
Ingestion:
Corrosive! Swallowing may cause severe burns of mouth, throat, and stomach. Severe scarring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, fall in blood pressure. Damage may appear days after exposure.
Skin Contact:
Corrosive! Contact with skin can cause irritation or severe burns and scarring with greater exposures.
Eye Contact:
Corrosive! Causes irritation of eyes, and with greater exposures it can cause burns that may result in permanent impairment of vision, even blindness.
Chronic Exposure:
Prolonged contact with dilute solutions or dust has a destructive effect upon tissue.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems or impaired respiratory function may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:

EPAPA005001800

DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician, immediately. Wash clothing before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Hot or molten material can react violently with water. Can react with certain metals, such as aluminum, to generate flammable hydrogen gas.
Explosion:
May cause fire and explosions when in contact with incompatible materials.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Adding water to caustic solution generates large amounts of heat.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Do not flush caustic residues to the sewer. Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal.
US Regulations (CERCLA) require 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.

J. T. Baker NEUTRACIT®-2 or BuCAIM® caustic neutralizers are recommended for spills of this product.

EPAPA005001801

7. Handling and Storage

Keep in a tightly closed container. Protect from physical damage. Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities. Store above 16C (60F) to prevent freezing. Always add the caustic to water while stirring; never the reverse. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do not store with aluminum or magnesium. Do not mix with acids or organic materials.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
2 mg/m3 Ceiling
- ACGIH Threshold Limit Value (TLV):
2 mg/m3 Ceiling

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a half facepiece particulate respirator (NIOSH type N95 or better filters) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest.. A full-face piece particulate respirator (NIOSH type N100 filters) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. If oil particles (e.g. lubricants, cutting fluids, glycerine, etc.) are present, use a NIOSH type R or P filter. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

EPAPA005001802

Physical data is displayed for 10%, 30% and 50% aqueous sodium hydroxide solutions. (Merck Index).

Appearance:
Clear, colorless solution.

Odor:
Odorless.

Solubility:
Completely miscible with water.

Density:
10% solution - 1.11; 30% solution - 1.33; 50% solution - 1.53

pH:
14.0 (10%, 30% and 50% solutions)

% Volatiles by volume @ 21C (70F):
No information found.

Boiling Point:
For 10% solution = 105C (221F); for 30% solution = 115C (239F); for 50% solution = 140C (284F).

Melting Point:
For 10% solution = -10C (14 F); for 30% solution = 1C (34F); for 50% solution = 12C (53.6F).

Vapor Density (Air=1):
No information found.

Vapor Pressure (mm Hg):
13 @ 60C (140F) (50% solution)

Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
Sodium oxide. Decomposition by reaction with certain metals releases flammable and explosive hydrogen gas.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Sodium hydroxide in contact with acids and organic halogen compounds, especially trichloroethylene, may causes violent reactions. Contact with nitromethane and other similar nitro compounds causes formation of shock-sensitive salts. Contact with metals such as aluminum, magnesium, tin, and zinc cause formation of flammable hydrogen gas. Sodium hydroxide, even in fairly dilute solution, reacts readily with various sugars to produce carbon monoxide. Precautions should be taken including monitoring the tank atmosphere for carbon monoxide to ensure safety of personnel before vessel entry.

Conditions to Avoid:
Heat, moisture, incompatibles.

EPAPA005001803

11. Toxicological Information

Sodium hydroxide: irritation data: skin, rabbit: 500 mg/24H severe; eye rabbit: 50 ug/24H severe. Investigated as a mutagen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Sodium Hydroxide (1310-73-2)	No	No	None
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: SODIUM HYDROXIDE SOLUTION
Hazard Class: 8
UN/NA: UN1824
Packing Group: II
Information reported for product/size: 360LB

International (Water, I.M.O.)

Proper Shipping Name: SODIUM HYDROXIDE, SOLUTION

EPAPA005001804

Hazard Class: 8
UN/NA: UN1824
Packing Group: II
Information reported for product/size: 360LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Sodium Hydroxide (1310-73-2)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Sodium Hydroxide (1310-73-2)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Sodium Hydroxide (1310-73-2)	No	No	No	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Sodium Hydroxide (1310-73-2)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: Yes (Mixture / Liquid)

Australian Hazchem Code: 2R
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **1**

EPAPA005001805

Label Hazard Warning:
POISON! DANGER! CORROSIVE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. CAUSES BURNS TO ANY AREA OF CONTACT. REACTS WITH WATER, ACIDS AND OTHER MATERIALS.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe mist.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No Changes.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

EPAPA005001806

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **SODIUM NITRATE**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: SODIUM NITRATE
Synonyms: None
Chemical Family: Nitrate
Application: Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Sodium nitrate	7631-99-4	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye, skin, and respiratory irritation. Oxidizer.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

EPAPA005001807

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Oxidizer. May ignite combustibles. Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 1, Flammability 0, Reactivity 2
HMIS Ratings:	Flammability 0, Reactivity 2, Health 1

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid creating or inhaling dust.
Storage Information	Store away from combustibles. Store in a cool well ventilated area. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Localized ventilation should be used to control dust levels.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Dust proof goggles.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Solid
Color:	Transparent
Odor:	Odorless
pH:	7
Specific Gravity @ 20 C (Water=1):	2.27
Density @ 20 C (lbs./gallon):	Not Determined
Bulk Density @ 20 C (lbs/ft3):	75

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	100
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	85

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Contact with other materials may cause fire or explosion, especially if heated.
Incompatibility (Materials to Avoid)	Organic matter. All flammables, especially petroleum products, asphalt & other volatile flammables.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	May cause abdominal pain, vomiting, nausea, and diarrhea.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined

Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	This bag may contain residue of a hazardous material. Some authorities may regulate such containers as hazardous waste. Dispose of container according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Sodium Nitrate, 5.1, UN1498, III
NAERG 140

Canadian TDG
Sodium Nitrate, 5.1, UN1498, III

ADR
UN1498,Sodium Nitrate, 5.1, III

Air Transportation

ICAO/IATA
UN1498,Sodium Nitrate, 5.1, III

Sea Transportation

IMDG
UN1498,Sodium Nitrate, 5.1, III
EmS F-A, S-Q

EPAPA005001810

Other Shipping Information

Labels: Oxidizer

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Fire Hazard Reactive Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Reactivity D003
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	C Oxidizing Materials D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

EPAPA005001811

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001812

Trailer 1077
Hot Wash
Cold Rinse
Dry - Dry

EASTMAN

MATERIAL SAFETY DATA SHEET

Revision Date: 05/10/2006
MSDSUSA/ANSI/EN/150000000342/Version 3.0

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name	Solvent 140
Product Identification Number(s)	02424-00, P0242400, P0242401, P0242402, E0242401
Manufacturer/Supplier	Eastman Chemical Company 200 South Wilcox Drive Kingsport, TN 37660-5280 US +14232292000
MSDS Prepared by	Eastman Product Safety and Health
Chemical Name	not applicable
Synonym(s)	02424-00 434840
Molecular Formula	not applicable
Molecular Weight	not applicable
Product Use	solvent
OSHA Status	hazardous

For emergency health, safety & environmental information, call 800-EASTMAN.

For emergency transportation information, call CHEMTREC at 800-424-9300 or call 800-EASTMAN.

2. COMPOSITION INFORMATION ON INGREDIENTS

(Typical composition is given, and it may vary. A certificate of analysis can be provided, if available.)

Weight %	Component	CAS Registry No.
60 - 70%	C9-C12 hydrocarbons	not available
25 - 30%	C13-C16 hydrocarbons	not available
<5%	<C9 hydrocarbons	not available
1 - 3%	>C16 hydrocarbons	not available
1.5%	propylcyclopentane	2040-96-2

3. HAZARDS IDENTIFICATION

WARNING!
FLAMMABLE LIQUID AND VAPOR
CAUSES SKIN IRRITATION

HMIS® Hazard Ratings: Health - 2, Flammability -3, Chemical Reactivity - 0

HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

4. FIRST-AID MEASURES

Inhalation: If symptomatic, move to fresh air. Get medical attention if symptoms persist.
Eyes: Any material that contacts the eye should be washed out immediately with water. If easy to do,

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EPAPA005001813

remove contact lenses. Get medical attention if symptoms persist.

Skin: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Ingestion: Call a physician or poison control center immediately. Only induce vomiting at the instruction of medical personnel. Never give anything by mouth to an unconsious person.

5. FIRE FIGHTING MEASURES

Extinguishing Media: water spray, dry chemical, carbon dioxide, foam

Special Fire-Fighting Procedures: Wear self-contained breathing apparatus and protective clothing. USE WATER WITH CAUTION. Material will float and may ignite on surface of water. Fight fire from a protected location. Use water spray to keep fire-exposed containers cool. Water may be ineffective in fighting the fire.

Hazardous Combustion Products: carbon dioxide, carbon monoxide

Unusual Fire and Explosion Hazards: Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations.

6. ACCIDENTAL RELEASE MEASURES

Use personal protective equipment. Eliminate all ignition sources. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste.

For Large Spills: Use water spray to disperse vapors and dilute spill to a nonflammable mixture. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

7. HANDLING AND STORAGE

Personal Precautionary Measures: Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.

Prevention of Fire and Explosion: Keep away from heat, sparks, and flame. Keep from contact with oxidizing materials. Use only with adequate ventilation. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.

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

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Country specific exposure limits have not been established or are not applicable unless listed below.

Ventilation: 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.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where

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exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Eye Protection: Wear safety glasses with side shields (or goggles).

Skin Protection: Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific information.

Recommended Decontamination Facilities: eye bath, safety shower, washing facilities

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: liquid
Color: light yellow
Odor: hydrocarbon
Specific Gravity: 0.85 (20 °C)
Vapor Pressure: 20 °C; 2.9 mbar
Boiling Point: 135 °C
Solubility in Water: negligible
Flash Point: 4 - 22 °C (Tag closed cup)
Autoignition Temperature: 238 °C (ASTM D2155)
Thermal Decomposition Temperature: Thermal stability not tested. Low stability hazard expected at normal operating temperatures.

10. STABILITY AND REACTIVITY

Stability:	Not fully evaluated. Materials containing similar structural groups are normally stable.
Incompatibility:	Material reacts with strong oxidizing agents.
Hazardous Polymerization:	Will not occur.

11. TOXICOLOGICAL INFORMATION

General: The following information is based on the toxicological properties of a similar material.
Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.

Oral LD-50:(rat)	1,600 - 3,200 mg/kg
Oral LD-50:(mouse)	>3,200 mg/kg
Inhalation LC-50: (rat)	6 h: >1.83 mg/l
Dermal LD-50: (guinea pig)	> 20 ml/kg
Skin Irritation (guinea pig)	moderate
Eye Irritation (rabbit)	slight

12. ECOLOGICAL INFORMATION

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Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.

This material has not been tested for environmental effects.

13. DISPOSAL CONSIDERATIONS

Discharge, treatment, or disposal may be subject to national, state, or local laws. Mix with compatible chemical which is less flammable and incinerate. Since emptied containers retain product residue, follow label warnings even after container is emptied. Residual vapors may explode on ignition; do not cut, drill, grind, or weld on or near this container.

14. TRANSPORT INFORMATION

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

DOT (USA)

Possible Shipping Description(s):

Hydrocarbons, liquid, n.o.s.
3 UN 3295 II

Hydrocarbons, liquid, n.o.s.
3 (OIL) UN 3295 II

Sea - IMDG (International Maritime Dangerous Goods)

Class 3 Packing group II

Air - ICAO (International Civil Aviation Organization)

Possible Shipping Description(s):

Hydrocarbons, liquid, n.o.s.
3 UN 3295 II

15. REGULATORY INFORMATION

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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.
WHMIS (Canada) Status: controlled

WHMIS (Canada) Hazard Classification: B/2, D/2/B

SARA 311-312 Hazard Classification(s):
immediate (acute) health hazard
fire hazard

SARA 313: none, unless listed below

Carcinogenicity Classification (components present at 0.1% or more): none, unless listed below

TSCA (US Toxic Substances Control Act): This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

16. OTHER INFORMATION

Visit our website at www.EASTMAN.com or call 001-423-229-2000.

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information. Users should make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials, the safety and health of employees and customers, and the protection of the environment.

Highlighted areas indicate new or changed information.

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MATERIAL SAFETY DATA SHEET

Share Corporation
P.O. Box 245013
Milwaukee, WI 53224

GENERAL INFORMATION NUMBER: 414-355-4000
EMERGENCY TELEPHONE NUMBER: (800) 776-7192
CHEMTREC: (800) 424-9300

REVISION DATE: December 20, 2005
DATE OF ISSUE: February 15, 2006

I - Product Identification

Earth's Own Soy Pen Oil

PRODUCT CODE: 0335
CHEMICAL FORMULATION: Soy based penetrating oil.
NFPA HAZARD IDENTIFICATION SYSTEM: **HEALTH:** 1 **FLAMMABILITY:** 2 **REACTIVITY:** 0
HAZARD RATING: 4 - Extreme; 3 - High; 2 - Moderate; 1 - Slight; 0 - Insignificant

II - Hazardous Ingredients

Values reported as TWA unless noted.

SUBSTANCE	APPROX %	OSHA PEL	ACGIH TLV	EPA 40 CFR: 302	355	372	CAS #
Ethyl Lactate	25.0-35.0	N/E	N/E	N	N	N	97-64-3

Key: **PEL**: Permissible Exposure Limit **TLV**: Threshold Limit Value **C**: Ceiling level **STEL**: Short Term Exposure Limit
N/A: Not Applicable **N/D**: Not Determined **N/E**: Not Established **Y**: Yes **N**: No
302: CERCLA List of Hazardous Substances and Reportable Quantities (40 CFR 302.4).
355: SARA TITLE III / List of Extremely Hazardous Substances for Emergency Planning and Notification (40 CFR 355).
372: SARA TITLE III / List of Toxic Chemicals subject to Release Reporting (Community Right to Know) (40 CFR 372).

III - Physical Data

BOILING POINT (°F): N/D
SPECIFIC GRAVITY (WATER = 1): 0.92
VAPOR PRESSURE (mm Hg): N/D
VOC CONTENT (% by weight): N/D
VAPOR DENSITY (AIR = 1): N/D
EVAPORATION RATE (WATER = 1): N/D
SOLUBILITY IN WATER: Insoluble
pH: N/A
APPEARANCE AND ODOR: Clear, colorless to slight yellow liquid; soy scent.

IV - Fire and Explosion Hazard Data

FLASH POINT (°F): 143 **(TEST METHOD):** Closed Cup
FLAMMABLE LIMITS IN AIR (VOLUME %) **UPPER:** N/D **LOWER:** N/D
EXTINGUISHING MEDIA: Water spray, foam, carbon dioxide, dry chemical.
SPECIAL FIRE FIGHTING PROCEDURES: Treat as an oil fire. Cool fire exposed containers with water fog. Firefighters should be equipped with full protective gear including self-contained breathing apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARD: Rags soaked with any solvent present a fire hazard and should always be stored in UL listed or Factory Mutual approved, covered containers. Improperly stored rags can create conditions that lead to oxidation. Oxidation, under certain conditions can lead to spontaneous combustions. This product contains antioxidants to retard oxidation.

V - Reactivity Data

STABILITY: Stable
INCOMPATIBILITY: Strong oxidizers.
CONDITIONS TO AVOID: Excess heat and open flame.
HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may produce oxides of carbon.
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS TO AVOID: None

VI - Health Hazard Data

ROUTES OF ENTRY **INHALATION:** X **EYE CONTACT:** X **SKIN CONTACT:** X **INGESTION:** X
INGREDIENTS THAT ARE CONSIDERED BY OSHA, NTP, IARC TO BE SUSPECTED HUMAN CARCINOGENS: None
EFFECTS OF OVEREXPOSURE
IF IN EYES: Mild irritation.
IF ON SKIN: Mild irritation.
IF SWALLOWED: None known.
IF INHALED: May cause irritation of mucous membranes.
EMERGENCY AND FIRST AID PROCEDURES
IF IN EYES: Flush eyes and under eyelids with plenty of cool water for at least 15 minutes. If irritation persists, obtain medical attention.
IF ON SKIN: Wash affected area.
IF SWALLOWED: Contact physician or poison control center immediately.
IF INHALED: Remove person to fresh air. Get immediate medical attention.

VII - Spill or Leak Protection

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Ventilate area and remove all sources of ignition. Contain spill. Soak up spilled material with inert absorbent material and place in a properly marked closed container for proper disposal.
WASTE DISPOSAL METHOD: Consult local environmental authorities.

VIII - Special Protection Information

RESPIRATORY PROTECTION: Use with adequate ventilation. Do not breathe vapors or mists.
VENTILATION **LOCAL:** Recommended **MECHANICAL:** Not required
PROTECTIVE GLOVES: Chemical resistant.
EYE PROTECTION: Safety glasses or chemical goggles.
OTHER PROTECTIVE EQUIPMENT: Protective clothing, apron.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store in a cool, dry place away from heat or open flame. Keep container tightly closed when not in use.
OTHER PRECAUTIONS: Keep out of reach of children.

IX - Transportation Information (ground transportation only)

DOT PROPER SHIPPING NAME: None
DOT CLASS: None **DOT ID NUMBER:** None **DOT PACKING GROUP:** None

The shipping information listed above applies only to non-bulk (< 119 gallons) containers of this product. This product may have more than one proper shipping name depending on packaging, product properties, & mode of shipment. If any alteration of packaging, product, or mode of transportation is further intended, different shipping names and labeling may apply.

REVISION DATE: December 20, 2005 Prepared by: Technical Dept. DATE OF ISSUE: February 15, 2006

This information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof. Share Corporation assumes no responsibility for personal injury or property damage to the vendee, users or third parties caused by the material such vendees or users assume all risks associated with the use of this material.

MSDS Number: **S4106** * * * * * *Effective Date: 01/31/07* * * * * *Supercedes: 11/10/05*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

SODIUM HYPOCHLORITE SOLUTION

1. Product Identification

Synonyms: Bleach; hypochlorous acid, sodium salt; soda bleach; sodium oxychloride
CAS No.: 7681-52-9
Molecular Weight: 74.44
Chemical Formula: NaOCl
Product Codes: 9416, P005

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sodium Hypochlorite (as NaOCl)	7681-52-9	5%	Yes
Water	7732-18-5	95%	No

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION

EPAPA005001820

TO EYES AND RESPIRATORY TRACT. CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 0 - None
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
May cause irritation to the respiratory tract, (nose and throat); symptoms may include coughing and sore throat.
Ingestion:
May cause nausea, vomiting.
Skin Contact:
May irritate skin.
Eye Contact:
Contact may cause severe irritation and damage, especially at higher concentration.
Chronic Exposure:
A constant irritant to the eyes and throat. Low potential for sensitization after exaggerated exposure to damaged skin.
Aggravation of Pre-existing Conditions:
Persons with impaired respiratory function, or heart disorders (or disease) may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

EPAPA005001821

Note to Physician:
Consider oral administration of sodium thiosulfate solutions if sodium hypochlorite is ingested. Do not administer neutralizing substances since the resultant exothermic reaction could further damage tissue. Endotracheal intubation could be needed if glottic edema compromises the airway. For individuals with significant inhalation exposure, monitor arterial blood gases and chest x-ray.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Substance releases oxygen when heated, which may increase the severity of an existing fire. Containers may rupture from pressure build-up.
Explosion:
This solution is not considered to be an explosion hazard. Anhydrous sodium hypochlorite is very explosive.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Use water spray to cool fire-exposed containers, to dilute liquid, and control vapor.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require 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.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

EPAPA005001822

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Sodium Hypochlorite:
AIHA (WEEL) - STEL - 2 mg/m3

-OSHA Permissible Exposure Limit (PEL):
0.5 ppm (TWA), 1 ppm (STEL) as Chlorine

-ACGIH Threshold Limit Value (TLV):
1 ppm (TWA), 3 ppm (STEL) as Chlorine

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Colorless to yellowish liquid.

Odor:
Chlorine-like odor.

Solubility:
100% in water.

Density:
1.07 - 1.14

pH:
9 - 10 (neutral solution-no excess sodium hydroxide)

% Volatiles by volume @ 21C (70F):
ca. 95

Boiling Point:

EPAPA005001823

40C (104F) Decomposes slightly
Melting Point:
-6C (21F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
17.5 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Slowly decomposes on contact with air. Rate increases with the concentration and temperature. Exposure to sunlight accelerates decomposition. Sodium hypochlorite becomes less toxic with age.
Hazardous Decomposition Products:
Emits toxic fumes of chlorine when heated to decomposition. Sodium oxide at high temperatures.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Ammonia (chloramine gas may evolve),amines, ammonium salts, aziridine, methanol, phenyl acetonitrile, cellulose, ethyleneimine, oxidizable metals, acids, soaps, and bisulfates.

Conditions to Avoid:
Light, heat, incompatibles.

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11. Toxicological Information

No LD50/LC50 information found relating to normal routes of occupational exposure. Investigated as a tumorigen and mutagen. Irritation data: eye, rabbit, 10 mg - Moderate

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Sodium Hypochlorite (as NaOCl) (7681-52-9)	No	No	3
Water (7732-18-5)	No	No	None

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12. Ecological Information

EPAPA005001824

Environmental Fate:
No information found.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Dilute with water and flush to sewer if local ordinances allow, otherwise, whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------

Ingredient	TSCA	EC	Japan	Australia
Sodium Hypochlorite (as NaOCl) (7681-52-9)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Sodium Hypochlorite (as NaOCl) (7681-52-9)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\---------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Sodium Hypochlorite (as NaOCl) (7681-52-9)	No	No	No	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\---------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Sodium Hypochlorite (as NaOCl) (7681-52-9)	100	No	No
Water (7732-18-5)	No	No	No

EPAPA005001825

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: None allocated.
Poison Schedule: S5
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **0** Reactivity: **1**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. CAUSES SUBSTANTIAL BUT TEMPORARY EYE INJURY.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid breathing mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
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Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

EPAPA005001827

VALERO

MATERIAL SAFETY DATA SHEET

Spent Sulfidic Caustic

VALERO MARKETING & SUPPLY COMPANY
and Affiliates
P.O. Box 696000
San Antonio, TX 78269-6000

Emergency Phone Numbers
24 Hour Emergency: 866-565-5220
Chemtrec Emergency: 800-424-9300

General Assistance
General Assistance: 210-345-4593

BRAND NAMES: Valero, Diamond Shamrock, Shamrock, Ultramar, Beacon, Total

Section 1. Chemical Product and Company Identification

Common / Trade name : Spent Sulfidic Caustic

SYNONYMS/COMMON NAMES: This Material Safety Data Sheet applies to the listed products and synonym descriptions for Hazard Communication purposes only. Technical specifications vary greatly depending on the product and are not reflected in this document. Consult specification sheets for technical information. This product contains ingredients that are considered to be hazardous as defined by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Material uses : This product is intended for use as a refinery feedstock, fuel, or for use in engineered processes. Use in other applications may result in higher exposures and require additional controls, such as local exhaust ventilation and personal protective equipment.

MSDS # : 615

CAS # : Mixture

Section 2. Composition, information on ingredients

Name	CAS number	Concentration (%)
Sodium Sulfide	1313-82-2	1 - 15
Sodium Hydroxide	1310-73-2	0 - 15
Hydrogen Sulfide	7783-06-4	0.1 - 0.2

Section 3. Hazards Identification

DANGER: Corrosive material. Avoid contact with eyes and skin in mist or liquid form. Do not eat, drink, or smoke while using this product. Store in properly labeled tanks or containers. Do not store near strong acids, organic chemicals, e.g. solvents, alcohols, etc. contact with acids may generate toxic gas hydrogen sulfide.
The fumes may contain hydrogen sulfide, avoid breathing fumes. Wash with soap and water before eating, drinking, smoking or using toilet facilities.

Physical state : Liquid.

Emergency overview : Warning!

MAY BE FATAL IF INHALED.
HARMFUL IF SWALLOWED.
CAUSES SKIN IRRITATION.
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, RESPIRATORY TRACT, SKIN, EYE, LENS OR CORNEA.
Avoid contact with skin and clothing. Wash thoroughly after handling.

Continued on next page

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Eyes : Severely corrosive to the eyes. Inflammation of the eye is characterized by redness, watering and itching. May cause corneal opacity. Liquid, spray or mist may produce tissue damage, particularly to mucous membranes of eyes, mouth and respiratory tract. May cause severe irritation, redness, tearing, blurred vision and conjunctivitis. Severe eye damage may result. Liquid in the eye can cause severe destruction and blindness. These effects can occur rapidly effecting all parts of the eye. Mists at high concentrations can cause destructive burns.

Skin : Corrosive to skin on contact. Skin contact can produce inflammation and blistering. Skin inflammation is characterized by itching, scaling, reddening or, occasionally, blistering. Major potential hazard to skin. Contact with the skin can cause severe burns with deep ulcerations. Contact with solution or mist can cause multiple burns with temporary loss of hair at burn site. Solutions of 4% Sodium Hydroxide may not cause irritation and burning for several hours, while 25-50% solutions cause these effects in less than 3 minutes. Prolonged or repeated contact may cause moderate irritation, defatting (cracking), redness, itching, inflammation, dermatitis and possible secondary infection. High pressure skin injections are SERIOUS MEDICAL EMERGENCIES. Injury may not appear serious at first. Within a few hours, tissues will become swollen, discolored and extremely painful.

Inhalation : Corrosive to the respiratory system. Inhalation of the spray or mist may produce severe irritation of respiratory tract, characterized by coughing, choking or shortness of breath. Possible risk of irreversible effects. After the initial episode, individuals should be followed for the delayed appearance of pulmonary edema and chemical pneumonitis. Warning - Hydrogen sulfide (H2S) and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. Inhalation of vapors, mist or fumes (generated at high temperatures) may cause irritation to the eyes, nose, throat and respiratory tract. Additionally, inhalation of high concentrations may cause CNS (Central nervous System) depression and/or chemical pneumonitis. In worst cases immediate comma and death may occur. Hydrogen sulfide is an extremely toxic gas.

Inhalation of solution mists can cause mild irritation at 2 mg/m3. More severe burns and tissue damage at the upper respiratory tract, can occur at higher concentrations.

Ingestion : Irritating to mouth, throat and stomach. May cause burns to mouth, throat and stomach. May be fatal if swallowed. This product may be harmful or fatal if swallowed. This product may cause nausea, vomiting, diarrhea and restlessness. DO NOT INDUCE VOMITING. Aspiration into the lungs can cause severe chemical pneumonitis or pulmonary edema/hemorrhage, which can be fatal. Accidental ingestion of sodium hydroxide can cause severe burning and pain in lips, mouth, throat and stomach. Severe scarring of the throat can occur after swallowing. Death can result from ingestion.

Medical conditions aggravated by over-exposure : Preexisting eye, skin, and respiratory disorders may be aggravated by exposure to this product.

Over-exposure signs/symptoms : After the initial episode, individuals should be followed for the delayed appearance of pulmonary edema and chemical pneumonitis.

See toxicological information (section 11)

Continued on next page

Section 4. First Aid Measures

Eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately. May cause severe irritation, redness, tearing, blurred vision and conjunctivitis. Severe eye damage may result. Liquid in the eye can cause severe destruction and blindness. These effects can occur rapidly effecting all parts of the eye. Mists at high concentrations can cause destructive burns.

Skin contact : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention. Major potential hazard to skin. Contact with the skin can cause severe burns with deep ulcerations. Contact with solution or mist can cause multiple burns with temporary loss of hair at burn site. Solutions of 4% Sodium Hydroxide may not cause irritation and burning for several hours, while 25-50% solutions cause these effects in less than 3 minutes. Prolonged or repeated contact may cause moderate irritation, defatting (cracking), redness, itching, inflammation, dermatitis and possible secondary infection. High pressure skin injections are SERIOUS MEDICAL EMERGENCIES. Injury may not appear serious at first. Within a few hours, tissues will become swollen, discolored and extremely painful.

Inhalation : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention. Warning - Hydrogen sulfide (H2S) and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. Inhalation of vapors, mist or fumes (generated at high temperatures) may cause irritation to the eyes, nose, throat and respiratory tract. Additionally, inhalation of high concentrations may cause CNS (Central nervous System) depression and/or chemical pneumonitis. In worst cases immediate comma and death may occur. Hydrogen sulfide is an extremely toxic gas.

Inhalation of solution mists can cause mild irritation at 2 mg/m3. More severe burns and tissue damage at the upper respiratory tract, can occur at higher concentrations.

Ingestion : Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If potentially dangerous quantities of this material have been swallowed, call a physician immediately.

Notes to physician : In case of ingestion, treat symptomatically. Consideration should be given to the use of an intratracheal tube, to prevent aspiration. Individuals intoxicated by the product should be hospitalized immediately. Positive pressure ventilation may be necessary. After the initial episode, individuals should be followed for the delayed appearance of pulmonary edema and chemical pneumonitis. Individuals with chronic pulmonary disease will be more seriously impaired, and recovery from inhalation exposure may be complicated. In case of skin injection, prompt debridement of the wound is necessary to minimize necrosis and tissue loss.

Section 5. Fire Fighting Measures

Flammability of the product : May be combustible at high temperature.

Products of combustion : These products are sulfur oxides (SO_2, SO_3 etc.). Some metallic oxides.

Fire-fighting media and instructions : Use an extinguishing agent suitable for the surrounding fire. Foam, dry chemical or carbon dioxide type extinguishing agents may all be suitable for product, depending on size or potential size of fire and circumstances related to the situation. Plan fire protection and response strategy through consultation with local fire protection authorities or appropriate specialists.
Fires involving small amounts of combustibles may be smothered with suitable dry chemical. Use water on combustibles burning in vicinity of this material but use care as water applied directly to this acid results in evolution of heat and causes spattering. Use water to flush spills away from sources of ignition. Do not flush down public sewers.

No specific hazard.

Continued on next page

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.

Special remarks on fire hazards :

Special remarks on explosion hazards :

Section 6. Accidental Release Measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8).

Environmental precautions : If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Extremely flammable. Review Fire Fighting Measures section before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g., by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 800-424- 8802. For highway or railway spills, contact Chemtrec at 800-424-9300.

Section 7. Handling and Storage

Handling : Avoid contact with skin and clothing. Keep container closed. Use only with adequate ventilation. Avoid breathing vapor or mist. Wash thoroughly after handling. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use good personal hygiene practices. After handling this product, wash hands before eating, drinking, or using toilet facilities.

Storage : Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8. Exposure controls, personal protection

Engineering controls : Provide a readily-accessible eyewash facility and quick-drench safety shower. Keep container tightly closed and in a well-ventilated place. Local exhaust ventilation should be provided.

Personal protection

Eyes : 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 or dusts. face shield splash goggles

Skin : 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.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.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.

Hands : 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.

Continued on next page

Personal protective equipment (Pictograms) : Consult your Supervisor or S.O.P. for special handling directions.

Personal protection in case of a large spill : Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be adequate. Consult a specialist before handling this product. Wear MSHA/NIOSH-approved self-contained breathing apparatus or equivalent and full protective gear.

Component	Exposure limits
Sodium Hydroxide	**ACGIH TLV (United States, 1/2005).** CEIL: 2 mg/m^3 Form: All forms **NIOSH REL (United States, 12/2001).** CEIL: 2 mg/m^3 Form: All forms **OSHA PEL (United States, 8/1997).** TWA: 2 mg/m^3 8 hour/hours. Form: All forms
Hydrogen Sulfide	**ACGIH TLV (United States, 9/2004).** TWA: 10 ppm 8 hour/hours. Form: All forms STEL: 15 ppm 15 minute/minutes. Form: All forms **NIOSH REL (United States, 12/2001).** CEIL: 10 ppm 10 minute/minutes. Form: All forms **OSHA PEL Z2 (United States, 8/1997).** CEIL: 20 ppm Form: All forms AMP: 50 ppm 10 minute/minutes. Form: All forms

Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical state : Liquid.

Color : Dark Orange. Green. Light brown.

Odor : Sulfurous.

pH : >11 [Basic.]

Boiling point : >104°C (219.2°F)

Melting/freezing point : 0.5°C (32.9°F)

Specific gravity : 1.13 to 1.18 (Water = 1) (@ 60 °F)

Solubility : Soluble in cold water.

Section 10. Stability and reactivity data

Stability and reactivity : The product is stable.

Incompatibility with various substances : Extremely reactive or incompatible with oxidizing agents, reducing agents, organic materials, acids, water.

Section 11. Toxicological Information

Toxicity data

HYDROGEN SULFIDE can affect the body if it is inhaled or if it comes into contact with the eyes, skin, nose or throat. It can also affect the body if it is swallowed. It is colorless and has the odor of rotten eggs. However, its odor cannot be used as an indication of its presence since one of the first effects of H2S exposure is the loss of the sense of smell. Inhalation of high concentrations of hydrogen sulfide, 1000 to 2000 ppm, may cause coma after a single breath and may be rapidly fatal, convulsions can also occur. Hydrogen sulfide gas is a rapidly acting systemic poison which causes respiratory paralysis with consequent asphyxia at high concentrations (500 to 1000 ppm). A case of polyneuritis and encephalopathy from one day's exposure to a concentration insufficient to cause loss of consciousness has been reported. It irritates the eyes and respiratory tract at lower concentrations (50 to 500 ppm). Pulmonary edema and bronchial pneumonia may follow prolonged exposure at concentrations exceeding 250 ppm. Exposure to concentrations of hydrogen sulfide around 50 ppm for one hour may produce rhinitis, pharyngitis, bronchitis, pneumonitis, acute conjunctivitis with pain, lacrimation and photophobia, in severe form this may progress to keratoconjunctivitis and vesiculation of the corneal epithelium. In lower concentrations, hydrogen sulfide may cause headache, fatigue, irritability, insomnia, and gastrointestinal disturbances, as well as central nervous system disturbances, causing excitation

Continued on next page

and dizziness. Repeated exposure to hydrogen sulfide results in increased susceptibility, so that eye irritation, cough and systemic effects may result from concentrations previously tolerated without any effect.

Ingredient name	Test	Result	Route	Species
Sodium Sulfide	LD50	208 mg/kg	Oral	Rat
	LD50	205 mg/kg	Oral	Mouse
Sodium Hydroxide	LDLo	500 mg/kg	Oral	Rabbit
Hydrogen Sulfide	LC50	444 ppm (1 hour/hours)	Inhalation	Rat
	LC50	673 ppm (1 hour/hours)	Inhalation	Mouse

IDLH :

Chronic effects on humans : Contains material which causes damage to the following organs: lungs, upper respiratory tract, skin, eye, lens or cornea.

Other toxic effects on humans : Very dangerous in case of skin contact (corrosive, irritant, sensitizer, permeator), eye contact (irritant), ingestion or inhalation.

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Target organs : Contains material which causes damage to the following organs: lungs, upper respiratory tract, skin, eye, lens or cornea.

Section 12. Ecological Information

Ecotoxicity data

Ingredient name	Species	Period	Result
Sodium Sulfide	Poecilia reticulata (LC50)	96 hour/hours	15 mg/l
Hydrogen Sulfide	Pimephales promelas (LC50)	96 hour/hours	0.007 mg/l
	Oncorhynchus mykiss (LC50)	96 hour/hours	0.007 mg/l
	Pimephales promelas (LC50)	96 hour/hours	0.0071 mg/l
	Lepomis macrochirus (LC50)	96 hour/hours	0.009 mg/l
	Pimephales promelas (LC50)	96 hour/hours	0.0107 mg/l
	Oncorhynchus mykiss (LC50)	96 hour/hours	0.012 mg/l

Products of degradation :

Toxicity of the products of biodegradation : N/A

Section 13. Disposal Considerations

Waste disposal : Do not puncture or incinerate container. 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.

Consult your local or regional authorities.

Section 14. Transport Information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1760	Corrosive liquids, n.o.s.	8	II		NAERG #154

Continued on next page

TDG Classification	UN1760	Corrosive liquids, n.o.s.	8	II		Not available.

Section 15. Regulatory Information

United States

U.S. Federal regulations : TSCA 8(b) inventory: Sodium Sulfide; Hydrogen Sulfide; Sodium Hydroxide
TSCA precursor chemical list: Sodium Sulfide
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Sodium Sulfide; Sodium Hydroxide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Sodium Sulfide: Fire hazard, Immediate (acute) health hazard; Sodium Hydroxide: Immediate (acute) health hazard
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: Sodium Hydroxide
Clean Air Act (CAA) 112 accidental release prevention: Hydrogen Sulfide
Clean Air Act (CAA) 112 regulated flammable substances: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: Hydrogen Sulfide

State regulations : Pennsylvania RTK: Hydrogen Sulfide: (environmental hazard, generic environmental hazard); Sodium Hydroxide: (environmental hazard, generic environmental hazard)
Massachusetts RTK: Sodium Sulfide; Hydrogen Sulfide; Sodium Hydroxide
New Jersey: Sodium Sulfide; Hydrogen Sulfide; Sodium Hydroxide
California Prop. 65: No products were found.

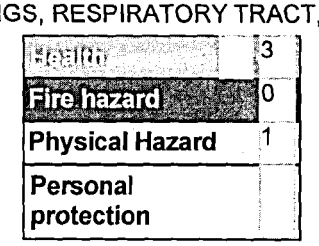
Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class E: Corrosive material
CEPA DSL: Sodium Sulfide; Sodium Hydroxide

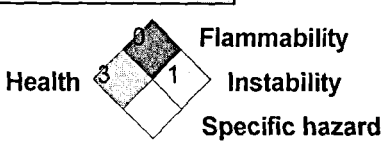
Section 16. Other Information

Label requirements : MAY BE FATAL IF INHALED.
HARMFUL IF SWALLOWED.
CAUSES SKIN IRRITATION.
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, RESPIRATORY TRACT, SKIN, EYE, LENS OR CORNEA.

Hazardous Material Information System (U.S.A.) :



National Fire Protection Association (U.S.A.) :



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Disclaimer

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Definitions of Material Safety Data Sheet Terminology

GOVERNMENT AGENCIES AND PRIVATE ASSOCIATIONS

ACGIH - American Conference of Governmental Industrial Hygienists, (private association)
DOT - United States Department of Transportation
EPA - United States Environmental Protection Agency
IARC - International Agency for Research on Cancer, (private association)
NFPA - National Fire Protection Association, (private association)
MSHA - Mine Safety and Health Administration, U.S. Department of Labor
NIOSH - National Institute of Occupational Safety and Health, U.S. Department of Health and Human Services
NTP - National Toxicology Program, (private association)
OSHA - Occupational Safety and Health Administration, U.S. Department of Labor
WHMIS- Workplace Hazardous Material Information System
CSA- Canadian Standards Association

HAZARD AND EXPOSURE INFORMATION

Acute Hazard - An adverse health effect which occurs rapidly as a result of short term exposure.
CAS # - American Chemical Society's Chemical Abstract service registry number which identifies the product and/or ingredients.
Ceiling - The concentration that should not be exceeded during any part of the working exposure
Chronic Hazard - An adverse health effect which generally occurs as a result of long term exposure or short term exposure with delayed health effects and is of long duration
Fire Hazard - A material that poses a physical hazard by being flammable, combustible, phyrophoric or an oxidizer as defined by 29 CFR 1910.1200
Hazard Class - DOT hazard classification
Hazardous Ingredients - Names of ingredients which have been identified as health hazards
IDLH- Immediately Dangerous to Life and Health, the airborne concentration below which a person can escape without respiratory protection and exposure up to 30 minutes, and not suffer debilitating or irreversible health effects. Established by NIOSH.
mg/m3 - Milligrams of contaminant per cubic meter of air, a mass to volume ratio
N/A - Not available or no relevant information found
NA - Not applicable
PEL - OSHA permissible exposure limit; an action level of one half this value may be applicable
ppm - Part per million (one volume of vapor or gas in one million volumes of air)
Pressure Hazard - A material that poses a physical hazard due to the potential of a sudden release of pressure such as explosive or a compressed gas as defined by 29 CFR 1910.1200
Reactive Hazard - A material that poses a physical hazard due to the potential to become unstable reactive, water reactive or that is an organic peroxide as defined by 29 CFR 1910.1200.
STEL - The ACGIH Short-Term Exposure Limit, a 15-minute Time-Weighted Average exposure which should not be exceeded at any time during a workday, even if the 8-hour TWA is less than the TLV.
TLV - ACGIH Threshold Limit Value, represented herein as an 8-hour TWA concentration.
8-hour TWA - The time weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.
LD50 – Single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the

Continued on next page

death of 50% of the defined animal population.
LC50 - The concentration of a substance in air that, when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.

Material Safety Data Sheet

Stearic acid

ACC# 95204

Section 1 - Chemical Product and Company Identification

MSDS Name: Stearic acid
Catalog Numbers: AC174490000, AC174490010, AC174490025, AC419700000, AC419700010
Synonyms: Octadecanoic acid
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
57-11-4	Stearic acid	>=97%	200-313-4

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Not available. Appearance: white flakes.
Not available.
Target Organs: Respiratory system, eyes, skin.

Potential Health Effects
Eye: Causes eye irritation.
Skin: Causes mild skin irritation. May be harmful if absorbed through the skin.
Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed.
Inhalation: Causes respiratory tract irritation. May be harmful if inhaled.
Chronic: Not available.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

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Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Get medical aid. Wash mouth out with water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Material will burn in a fire. Combustible solid. Dangerous fire hazard in the form of dust when exposed to heat or flame.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: 196 deg C (384.80 deg F)
Autoignition Temperature: 395 deg C (743.00 deg F)
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Use a spark-proof tool.

Section 7 - Handling and Storage

Handling: Use spark-proof tools and explosion proof equipment. Avoid breathing dust, vapor, mist, or gas. Avoid contact with skin and eyes. Keep away from heat, sparks and flame.
Storage: Keep away from heat, sparks, and flame. Store in a cool, dry place. Store in a tightly closed container. Keep from contact with oxidizing materials. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Stearic acid	none listed	none listed	none listed

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OSHA Vacated PELs: Stearic acid: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Not available.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Flakes
Appearance: white
Odor: fatty odor
pH: Not available.
Vapor Pressure: 1mmHg @174 deg C
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 361 deg C @760mmHg
Freezing/Melting Point:67 - 69 deg C
Decomposition Temperature: Not available.
Solubility: Slightly soluble.
Specific Gravity/Density:0.840
Molecular Formula:C18H36O2
Molecular Weight:284.47

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, oxidizing agents, reducing agents, bases.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 57-11-4: WI2800000
LD50/LC50:
CAS# 57-11-4:
Draize test, rabbit, skin: 500 mg/24H Moderate;
Skin, rabbit: LD50 = >5 gm/kg;

Carcinogenicity:

CAS# 57-11-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	FLAMMABLE SOLIDS, ORGANIC, N.O.S.	FLAMMABLE SOLID, ORGANIC, N.O.S.*
Hazard Class:	4.1	4.1
UN Number:	UN1325	UN1325
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 57-11-4 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 57-11-4: fire.
Section 313 No chemicals are 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 Substances 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:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 57-11-4 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XI F
Risk Phrases:
R 11 Highly flammable.
R 36/37/38 Irritating to eyes, respiratory system and skin.

Safety Phrases:
S 16 Keep away from sources of ignition - No smoking.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)
CAS# 57-11-4: 0
Canada - DSL/NDSL
CAS# 57-11-4 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2B, B4.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 57-11-4 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #2 Date: 8/04/2005

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Catalog Number: 102959
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 102959

Product name: STEARYL ALCOHOL

Synonyms: 1-Octadecanol; Decyl Octyl Alcohol; Stearol
Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
STEARYL ALCOHOL	112-92-5	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

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5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards: Burning produces irritant fumes.
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: ca. 195 °C (open cup)
Autoignition temperature: 450°C
NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment.
Environmental precautions: Prevent product from entering drains.
Methods for cleaning up: Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor White
Physical state: Solid
Formula: C18H38O
Molecular weight: 270.5
Melting point/range: 57.4 - 57.7 °C
Boiling point/range: 340 - 360 °C at 1013 hPa
Density: .8124 g/cm3 at 59 °C
Vapor pressure: .00015 hPa at 20 °C

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Evaporation rate:	No data available
Vapor density:	No data available
Solubility (in water):	Slightly soluble
Flash point:	ca. 195 °C (open cup)
Autoignition temperature:	450°C

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-

Incompatible with strong acids, caustics, aliphatic amines, isocyanates.

Conditions to avoid: Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
STEARYL ALCOHOL	RG2010000	Oral LD50 Rat : 20 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
STEARYL ALCOHOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
STEARYL ALCOHOL	Not Listed	Not Listed	LC50 (96 hr) fathead minnow: 0.0016 mg/L.

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
STEARYL ALCOHOL	Not Listed	Not Listed	Not Listed

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Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
STEARYL ALCOHOL	Not Listed	indicator 2; Not sponsored	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
STEARYL ALCOHOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
STEARYL ALCOHOL	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
STEARYL ALCOHOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
STEARYL ALCOHOL	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present

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EU EINECS List -	204-017-6; C18H38O
Inventory - Japan:	2-217; 2-3704
Korean KECL:	KE-26419
Philippines PICCS:	Present

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
STEARYL ALCOHOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
STEARYL ALCOHOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
STEARYL ALCOHOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety

Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001847

Material Safety Data Sheet

C14/C16 3-HYDROXY-1-ALKANE SULFONIC ACID (SODIUM SALT)

November 11, 2000
MSDS Number: 006415
Revision Number: 2

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

CHEVRON PHILLIPS CHEMICAL COMPANY LP
10001 Six Pines Drive
The Woodlands, TX 77380

PHONE NUMBERS
HEALTH:
Chevron Phillips Emergency Information Center 866.442.9628 (North America) and 1.832.813.4984(International)
TRANSPORTATION:
North America: CHEMTREC 800.424.9300 or 703.527.3887
ASIA: 1.703.527.3887
EUROPE: BIG .32.14.584545 (phone) or .32.14.583516 (telefax)
SOUTH AMERICA SOS-Cotec
Inside Brazil: 0800.111.767
Outside Brazil: 55.19.3467.1600
Technical Services: (832) 813-4862
For Additional MSDSs: (800) 852-5530

2. COMPOSITION/INFORMATION ON INGREDIENTS

100.0 % C14/C16 3-HYDROXY-1-ALKANE SULFONIC ACID (SODIUM SALT)

CONTAINING

COMPONENTS	AMOUNT	LIMIT/QTY	AGENCY/TYPE
C14-16 H-ALKANE/ALKENE NA SULF			

Chemical Name: C14-16-ALKANE HYDROXY & C14-16 ALKENE NA SULFONATE
CAS68439576 100.00% NONE NA

INCLUDING

C14/C16 3-HYDROXY-1-ALKANE SULFONIC ACID (SODIUM SALT)
80.00%

C14/C16 2-ALKENE-1-SULFONIC ACID (SODIUM SALT)
15.00%

3-ALKENE SULFONATE
C14/C16 3-ALKENE-1-SULFONIC ACID (SODIUM SALT)
5.00%

COMPOSITION COMMENT:
This material is on the Toxic Substances Control Act Chemical Substances Inventory.

3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

White powder

- **CAUSES EYE IRRITATION**
- **MAY CAUSE RESPIRATORY TRACT IRRITATION IF INHALED**

****

IMMEDIATE HEALTH EFFECTS
EYE:
Contact with the eyes causes irritation.
SKIN:
Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin.
INGESTION:
Not expected to be harmful if swallowed.
INHALATION:
The dust from this material may cause respiratory irritation.
SIGNS AND SYMPTOMS OF EXPOSURE:
Eye irritation: may include pain, tearing, reddening, swelling, and impaired vision. Respiratory irritation: may include coughing and difficulty breathing.

4. FIRST AID MEASURES

EYE:
Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention if irritation persists.
SKIN:
No specific first aid measures are required because this material is not expected to be harmful if it contacts the skin. As a precaution, remove clothing and shoes if contaminated. Wash skin with soap and water. Wash

or clean contaminated clothing and shoes before reuse.

INGESTION:

No specific first aid measures are required because this material is not expected to be harmful if swallowed. Do not induce vomiting. As a precaution, give the person a glass of water or milk to drink and get medical advice. Never give anything by mouth to an unconscious person.

INHALATION:

Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.

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5. FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:

Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

NFPA Classification (NFPA 30 1-7.3.2): Class IIIB: Combustible.

FLAMMABLE PROPERTIES:

FLASH POINT: >230F (>110C)
AUTOIGNITION: NA
FLAMMABILITY LIMITS (% by volume in air): Lower: NA Upper: NA
EXTINGUISHING MEDIA:
CO2, dry chemical, foam and water fog.

NFPA RATINGS: Health 1; Flammability 1; Reactivity 0.

FIRE FIGHTING INSTRUCTIONS:

This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

COMBUSTION PRODUCTS:

Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide. Combustion may form oxides of sulfur.

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6. ACCIDENTAL RELEASE MEASURES

CHEMTREC EMERGENCY NUMBER (24 hr): (800)424-9300 or (703)527-3887
International Collect Calls Accepted

ACCIDENTAL RELEASE MEASURES:

Sweep up material and place in a disposable container.

Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

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7. *HANDLING AND STORAGE*

Do not get in eyes. Avoid breathing dust.

Store in cool, dry place, out of direct sunlight.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS
If user operations generate airborne material, use process enclosures, local exhaust ventilation, or other engineering controls to control exposure.

PERSONAL PROTECTIVE EQUIPMENT
EYE/FACE PROTECTION:
Wear eye protection such as safety glasses, chemical goggles, or face shields if engineering controls or work practices are not adequate to prevent eye contact.
SKIN PROTECTION:
No protective clothing is normally required.
RESPIRATORY PROTECTION:
If user operations generate harmful levels of airborne material that is not adequately controlled by ventilation, wear a NIOSH approved respirator that provides adequate protection. Use the following elements for air-purifying respirators: High Efficiency Particulate Air.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DESCRIPTION:
White powder

pH:	NA
VAPOR PRESSURE:	<1 mm Hg
VAPOR DENSITY (AIR=1):	>8
BOILING POINT:	>480F (>249C)
FREEZING POINT:	>80F (>27C)
MELTING POINT:	>80F (>27C)
SOLUBILITY:	Insoluble in organic solvents; Soluble in water.
SPECIFIC GRAVITY:	NA
DENSITY:	NA
VISCOSITY:	NA
PERCENT VOLATILE (VOL):	0%

10. STABILITY AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:

NDA
CHEMICAL STABILITY:
This material is considered chemically and thermally stable.
CONDITIONS TO AVOID:
No data available.
INCOMPATIBILITY WITH OTHER MATERIALS:
May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
HAZARDOUS POLYMERIZATION:
Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS:
The eye irritation hazard is based on data for a similar material.
SKIN EFFECTS:
The skin irritation hazard is based on data for a similar material. The acute dermal toxicity is based on data for a similar material.
ACUTE ORAL EFFECTS:
The acute oral toxicity is based on data for a similar material.
ACUTE INHALATION EFFECTS:
The respiratory irritation hazard is based on data for a similar material.

12. ECOLOGICAL INFORMATION

ECOTOXICITY:
The toxicity of this material to aquatic organisms has not been evaluated. Consequently, this material should be kept out of sewage and drainage systems and all bodies of water.
ENVIRONMENTAL FATE:
This material is expected to be readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT SHIPPING NAME: NOT DESIGNATED AS A HAZARDOUS MATERIAL BY THE FEDERAL DOT
DOT HAZARD CLASS: NOT APPLICABLE
DOT IDENTIFICATION NUMBER: NOT APPLICABLE

DOT PACKING GROUP: NOT APPLICABLE

15. REGULATORY INFORMATION

SARA 311 CATEGORIES:

1. Immediate (Acute) Health Effects: YES
2. Delayed (Chronic) Health Effects: NO
3. Fire Hazard: NO
4. Sudden Release of Pressure Hazard: NO
5. Reactivity Hazard: NO

REGULATORY LISTS SEARCHED:

01=SARA 313	11=NJ RTK	22=TSCA Sect 5(a)(2)
02=MASS RTK	12=CERCLA 302.4	23=TSCA Sect 6
03=NTP Carcinogen	13=MN RTK	24=TSCA Sect 12(b)
04=CA Prop 65-Carcin	14=ACGIH TWA	25=TSCA Sect 8(a)
05=CA Prop 65-Repro Tox	15=ACGIH STEL	26=TSCA Sect 8(d)
06=IARC Group 1	16=ACGIH Calc TLV	27=TSCA Sect 4(a)
07=IARC Group 2A	17=OSHA PEL	28=Canadian WHMIS
08=IARC Group 2B	18=DOT Marine Pollutant	29=OSHA CEILING
09=SARA 302/304	19=Chevron TWA	30=Chevron STEL
10=PA RTK	20=EPA Carcinogen	

None of the listed components of this material are found on the regulatory lists indicated.

EU RISK AND SAFETY LABEL PHRASES:
R36: Irritating to eyes.
S25: Avoid contact with eyes.
S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

EU SYMBOL(S): Xi.
WHMIS CLASSIFICATION:
Class D, Division 2, Subdivision B: Toxic Material
-Skin or Eye Irritation

16. OTHER INFORMATION

NFPA RATINGS: Health 1; Flammability 1; Reactivity 0;
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT:
This revision updates Section 1.

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV	- Threshold Limit Value	TWA	- Time Weighted Average
STEL	- Short-term Exposure Limit	TPQ	- Threshold Planning Quantity
RQ	- Reportable Quantity	PEL	- Permissible Exposure Limit
C	- Ceiling Limit	CAS	- Chemical Abstract Service Number

A1-5 - Appendix A Categories () - Change Has Been Proposed
NDA - No Data Available NA - Not Applicable

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Toxicology and Health Risk Assessment Unit, CRTC, P.O. Box 1627, Richmond, CA 94804

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The above information 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 available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

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THIS IS THE LAST PAGE OF THIS MSDS

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MATERIAL SAFETY DATA SHEET

Sulfuric Acid

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Sulfuric Acid
Synonyms: Sulphuric Acid, Hydrogen Sulphate, Oil of Vitriol, Battery Acid, Sulfuric acid 66BE, Sulfuric Acid All Grades
Product Use: Used in manufacture of fertilizers, explosives, other acids, metal pickling and petroleum processing.

Supplier: HARCROS CHEMICALS, INC.
5200 Speaker road
Kansas City, KS 66101-1095
913-321-3131

Date: 12/19/2007
MSDS No. 104457

Transportation Emergency Telephone Number: 1-800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	% by Wt.	CAS Number
Sulfuric Acid	70-100%	7664-93-9
Non-Hazardous Ingredients		
Water	0-30%	7732-18-5

3. HAZARD INFORMATION

EMERGENCY OVERVIEW

Danger! Extremely corrosive. Causes severe burns and eye damage. Mist: Causes respiratory irritation. Harmful if inhaled. Harmful or fatal if swallowed. Reacts violently with water. Concentrated Sulfuric Acid will react with many organic materials and may cause fire due to the heat of the reaction. Not flammable, but reacts with most metals to form explosive/flammable hydrogen gas. Read the entire MSDS for a more thorough evaluation of the hazards.

National Fire Protection Association (NFPA) Rating
Hazardous Materials Identification System (HMIS) Rating

	NFPA	HMIS	4 = Extreme/Severe
Health	3	3	3 = High/Serious
Fire	0	0	2 = Moderate
Reactivity	2	2	1 = Slight
Special	W		0 = Minimum
Personal Protection		C	W= Water Reactive

EPAPA005001855

3. HAZARD INFORMATION (continued)

Exposure Limits:

	ACGIH (TLV)	OSHA (PEL)	NIOSH (REL)
Sulfuric Acid	1 mg/m^3 (TWA) 3 mg/m^3 (STEL) A2 (Notations) refers to sulfuric acid contained in strong inorganic acid mists; suspected human carcinogen	1 mg/m^3 (TWA)	1 mg/m^3 (TWA)

POTENTIAL HEALTH EFFECTS:

Eye Contact: Immediate pain, severe burns and corneal damage, which may result in permanent blindness.

Skin Contact: Causes burns, and brownish or yellow stains. Concentrated solutions may cause second or third degree burns with severe necrosis. Prolonged and repeated exposure to dilute solutions may cause irritation, redness, pain and drying and cracking of the skin.

Inhalation: Causes respiratory irritation and at high concentrations may cause severe injury, burns, or death. Effects of exposure may be delayed.

Ingestion: Causes severe irritation or burns of the mouth, throat, and esophagus.

Existing Medical Conditions Possibly Aggravated By Exposure: Skin irritation may be aggravated in individuals with existing skin lesions. Breathing of vapors or sprays (mists) may aggravate acute or chronic asthma and chronic pulmonary disease such as emphysema and bronchitis.

Carcinogenicity: Strong inorganic acid mists containing sulfuric acid (Occupational exposures) : Proven (Human, Group 1, IARC) ; Suspected (Human Group A2, ACGIH) ; Group 3 (NTP) ; Classification not applicable to sulfuric acid and sulfuric acid solutions.

4. FIRST AID MEASURES

General: Corrosive effects on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. SPEED IS ESSENTIAL. OBTAIN IMMEDIATE MEDICAL ATTENTION.

Skin Contact: Immediately flush skin with running water for a **minimum** of 20 minutes. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. Obtain medical attention 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. If immersion is not practical, compresses of iced water can be applied. Avoid freezing tissues.

Discard heavily contaminated clothing and shoes in a manner that limits further exposure. Otherwise, wash clothing separately before reuse.

Eye Contact: Immediately flush eyes with running water for a ***minimum*** of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.

Inhalation: Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Do not use mouth-to-mouth method if victim ingested or inhaled the substance: 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. Obtain medical attention IMMEDIATELY.

Ingestion: DO NOT INDUCE VOMITING. If victim is alert and not convulsing, rinse mouth and give ½ to 1 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. IMMEDIATELY contact local poison control center. Vomiting may need to be induced but should be directed by a physician or a poison control centre. IMMEDIATELY transport victim to an emergency facility.

Note to Physicians: This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Following exposure the patient should be kept under medical review for at least 48 hours as delayed pneumonitis may occur. DO NOT attempt to neutralize the acid with weak bases since the reaction will produce heat that may extend the corrosive injury

5. FIRE AND EXPLOSION DATA

Flash Point (method): Not applicable. Not combustible
Flammable Limits (Lower): Not applicable.
Flammable Limits (Upper): Not applicable.
Auto Ignition Temperature: Not applicable.
Combustion and Thermal Decomposition Products: Oxides of Sulfur

Fire and Explosion Hazards: Not flammable but highly reactive. Strong dehydrating agent, which may cause ignition of finely divided combustible materials on contact. Reacts violently with water with evolution of heat can react with organic materials explosively (See Section 10). Reacts with many metals to liberate hydrogen gas which can form explosive mixtures with air. Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside drums, or any types of steel containers or tanks upon storage. Oxides of sulfur may be produced in fire.

Fire Fighting Instructions: Wear a NIOSH/MSHA approved self-contained breathing apparatus if vapors or mists are present and full protective clothing. For fighting fires in close proximity to spill or vapors, use acid-resistant personal protective equipment. Evacuate personnel to a safe area. Prevent unauthorized entry to fire area. Dike area to contain runoff and prevent contamination of water sources. Neutralize runoff with lime, soda ash or other suitable neutralizing agents (see Deactivating Chemicals, Section 6). Cool containers that are exposed to flame with streams of water until fire is out.

NOTE: Also see "Section 10 - Stability and Reactivity"

6. ACCIDENTAL RELEASE MEASURES

Steps to be taken in the event of a spill or leak: Remove all ignition sources (no smoking, flares, sparks or flames). All equipment should be grounded. Ventilate area. Use appropriate Personal Protection Equipment. Prevent liquid from entering sewers or waterways. Stop or reduce leak if safe to do so.
Small Spills: Cover with DRY earth, sand or other non-combustible material. Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
Large Spills: Prevent liquid from entering sewers or waterways. Dike with inert material (sand, earth, etc.). Collect into plastic containers for disposal. Consider insitu neutralization and disposal. Ensure adequate decontamination of tools and equipment following clean up. Comply with Federal, Provincial/State and local regulations on reporting releases.

Waste Disposal Methods: Dispose of waste material at an approved waste treatment/disposal facility, in accordance with applicable regulations. Do not dispose of waste with normal garbage or to sewer systems.

Note - Clean-up material may be a RCRA Hazardous Waste on disposal.
- Spills are subject to CERCLA reporting requirements: RQ = 1000 lbs.

7. HANDLING AND STORAGE

Handling: Wear appropriate Personal Protection Equipment. Do not breathe sprays or mists. Do not ingest. Do not get in eyes, on skin or on clothing. Keep ignition sources away from sulfuric acid storage, handling and transportation equipment. Locate safety shower and eyewash station close to chemical handling area. Use EXTREME care when diluting with water. **Always add acid to water.** CAUTION: Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside drums, or any types of steel containers or tanks upon storage. **Carbon steel storage tanks must be vented.** People working with this chemical should be properly trained regarding its hazards and its safe use.

Storage: If stored in non-reactive container, keep container tightly closed. Metal and, specifically carbon steel, storage tanks must be vented due to hydrogen release as noted above.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Local exhaust ventilation should be applied wherever there is an incidence of point source emissions or dispersion of regulated contaminants in the work area. Ventilation control of the contaminant as close to its point of generation is both the most economical and safest method to minimize personnel exposure to airborne contaminants. The most effective measures are the total enclosure of processes and the mechanization of handling procedures to prevent all personal contact with sulfuric acid. Electrical installations should be protected against the corrosive action of acid vapors. Smoking should be prohibited in areas in which sulfuric acid is stored or handled.

Respiratory Protection: A NIOSH/MSHA approved air-purifying respirator equipped with acid gas/fume, dust, mist cartridges for concentrations up to 10 mg/m^3. An air-supplied respirator if concentrations are higher or unknown.

Skin Protection: RECOMMENDED: Impervious (i.e., neoprene, PVC) gloves, coveralls, boots and/or other acid resistant protective clothing.

Eye Protection: Tight-fitting chemical goggles and face shield.

Other Personal Protective Equipment: Where there is a danger of spilling or splashing, acid resistant aprons or suits should be worn. Trouser legs should be worn outside (not tucked in) rubber boots. Safety showers and eyewash fountains should be installed in storage and handling areas.

Pictograms

EXPOSURE GUIDELINES:

HAZARDOUS INGREDIENT(S):

Sulfuric Acid:	
ACGIH TLV	1 mg/m^3 (TWA) 8 hours
ACGIH STEL	3 mg/m^3 15 minutes
OSHA PEL	1 mg/m^3 (TWA) 8 hours
NIOSH REL	1 mg/m^3 (TWA) 10 hours

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight: 98.08
Physical State: Liquid
Appearance and Odor: Odourless, clear to amber, heavy, oily liquid. A pungent odor may exist If certain impurities are present in the acid.
Odor Threshold: Not applicable
Boiling Point: 77.67%: 193°C (380°F); 93.19%: 276°C (529°F); 98%: 330°C (626°F)
Melting/Freezing Point: 77.67%: -11.2°C (+11.6°F); 93.19%: -29.5°C (-21.1°F) ; 98%: -1.1°C (30°F)
Vapor Pressure at 40°C (102°F): 77.67%: 1.2 mmHg; 93.19%: 0.0016 mmHg; 98%: 0.002 mmHg
Specific Gravity at 15°C (60°F): 77.67%: 1.7059; 93.19%: 1.8354; 98%: 1.8437
Vapor Density: (Air=1): 3.4 sulfuric acid component
Bulk Density: Not applicable (see specific gravity)
Evaporation Rate: Not applicable
Solubility: Miscible in all proportions in water.
pH: 0.3 (1N solution at 25°C/78°F)

10. STABILITY AND REACTIVITY

Stability: The product is stable under normal conditions.

Conditions to Avoid: Keep away from heat and sources of ignition. Avoid temperatures, which may have a negative effect on the materials of construction used in equipment.

Materials to Avoid: Contact with organic materials (such as alcohol, acrylonitrile, chlorates, carbides, epichlorohydrin, fulminates, isoprene, nitrates and picrates) may cause fire and explosions. Contact with metals may produce flammable hydrogen gas. When diluting, add acid to water. Do NOT add water to the acid.

Hazardous Decomposition or Combustion Products: Toxic gases and vapors (e.g. sulfur dioxide, sulfuric acid vapors/mists and sulfur trioxide) may be released when sulfuric acid decomposes.

Hazardous Polymerization: Will not occur

Corrosivity: The product is corrosive.

11. TOXICOLOGICAL INFORMATION

Toxicological Data: LD_{50} (oral, rat) = 2140 mg/kg
LC_{50} (inhalation, rat) = 510 mg/m^3 for 2 hrs
Skin effects (rabbit): Severe irritation
Eye effects (rabbit): Severe irritation

Carcinogenicity Data: The International Agency for Research on Cancer (IARC) has concluded that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to man, causing cancer of the larynx (the voice box). Although no direct link has been established between exposure to sulfuric acid, itself, and cancer in man, exposure to any mist or aerosol during the use of this product should be avoided See Section 3. Hazard Information, regarding Potential Health Effects (Long Term Exposure) for further discussion.

The National Toxicology Program (NTP) does not classify sulfuric acid or strong inorganic acid mists as known (or reasonably anticipated to be) human carcinogens.

Reproductive Effects: Slightly embryotoxic in rabbits (a minor, rare skeletal variation). The animals were exposed to 5 and 20 mg/m^3 for 7 hrs/day throughout pregnancy. Slight maternal toxicity was present at the highest dose in both species.

Mutagenicity Data: Cytogenic analysis (hamster) ovaries 4 mmol/L

Teratogenicity Data: Not teratogenic in mice and rabbits.

Synergistic Materials: None known

12. ECOLOGICAL INFORMATION

Ecotoxic Effects: Harmful to aquatic life in very low concentrations. May be dangerous if it enters water intake; Fish toxicity; 2.8 µg/L 96 hrs LC50 Rainbow trout.

Products of Degradation: These products are sulphur oxides (SO2, SO3)

Toxicity of the Products of Degradation: The products of degradation are more toxic than the original product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Cleaned up material may be a hazardous waste as defined by Resource Conservation and Recovery Act (RCRA) on disposal due to the corrosivity characteristic. DO NOT flush to surface water or sanitary sewer system. Waste must be disposed of in accordance with federal, state, provincial and local environmental control regulations.

14. TRANSPORT INFORMATION

U.S. (Under DOT)

Shipping Name: Sulfuric acid
Hazard Class or Division: 8
Identification No.: UN1830
Packing Group: II
Reportable Quantity = 1000 pounds (454 kg)
IMO: 8
IATA/ICAO Class: 8

ER Guide: 137

Canada (Under TDG)

Shipping Name: Sulfuric acid
Classification(s): Class 8
Product Identification No. (PIN): UN1830
Packing Group: II
Regulated Limit: 50 kg

15. REGULATORY INFORMATION

U.S.A.

SARA Title III HAZARD CATEGORIES AND LISTS

Product Hazard Categories		Lists	
Acute (Immediate) Health:	Yes	Extremely Hazardous Substance (40 CFR 355, SARA Title III Section 302)	Yes
Chronic (Delayed) Health:	Yes		
Fire:	No	CERCLA Hazardous Substance (40 CFR 302.4)	Yes
Reactivity:	Yes		
Sudden Release of Pressure:	No	Toxic Chemical (40 CFR 372.65, SARA Title III Section 313)	Yes

Reportable Quantity (RQ) under U.S. EPA CERCLA: RQ=1000 lb / 454 kg

TSCA Inventory Status: Reported/Included

Right-To-Know: Illinois, Massachusetts, New Jersey, Pennsylvania

Other Regulations/Legislation which apply to this product: New Jersey Special Health Hazard Substance List and Environmental Hazardous Substance; Minnesota, Florida, Rhode Island Hazardous Substance; California Director's List of Hazardous Substances; Massachusetts Extraordinarily Hazardous Substance List

15. REGULATORY INFORMATION (continued)

CANADA

Workplace Hazardous Materials Information System (WHMIS)

WHMIS Classification(s): Class D1A - Very Toxic
Class D2B – Suspected Human Carcinogen
Class E - Corrosive

WHMIS Health Effects Index: Acute Lethality - very toxic – immediate
Materials Causing Other Toxic Effects- Chronic
Corrosive to animal skin

WHMIS Ingredient Disclosure List: Confirmed A; Meets criteria for disclosure at 1% or greater.

National Pollutant Release Inventory (NPRI): Included

European:

EEC CLASSIFICATION: C, R 35
EINECS: 231-639-5

16. OTHER INFORMATION

REFERENCES:

1. **RTECS-Registry of Toxic Effects of Chemical Substances,** On-line search, Canadian Centre for OccupationalHealth and Safety RTECS database, Doris V. Sweet, Ed., National Institute for Occupational Safety and Health, U.S. Dept. of Health and Human Services, Cincinnati, Entry Update/Dec1997.

2. ChemAdvisor, Canadian Centre for Occupational Health and Safety, October 1998.

3. **CHEMINFO**, through **"CCINFOdisc"**, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, (August, 1998).

4. **Hazardous Substances Data Bank** , through "CCINFO disc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, (2007).

5. NIOSH POCKET GUIDE TO CHEMICAL HAZARDS, U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, 2006.

6. "8th Report on Carcinogens – 1998 Summary", National Toxicology Program.

7. Sax, N.I., "Dangerous Properties of Industrial Materials", 7th Edition, 1989.

8. "2006 Threshold Limit Values and Biological Exposure Indices", American Conference of Government Industrial Hygienists, 2006.

9. Merck, 12th Edition, 1999.

10. Supplier's Material Safety Data Sheets.

16. OTHER INFORMATION (continued)

Legend:

AFFF	- Aqueous Film Forming Foam
CAS #	- Chemical Abstracts Service Registry Number
CERCLA	- Comprehensive Environmental Response, Compensation, and Liability Act
CFR	- Code of Federal Regulations
DOT	- Department of Transportation
EPA	- Environmental Protection Agency
LC_{50}	- The concentration of material in air expected to kill 50% of a group of test animals
LD_{50}	- Lethal Dose expected to kill 50% of a group of test animals
LEL	- Lower Explosive Limit
MSHA	- Mine Safety and Health Administration
NIOSH	- National Institute for Occupational Safety and Health
PEL	- Permissible Exposure Limit
PVC	- Polyvinyl chloride
RCRA	- Resource Conservation and Recovery Act
SARA	- Superfund Amendments and Reauthorization Act of the U.S. EPA
STEL	- Short Term Exposure Limit
TC	- Transport Canada
TDG	- Transportation of Dangerous Goods Act/Regulations
TLV	- Threshold Limit Value
TSCA	- Toxic Substances Control Act
TWA	- Time-Weighted Average
UEL	- Upper Explosive Limit

The information provided in this Material Safety Data sheet has been obtained from sources believed to be reliable. Harcros Chemicals, Inc. provides no warranties, either expressed or implied and assumes no responsibility for the accuracy or completeness of the data contained herein. this information is offered for your information, consideration and investigation. You should satisfy yourself that you have all current data relevant to your particular use. Harcros Chemicals, Inc. knows of no medical condition, other than those noted on this Material Safety Data Sheet, which are generally recognized as being aggravated by exposure to this product.

7914

Rhodia

SPENT SULFURIC ACID FOR INTERNAL USE ONLY

Material Safety Data Sheet **Date Prepared:** **12/11/03 Supersedes Date:** **5/23/03**

1. PRODUCT AND COMPANY DESCRIPTION

RHODIA INC.
ECO SERVICES
CN 7500

Cranbury NJ 08512

Emergency Phone Numbers:
FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CONTACT: CHEMTREC (800-424-9300 within the United States or 703-527-3887 for international collect calls) or Rhodia CAERS (Communication and Emergency Response System) at 800-916-3232.

For Product Information:
(800) 642-4200

Chemical Name or Synonym:
SPENT SULFURIC ACID

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Reg Number	OSHA Hazard	Percentage
SULFURIC ACID	7664-93-9	Y	70 - 95
WATER	7732-18-5	N	3 - 25
HYDROCARBONS (MIXED)	**********	Y	0.5 - 5

3. HAZARDS IDENTIFICATION

A. EMERGENCY OVERVIEW:

Physical Appearance and Odor:
brown / liquid, strong, acrid odor.

Warning Statements:
DANGER! CAUSES SEVERE BURNS. REACTS VIOLENTLY WITH WATER. CONTENTS MAY BE UNDER PRESSURE OF EXPLOSIVE, FLAMMABLE HYDROGEN GAS. HIGHLY REACTIVE

 Continued on Next Page

3. HAZARDS IDENTIFICATION (Continued)

AND CAPABLE OF IGNITING COMBUSTIBLE MATERIAL ON CONTACT.

B. POTENTIAL HEALTH EFFECTS:

Acute Eye:
Corrosive. Causes burns, tissue destruction, Can cause blindness.

Acute Skin:
Corrosive. Causes redness, inflammation, burns.

Acute Inhalation:
Harmful if inhaled. Causes upper respiratory tract irritation, lung irritation, chest pain.

Acute Ingestion:
Harmful if ingested. Can cause irritation, abdominal pain, corrosion.

Chronic Effects:
Repeated, prolonged contact may cause eye irritation, lung irritation, erosion of tooth enamel, cough, stomach disturbances, When mists are released from this product they are considered to be probable or suspected human carcinogens (see Section 11 - Chronic).

4. FIRST AID MEASURES

FIRST AID MEASURES FOR ACCIDENTAL:
Eye Exposure:
Hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. Seek immediate medical attention.

Skin Exposure:
Immediately wipe excess material off skin with a dry cloth; then wash skin with plenty of soap and water for at least 15 minutes. Seek medical attention. Remove contaminated clothing and shoes while washing. Clean contaminated clothing and shoes before re-use or discard if they cannot be thoroughly cleaned.

Inhalation:
Remove victim from immediate source of exposure and assure that the victim is breathing. If breathing is difficult, administer oxygen, if available. If victim is not breathing, administer CPR (cardio-pulmonary

4. FIRST AID MEASURES (Continued)

resuscitation). Seek medical attention.

Ingestion:
DO NOT INDUCE VOMITING. If the person is conscious and has no trouble breathing a small (no more than one glass) amount of water may be given. Do not leave victim unattended. To prevent aspiration of the swallowed product, lay victim on side with head lower than waist. If vomiting occurs do not re-administer water. Do not give anything by mouth to an unconscious person. IMMEDIATELY obtain medical attention.

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE:
Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease.

NOTES TO PHYSICIAN:
All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

This material is an acid. The primary toxicity of this product is due to its irritant effects on mucous membranes.

INHALATION: If cough or shortness of breath occurs, evaluate the possibility of bronchitis or pneumonitis. Chest x-ray and arterial blood gases can be used to determine the presence of pulmonary edema. In severe cases, use of humidified oxygen and assisted ventilation including positive end expiratory pressure (PEEP) may be needed. Parenteral steroids may be useful in limiting the extent of pulmonary damage.

SKIN: Wash exposed area thoroughly with soap and water. Chemical burns from strong acids are generally treated the same as thermal burns.

EYES: Irrigate eyes for 15 minutes with sterile saline. If irritation, pain, swelling, photophobia or lacrimation persist, examination by an ophthalmologist is recommended.

INGESTION: If not already performed by first aid personnel, irrigate mouth with large amounts of water and dilute the acid by having victim drink 4 to 8 ounces of water or milk. DO NOT induce vomiting. Use of gastric lavage is controversial. The advantage of removal of acid must be weighted against the risk of perforation or bleeding. If a large

4. FIRST AID MEASURES (Continued)

amount of acid (> 1 ml/kg body weight) has been recently ingested, cautious gastric lavage is generally advised if the patient is alert and there is little risk of convulsions. Consultation with a gastroenterologist and/or surgeon is advised. Serious complications such as perforation or stricture of the esophagus may occur requiring care by specialists. Laryngeal edema may develop requiring intubation or tracheostomy.

5. FIRE FIGHTING MEASURES

FIRE HAZARD DATA:

Flash Point:
> 93 C (199 F). Flammability Class: WILL BURN.

Method Used:
Closed cup

Flammability Limits (vol/vol%):	**Lower:**	**Upper:**
	No Data	No Data

Extinguishing Media:
Recommended (small fires): dry chemical, Recommended (large fire): AFFF "alcohol-type" agent applied through a fog nozzle.

Special Fire Fighting Procedures:
Firefighters should wear NIOSH/MSHA approved positive pressure breathing apparatus with full face-piece and full acid-resistant protective clothing. Fight fire from maximum distance.

Unusual Fire and Explosion Hazards:
Strong oxidizers can react with reducing agents or combustibles producing heat and causing ignition. Product will burn under fire conditions. Flammability depends on hydrocarbon concentration which can vary widely with this waste product.

Hazardous Decomposition Materials (Under Fire Conditions):
oxides of sulfur
oxides of carbon

6. ACCIDENTAL RELEASE MEASURES

Evacuation Procedures and Safety:
Personnel handling this material should be thoroughly trained to handle spills and releases. Do not direct hose streams into an unignited transportation spill (tank truck or tank car).

Containment of Spill:
Stop leak if it can be done without risk. Dike spill using absorbent or impervious materials such as earth, sand or clay. Dike or retain dilution water or water from firefighting for later disposal.

Cleanup and Disposal of Spill:
Pump any free liquid into an appropriate closed container (see Section 7: Handling and Storage). Exercise caution during neutralization as considerable heat may be generated.

Environmental and Regulatory Reporting:
Do not flush to drain. Runoff from fire control or dilution water may cause pollution. Dispose of as a hazardous waste. Spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies. Large spills should be handled according to a predetermined plan. For assistance in developing a plan contact the Technical Service Department using the Product Information phone number in Section 1.

7. HANDLING AND STORAGE

Minimum/Maximum Storage Temperatures:
Not Available

Handling:
Do not breathe vapors and mists. Do not get on skin or in eyes.

When diluting an acid, ALWAYS add the acid slowly to water and stir well to avoid spattering. NEVER ADD WATER TO ACID.

Storage:
Store in an area that is diked with impermeable material, dry, well-ventilated, Store in tightly closed containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Introductory Remarks:
These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. While developing safe handling procedures, do not overlook the need to clean equipment and piping systems for maintenance and repairs. Waste resulting from these procedures should be handled in accordance with Section 13: Disposal Considerations.

Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

Exposure Guidelines:
Exposure limits represent regulated or recommended worker breathing zone concentrations measured by validated sampling and analytical methods, meeting the regulatory requirements. The following limits apply to this material, where, if indicated, S=skin and C=ceiling limit:

SULFURIC ACID

	Notes	TWA	STEL
ACGIH		1 mg/cu m	3 mg/cu m
OSHA		1 mg/cu m	
RPI		0.3 mg/cu m	

Engineering Controls:
Where engineering controls are indicated by use conditions or a potential for excessive exposure exists, the following traditional exposure control techniques may be used to effectively minimize employee exposures: local exhaust ventilation at the point of generation.

Respiratory Protection:
When respirators are required, select NIOSH/MSHA approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industrial recommendations.

Under normal conditions, in the absence of other airborne contaminants, the following devices should provide protection from this material up to the conditions specified by the appropriate OSHA, WHMIS or ANSI standard(s): Air-purifying (half-mask/full-face) respirator with cartridges/canister approved for use against acid gases.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION (Continued)

Eye/Face Protection:
Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material.

Eye contact should be prevented through use of chemical safety glasses with side shields or splash proof goggles. An emergency eye wash must be readily accessible to the work area.

Skin Protection:
Skin contact must be prevented through the use of permeation resistant clothing, gloves and footwear, selected with regard for use conditions and exposure potential. An emergency shower must be readily accessible to the work area. Consideration must be given both to durability as well as permeation resistance.

Work Practice Controls:
Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

(1) Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
(2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics, or using the toilet.
(3) Wash exposed skin promptly to remove accidental splashes or contact with this material.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product Information phone number in Section 1 for its exact specifications.

Physical Appearance:
brown / liquid.

Odor:
strong, acrid odor.

9. PHYSICAL AND CHEMICAL PROPERTIES (Continued)

pH:
1 at 1 wt/wt%.

Specific Gravity:
1.72 at 20 C (68 F).

Water Solubility:
soluble

Melting Point Range:
Not Available

Boiling Point Range:
Not Available

Vapor Pressure:
Not Available

Vapor Density:
Not Available

10. STABILITY AND REACTIVITY

Chemical Stability:
This material is stable under normal handling and storage conditions described in Section 7.

Conditions To Be Avoided:
heat
open flame
spark

Materials/Chemicals To Be Avoided:
strong reducing agents
halogens
bases
metals
nitrogen compounds

The Following Hazardous Decomposition Products Might Be Expected:
Decomposition Type: thermal

10. STABILITY AND REACTIVITY (Continued)

oxides of sulfur
oxides of carbon

Hazardous Polymerization Will Not Occur.
Avoid The Following To Inhibit Hazardous Polymerization:
not applicable

11. TOXICOLOGICAL INFORMATION

Acute Eye Irritation:
The following data are for similar or related products.

Toxicological Information and Interpretation
eye - eye irritation, 250 ug/24 hr, rabbit.
Severely irritating. Data for sulfuric acid.

Acute Skin Irritation:
No test data found for product. This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

Acute Dermal Toxicity:
No test data found for product. This product was not tested because strong acids are known to be corrosive and to cause severe tissue destruction.

Acute Respiratory Irritation:
The following data is for similar or related products.

Toxicological Information and Interpretation
lung - lung irritation, < 5 mg/cu m, human.
Mildly irritating. Data for sulfuric acid.

Acute Inhalation Toxicity:
The following data is for similar or related products.

Toxicological Information and Interpretation
LC50 - lethal concentration 50% of test species, 510 mg/cu m/2 hr, rat.
Data for sulfuric acid.
LC50 - lethal concentration 50% of test species, 347 ppm/1 hr, rat.

11. TOXICOLOGICAL INFORMATION (Continued)

Acute Oral Toxicity:
The following data is for similar or related products.

Toxicological Information and Interpretation
LD50 - lethal dose 50% of test species, 2140 mg/kg, rat.
Data for sulfuric acid.

Chronic Toxicity:
This product contains the substances that are considered to be "probable" or "suspected" human carcinogens as follows:

The International Agency for Research on Cancer (IARC) and the National Toxicology Program (NTP) have classified "occupational exposure to strong inorganic acid mists containing sulfuric acid" as a known human carcinogen (IARC Category 1). This classification applies only to sulfuric acid when generated as a mist. There is still debate in the scientific community whether the studies reviewed by IARC and NTP adequately controlled for confounding occupational exposures and personal habits such as cigarette smoking and alcohol consumption. A few epidemiology studies have suggested a possible association between sulfuric acid exposure and laryngeal or lung cancer; however, in all these studies, workers were exposed to many other chemicals, some of which are recognized carcinogens, such as diethylsulfate and nickel. Considering the multiple chemical exposures and other limitations of the studies, we disagree with IARC's conclusion that a cause and effect relationship between cancer and "occupational exposure to strong inorganic acid mist containing sulfuric acid" has been demonstrated. Also more recent epidemiological studies have failed to find any association between "occupational exposure to strong inorganic acid mist containing sulfuric acid" and laryngeal or lung cancer. ACGIH has classified "sulfuric acid as contained in strong inorganic acid mists" as a suspect human carcinogen. This classification does not apply to sulfuric acid per se.
Lifetime animal studies in hamsters, rats and guinea pigs were conducted in the 1970's under sponsorship of the Environmental Protection Agency (EPA) or the National Institutes of Environmental Health Sciences (NIEHS). All three lifetime studies were negative for carcinogenic effects. These studies were not formally published by the government agencies because they were satisfied that sulfuric acid mist was not a carcinogenic problem. Because these studies were not published, IARC or NTP did not consider them in their deliberations.

	Regulatory Agency Listing Carcinogen			
Ingredient Name	OSHA	IARC	NTP	ACGIH
OCCUPATIONAL EXPOSURES TO STRONG-INORGANIC-AC	No	1	Yes	A2

11. TOXICOLOGICAL INFORMATION (Continued)

ID MISTS CONTAINING

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:
Ecotoxicological Information and Interpretation:
The toxicity of sulfuric acid to fish is dependent on the resulting pH of the water. lethality at a pH of 5.0 or below. required to cause lethality varies depending on the hardness of the water (hard water has some buffering capacity) and the species of fish (some fish are more resistant to the effects of acidity). McKee, JE, and Wolf, HA (Editors), Water Quality Criteria, 2nd ed., Publication No. 3-A, p. 279, California State Water Resources Control Board, Sacramento, CA (rev. 1963).

Chemical Fate Information:
No data found for product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate or otherwise inappropriate. Please be advised that state and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Consult state and local regulations regarding the proper disposal of this material.
The composition of this material may vary because it is a waste product. However, the physical, chemical and toxicological properties of this material will not differ significantly from those reported on this MSDS.

Container Handling and Disposal:
Rinse containers before disposal.

EPA Hazardous Waste - YES

13. DISPOSAL CONSIDERATIONS (Continued)

EPA RCRA HAZARDOUS WASTE CODES:
"C" Corrosive; "R" Reactive.

14. TRANSPORTATION INFORMATION

Transportation Status: IMPORTANT! Statements below provide additional data on listed DOT classification.
The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

US Department of Transportation
Hazard Class..... 8

Shipping Name:
SULFURIC ACID, SPENT
ID Number..... UN1832
Packing Group.... II
Labels..... CORROSIVE
Emergency Guide #.... 137

15. REGULATORY INFORMATION

Inventory Status

Inventory	Status
UNITED STATES (TSCA)	Y
CANADA (DSL)	Y
EUROPE (EINECS/ELINCS)	Y
AUSTRALIA (AICS)	Y
JAPAN (MITI)	Y
SOUTH KOREA (KECL)	Y

Y = All ingredients are on the inventory.
E = All ingredients are on the inventory or exempt from listing.
P = One or more ingredients fall under the polymer exemption or are on the no longer polymer list. All other ingredients are on the inventory or exempt from listing.

15. REGULATORY INFORMATION (Continued)

N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing.

FEDERAL REGULATIONS

Inventory Issues:
All functional components of this product are listed on the TSCA Inventory.

SARA Title III Hazard Classes:

Fire Hazard	- YES
Reactive Hazard	- YES
Release of Pressure	- NO
Acute Health Hazard	- YES
Chronic Health Hazard	- YES

SARA 313 Chemicals
SULFURIC ACID (70 - 95%)

SARA Extremely Hazardous Substances (EHS)/CERCLA Hazardous Substances

Ingredient	CERCLA/SARA RQ	SARA EHS TPQ
SULFURIC ACID	1000 lbs	1000 lbs
UNLISTED HAZARDOUS WASTES - CHARACTERISTIC OF CORROSIVITY	100 lbs	
UNLISTED HAZARDOUS WASTES - CHARACTERISTIC OF REACTIVITY	100 lbs	

STATE REGULATIONS:
This product contains the following components that are regulated under California Proposition 65:

Ingredient Name	Cancer List	Reprod. List	No Sign. Risk Lvl (ug/day) California	RPI
OCCUPATIONAL EXPOSURES TO STRONG-INORGANIC-ACID MISTS CONTAINING SULFU	Y	N	ND	ND

16. OTHER INFORMATION

National Fire Protection Association Hazard Ratings--NFPA(R):
3 Health Hazard Rating--Serious
1 Flammability Rating--Slight

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16. OTHER INFORMATION (Continued)

2 Instability Rating--Moderate
0 * NO WATER

National Paint & Coating Hazardous Materials Identification System--HMIS(R):
3 Health Hazard Rating--Serious
1 Flammability Rating--Slight
2 Reactivity Rating--Moderate

Reason for Revisions:
Change and/or addition made to Section 4.

Key Legend Information:
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
TLV - Threshold Limit Value
PEL - Permissable Exposure Limit
TWA - Time Weighted Average
STEL - Short Term Exposure Limit
NTP - National Toxicology Program
IARC - International Agency for Research on Cancer
ND - Not determined
RPI - Rhodia Established Exposure Limits

Disclaimer:
The information herein is given in good faith but no warranty, expressed or implied, is made.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **SULFURIC ACID**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: SULFURIC ACID
Synonyms: None
Chemical Family: Inorganic acid
Application: Acid

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Sulfuric acid	7664-93-9	60 - 100%	0.2 mg/m^3	1 mg/m^3

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye and skin burns. May cause respiratory irritation. May be harmful if swallowed. Potential carcinogen.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician
Not Applicable

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5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	Water fog, carbon dioxide, foam, dry chemical.
Special Exposure Hazards	Decomposition in fire may produce toxic gases. Do not allow runoff to enter waterways.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 3, Flammability 0, Reactivity 1
HMIS Ratings:	Flammability 0, Reactivity 1, Health 3

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Neutralize to pH of 6-8. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.
Storage Information	Store away from alkalis. Store in a cool well ventilated area. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.
Respiratory Protection	Acid gas respirator.
Hand Protection	Impervious rubber gloves.
Skin Protection	Full protective chemical resistant clothing.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear colorless to pale yellow
Odor:	Odorless

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9. PHYSICAL AND CHEMICAL PROPERTIES

pH:	1
Specific Gravity @ 20 C (Water=1):	1.835
Density @ 20 C (lbs./gallon):	15.29
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	640
Boiling Point/Range (C):	337
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	0.01
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	98

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Strong alkalis. Prolonged contact with aluminum, lead, or zinc may liberate flammable hydrogen.
Hazardous Decomposition Products	Oxides of sulfur.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Causes severe respiratory irritation.
Skin Contact	Causes severe burns.
Eye Contact	May cause eye burns.
Ingestion	Causes burns of the mouth, throat and stomach.
Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	Contains sulfuric acid, a potential carcinogen. Prolonged, excessive exposure may cause erosion of the teeth.
Other Information	None known.
Toxicity Tests	
Oral Toxicity:	LD50: 2140 mg/kg (Rat)
Dermal Toxicity:	Not determined

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Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Readily biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Sulfuric Acid Solution, 8, UN1830, II
RQ (Sulfuric Acid - 454 kg.)
NAERG 137

Canadian TDG
Sulfuric Acid Solution, 8, UN1830, II

ADR
UN1830,Sulfuric Acid Solution, 8, II

Air Transportation

ICAO/IATA
UN1830,Sulfuric Acid Solution, 8, II
RQ (Sulfuric Acid - 454 kg.)

Sea Transportation

IMDG
UN1830,Sulfuric Acid Solution, 8, II
RQ (Sulfuric Acid - 454 kg.)
EmS F-A, S-B

Other Shipping Information

Labels: Corrosive

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard
EPA SARA (313) Chemicals	This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372: Sulfuric Acid//7664-93-9
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	EPA Reportable Spill Quantity is 70 Gallons based on Sulfuric acid (CAS: 7664-93-9).
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Corrosivity D002
California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	E Corrosive Material

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

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Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001885

CANADA COLORS & CHEMICALS LTD
80 SCARSDALE ROAD
DON MILLS, ONTARIO, CANADA M3B 2R7
(416)-449-7750

PRODUCT : SURFONIC N-95 CODE: 773414

SECTION 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER.....HUNTSMAN CORPORATION CANADA, INC.
P.O. BOX 450
GUELPH, ONTARIO
CANADA ; N1H 6K8
PREPARED BY.....ENVIRONMENTAL & REGULATORY AFFAIRS DEPARTMENT
PREPARATION DATE.....DEC 13/2002
PRODUCT NAME.....SURFONIC N-95
PRODUCT CODE.....773414
CHEMICAL FORMULA.....N.AV.
MOLECULAR WEIGHT.....N.AV.
CHEMICAL FAMILY.....ETHOXYLATED ALKYL PHENOL. SURFACTANT
MATERIAL USE.....EMULSIFYING AGENT
EMERGENCY PHONE NO.....(416)-444-2112

SECTION 02: COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS	EXPOSURE LEVELS	LD/50, ROUTE, SPECIES	LC/50, ROUTE, SPECIES
POLY(OXY-1,2-ETHANEDIYL), ALPHA-(NONYL PHENYL)-OMEGA-HYDROXY % :100 CAS #:9016-45-9	SEE SECTION 11	SEE SECTION 11	SEE SECTION 11

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:
SKIN CONTACT.....SLIGHTLY HAZARDOUS IN CASE OF SKIN CONTACT (IRRITANT).
SKIN ABSORPTION.....N.AV.
EYE CONTACT.....HAZARDOUS IN CASE OF EYE CONTACT. IRRITANT.
INHALATION.....HAZARDOUS IN CASE OF INHALATION
INHALATION, CHRONIC.....SEE ABOVE
INGESTION.....HAZARDOUS IN CASE OF INGESTION.
EFFECTS OF ACUTE EXPOSURE.....SEE ABOVE
EFFECTS OF CHRONIC EXPOSURE.....HAZARDOUS IN CASE OF INGESTION, OF INHALATION. SLIGHTLY HAZARDOUS IN CASE OF SKIN CONTACT (IRRITANT)

SECTION 04: FIRST AID MEASURES

PRODUCT : SURFONIC N-95 CODE: 773414

SECTION 04: FIRST AID MEASURES

INSTRUCTIONS:.....INGESTION:.. DO NOT INDUCE VOMITING UNLESS DIRECTED TO DO SO BY MEDICAL PERSONNEL. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. HAVE CONSCIOUS PERSON DRINK SEVERAL GLASSES OF WATER OR MILK. IF LARGE QUANTITIES OF THIS MATERIAL ARE SWALLOWED, CALL A PHYSICIAN IMMEDIATELY. SKIN CONTACT:.. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. IF IRRITATION PERSISTS, SEEK MEDICAL ATTENTION. WASH CONTAMINATED CLOTHING BEFORE REUSING. INHALATION:.. IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. SEEK IMMEDIATE MEDICAL ATTENTION. EYE CONTACT:.. CHECK FOR AND REMOVE ANY CONTACT LENSES. IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ADVICE.

SECTION 05: FIRE FIGHTING MEASURES

T.D.G. FLAM. CLASS.....NOT REGULATED
FLAMMABILITY.....NON-FLAMMABLE
IF YES, UNDER WHICH CONDITIONS?
EXTINGUISHING MEDIA.....SMALL FIRE: DRY CHEMICAL POWDER. LARGE FIRE: WATER SPRAY, FOG OR FOAM. DO NOT USE WATER JET.
SPECIAL PROCEDURES.....N.AV.
FLASH POINT (C), METHOD.....237.8. (PENSKY-MARTENS CLOSED CUP). 275. (CLEVELAND OPEN CUP)
AUTO IGNITION TEMPERATURE.....N.AV.
UPPER FLAMMABLE LIMIT (% BY VOL.).....N.AV.
LOWER FLAMMABLE LIMIT (% BY VOL.).....N.AV.
EXPLOSION DATA
  EXPLOSIVE POWER.....N.AV.
  RATE OF BURNING.....N.AV.
SENSITIVITY TO STATIC DISCHARGE.....N.AV.
  SENSITIVITY TO IMPACT.....N.AV.
HAZARDOUS COMBUSTION PRODUCTS....CARBON OXIDES

SECTION 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL.....RECYCLE TO PROCESS, IF POSSIBLE. DILUTE WITH WATER AND MOP UP, OR ABSORB WITH AN INERT DRY MATERIAL AND PLACE IN AN APPRIOPRIATE WASTE DISPOSAL CONTAINER. FINISH CLEANING BY SPREADING WATER ON THE CONTAMINATED SURFACE AND DISPOSE OF ACCORDING TO LOCAL AND REGIONAL AUTHORITY REQUIREMENTS.

PRODUCT : SURFONIC N-95 CODE: 773414

SECTION 07: HANDLING AND STORAGE

HANDLING PROCEDURES AND EQUIPMENT.....DO NOT BREATHE GAS, FUMES, VAPOR OR SPRAY. DO NOT INGEST. AVOID CONTACT WITH SKIN AND EYES. AFTER HANDLING, ALWAYS WASH HANDS THOROUGHLY WITH SOAP AND WATER.

STORAGE NEEDS.....DO NOT FREEZE.

SECTION 08: EXPOSURE CONTROLS/PERSONAL PROTECTION

GLOVES/ TYPE.....PLASTIC
RESPIRATORY/TYPE.....NONE REQUIRED
EYE/TYPE.....SAFETY GLASSES
FOOTWEAR/TYPE.....SAFETY SHOES
CLOTHING/TYPE.....WEAR IMPERVIOUS PROTECTIVE CLOTHING
OTHER/TYPE.....EYE BATH AND SAFETY SHOWER.

ENGINEERING CONTROLS.....IF USER OPERATIONS GENERATE DUST, FUME OR MIST, USE VENTILATION TO KEEP EXPOSURE TO AIRBORNE CONTAMINANTS BELOW THE EXPOSURE LIMIT.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE.....COLORLESS TO LIGHT YELLOW LIQUID
ODOUR.....CHARACTERISTIC
ODOUR THRESHOLD.....N.AV.
VAPOUR PRESSURE (MMHG).....<1
VAPOUR DENSITY (AIR=1).....HEAVIER THAN AIR
EVAPORATION RATE.....N.AV.
BOILING POINT.....>250 (C)
PH.....6
SPECIFIC GRAVITY (WATER=1).....1.057
FREEZING POINT.....5 C (41 F)
SOLUBILITY IN WATER (% W/W).....EASILY SOLUBLE IN COLD WATER. SOLUBLE IN HOT WATER.
COEFFICIENT OF WATER/OIL DIST....N.AV.

SECTION 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY:
YES.....THIS PRODUCT IS STABLE.
NO, WHICH CONDITIONS?
COMPATABILITY WITH OTHER SUBSTANCES:
YES.....N.AV.
NO, WHICH ONES?
REACTIVITY CONDITIONS?.....N.AV.
HAZARDOUS PRODUCTS OF DECOMPOSITION.....N.AV.
HAZARDOUS POLYMERIZATION.....WILL NOT OCCUR

PRODUCT : SURFONIC N-95 CODE: 773414

SECTION 11: TOXICOLOGICAL INFORMATION

EXPOSURE LIMIT OF MATERIAL.....N.AV.
LC 50 OF MATERIAL, SPECIES &.....N.AV.
ROUTE
LD 50 OF MATERIAL, SPECIES &.....3310 MG/KG (ORAL RAT)
ROUTE
CARCINOGENICITY OF MATERIAL.....N.AV.
REPRODUCTIVE EFFECTS.....N.AV.
IRRITANCY OF MATERIAL.....HAZARDOUS IN CASE OF INGESTION, OF INHALATION. SLIGHTLY HAZARDOUS IN CASE OF SKIN CONTACT (IRRITANT).
SENSITIZING CAPABILITY OF.....N.AV.
MATERIAL
SYNERGISTIC MATERIALS.....N.AV.

SECTION 12: ECOLOGICAL CONSIDERATIONS

ENVIRONMENTAL STATEMENT.....NO DATA AVAILABLE

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL.....WASTE MUST BE DISPOSED OF IN ACCORDANCE WITH FEDERAL, PROVINCIAL AND LOCAL ENVIRONMENTAL CONTROL REGULATIONS.

SECTION 14: TRANSPORT INFORMATION

UN NUMBER.....N.AP.
TDG CLASSIFICATION.....NOT REGULATED
PACKING GROUP.....N.AP.
SPECIAL SHIPPING INSTRUCTIONS....N.AP.

SECTION 15: REGULATORY INFORMATION

WHMIS CLASSIFICATION.....D2B
CPR COMPLIANCE.....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.

SECTION 16: OTHER INFORMATION

N.AV.=NOT AVAILABLE
N.AP.=NOT APPLICABLE

Material Safety Data Sheet

MSDS Number: 830820 - 2

24 Hour Emergency Assistance: CHEMTREC - Domestic: (800) 424-9300
24 Hour Emergency Assistance: CHEMTREC - International: (703) 527-3887
General Assistance Number: (713) 241-4819

SECTION 1 MATERIAL/COMPANY IDENTIFICATION

MATERIAL IDENTITY: Sulfidic Caustic (Spent Sulfidic Caustic)

COMPANY ADDRESS: Shell Chemical Company, P.O. Box 4320, Houston, TX 77210-4320, USA

SECTION 2 COMPOSITION

COMPONENTS	CAS#	CONCENTRATION
Water	7732-18-5	Balance
Sodium Hydroxide	1310-73-2	1- 13 %weight
Sodium Carbonate	497-19-8	0- 10 %weight
Sodium Sulfide	1313-82-2	0- 10 %weight
Sodium Mercaptides	16721-80-5	0- 4 %weight
Dimethyl Disulfide	624-92-0	0- 3 %weight
Acetone	67-64-1	0- 2 %weight
Mercaptans, Methyl, Ethyl, Propyl	Mixture	0- 0.1 %weight
Benzene	71-43-2	0- 0.1 %weight

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Appearance & Odor: Opaque yellow to clear liquid. Garlicy sulfur odor.
Health Hazards: Toxic and harmful if inhaled. Highly toxic and may be fatal if swallowed or absorbed through the skin. May cause cancer (AML- acute myelogenous leukemia). Causes severe skin burns. Causes severe eye burns. Causes severe respiratory tract burns. Causes digestive tract burns. May cause CNS depression. Avoid vapors from heated materials to prevent exposure to potentially toxic/irritating fumes.
Physical Hazards: COMBUSTIBLE. CORROSIVE.

Health Effects

Inhalation:
Toxic and harmful if inhaled. Severely irritating to the respiratory tract causing chemical burns which may result in permanent damage to the nose, throat and lungs. Breathing of high vapor concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.

Eye Contact:
May be corrosive (causing chemical burns) and may result in permanent eye damage or blindness.

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Skin Contact:
Highly toxic and may be fatal if absorbed through the skin. May be corrosive (causing chemical burns) which may result in permanent skin damage.

Ingestion:
Highly toxic and may be fatal if swallowed. Severely irritating to the mouth, throat and digestive system and may cause chemical burns which could result in permanent damage to the areas contacted. May cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Significant exposure may result in unconsciousness and death.

Other Health Effects:
Prolonged and repeated exposure to benzene may cause serious injury to blood forming organs and is associated with anemia and is linked to the later development of acute myelogenous leukemia (AML).

Primary Target Organs:
The following organs and/or organ systems may be damaged by overexposure to this material.
Blood Forming Organs

Signs and Symptoms:
Damage to blood-forming organs may be evidenced by: a) fatigue and anemia (RBC), b) decreased resistance to infection (WBC effect), and/or c) excessive bruising and bleeding (platelet effect).

SECTION 4 FIRST AID MEASURES

Inhalation:
DO NOT attempt to rescue the victim unless proper respiratory protection is worn. Move victim to fresh air. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting or unresponsive, give 100% oxygen with rescue breathing or CPR as required and transport to the nearest medical facility.

Eye:
Flush eyes with large amounts of water for at least 15 minutes, by the clock, while holding eyelids open. Transport to nearest medical facility for additional treatment.

Skin:
Remove contaminated clothing. Flush with large amounts of water for at least 15 minutes, by the clock, or longer depending on the concentration amount and duration of exposure. Transport to nearest medical facility for additional treatment.

Ingestion:
DO NOT induce vomiting. If victim is alert, rinse mouth and drink 1/2 to 1 glass of water to help dilute the material and call a doctor or poison control center. DO NOT GIVE LIQUIDS TO A DROWSY, CONVULSING OR UNCONSCIOUS PERSON. Keep the victim calm. Transport to nearest medical facility for additional treatment.

SECTION 5 FIRE FIGHTING MEASURES

Flash Point: < 140°F / < 60°C

Extinguishing Media:
Use water fog, 'alcohol foam', dry chemical or carbon dioxide (CO2) to extinguish flames.

Fire Fighting Instructions:
CORROSIVE. COMBUSTIBLE. Clear fire area of all non-emergency personnel. Do not enter confined fire space without full bunker gear (helmet with face shield, bunker coats, gloves and rubber boots), including a positive pressure, NIOSH approved, self-contained breathing apparatus. Containers exposed to intense heat from fires should be cooled with large quantities of water to prevent weakening of container structure which could result in container rupture.

Unusual Fire Hazards:
Concentrated material reacts with water to produce a violent chemical reaction. Hydrogen sulfide (H2S) and other toxic sulfur oxides may be given off when this material is heated. Do not depend on sense of smell for warning.

SECTION 6 ACCIDENTAL RELEASE MEASURES

CORROSIVE. COMBUSTIBLE.

Protective Measures:
Eliminate potential sources of ignition (no smoking, flares, sparks or flames in immediate area). Prevent all bodily contact with spilled material.

Wear appropriate personal protective equipment (refer to Section 8) when responding to spills.

Spill Management:
Shut off source of leak if safe to do so. Dike and contain spill. Remove with vacuum trucks or pump to storage/salvage vessels. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly. Flush area with water to remove trace residue. Contain run-off from residue flush and dispose of properly. Neutralize contaminated area as appropriate for acid or base spill. Prevent entry into waterways, sewer, basements or confined areas. For small spills: Soak up residue with an absorbent such as clay, sand or other suitable material. Place in non-leaking container and seal tightly for proper disposal.

Disposal:
Proper disposal should be evaluated based on regulatory status of this material (refer to Section 13), potential contamination from subsequent use and spillage, and regulations governing disposal in the local area.

Reporting:
U.S. regulations may require reporting releases of this material to the environment which exceed the reportable quantity (refer to Section 15) to the National Response Center at (800) 424-8802. Notify authorities if any exposures to the general public or environment occurs or is likely to occur.

SECTION 7 HANDLING AND STORAGE

Do not get in eyes, on skin or on clothing. Do not taste or swallow. Do not breathe material. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Handling:
Surfaces that are sufficiently hot may ignite liquid material.

Keep away from heat, sparks and flame. Extinguish pilot lights, cigarettes and turn off other sources of ignition prior to use and until all vapors have dissipated. Use explosion-proof ventilation to prevent vapor accumulation while in use. Avoid vapors from heated materials. Adequate ventilation and/or engineering controls must be employed in high temperature processing to prevent exposure to potentially toxic/irritating fumes. Wash with soap and water before eating, drinking, smoking, applying cosmetics, or using toilet facilities. Launder contaminated clothing before reuse. Contaminated leather articles including shoes cannot be decontaminated and should be destroyed to prevent reuse.

Storage:
Keep containers closed when not in use.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	TWA	STEL	Ceiling	Notation
Acetone	ACGIH - TLV	500 ppm (v)	750 ppm (v)		
Acetone	OSHA - PEL	1000 ppm (v)			

Acetone	OSHA - PEL-Interim Standard	750 ppm (v)	1000 ppm (v)		
Benzene	ACGIH - TLV	0.5 ppm (v)	2.5 ppm (v)		Skin
Benzene	OSHA - PEL	1 ppm (v)	5 ppm (v)		
Sodium hydroxide	ACGIH - TLV			2 mg/m3	
Sodium hydroxide	OSHA - PEL	2 mg/m3			
Sodium hydroxide	OSHA - PEL-Interim Standard			2 mg/m3	

Shell has adopted as Interim Standards, the OSHA PELs that were established in 1989 and later rescinded.

Exposure Controls

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Appropriate measures include:

Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Eye washes and showers for emergency use.

Personal Protective Equipment

Personal protective equipment (PPE) selections vary based on potential exposure conditions such as handling practices, concentration and ventilation. Information on the selection of eye, skin and respiratory protection for use with this material is provided below.

Eye Protection:
Chemical Goggles and Face Shield

Skin Protection:
Use protective clothing which is chemical resistant to this material. Selection of protective clothing depends on potential exposure conditions and may include gloves, boots, suits and other items. The selection(s) should take into account such factors as job task, type of exposure and durability requirements.

Respiratory Protection:
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, an approved respirator must be worn. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Types of respirator(s) to be considered in the selection process include:

Full-Face Air-Purifying Respirator for Dusts and Mists, Full-Face Supplied-Air Respirator, Self-Contained Breathing Apparatus (SCBA) - for use in environments with unknown concentrations or emergency situations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Opaque yellow to clear liquid. Garlicy sulfur odor.

Boiling Point	220 °F Approximate	**Flash Point**	< 140 °F [Pensky-Martens Closed Cup]
pH	13 - 14	**Solubility (in Water)**	Completely Soluble
Specific Gravity	1.1	**Stability**	Stable

SECTION 10 REACTIVITY AND STABILITY

Stability:

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Material is stable under normal conditions.

Conditions to Avoid:
Avoid heat and open flames.

Materials to Avoid:
This material may react violently with strong acids; prevent contact with acids. Do not acidify. Acidification generates hydrogen sulfide, mercaptans and carbon dioxide. Do not heat. Heating can cause caustic embrittlement of carbon steel and liberation of mercaptans. Sodium hydroxide reacts with most metals to produce hydrogen as which can form explosive mixtures with air. Hydroxide solutions may react violently with many organic chemicals especially nitrocarbons and chlorocarbons.

Hazardous Decomposition Products:
Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation. Hydrogen sulfide (H2S), an extremely flammable and toxic gas, and potentially toxic sulfur oxides may be present.

SECTION 11 TOXICOLOGICAL INFORMATION

Acute Toxicity

Material Tested	Effects	Test Results
Sodium Hydroxide	Inhalation - LD50	250 mg/m3
Sodium Hydroxide	Oral - LD50	40 mg/kg (Mouse)
Acetone	Dermal - LD50	>15.7 g/kg (Rabbit)

Eye Irritation:
Literature Reference - Corrosive Material Tested - Sodium Hydroxide

Skin Irritation:
Literature Reference - Corrosive Material Tested - Sodium Hydroxide

Carcinogenicity Classification

Chemical Name	NTP	IARC	ACGIH	OSHA Table Z
Acetone			A4-Not Classifiable	
Benzene	Known	Group 1-Carcinogen	A1-Confirmed Human	Yes

Reproductive and Developmental Toxicity:
In pregnant animals exposed to high concentrations of acetone, there were no birth defects, but some evidence of embryofetal toxicity (deceased pup weight, increased late resorptions).

Other Information:
In animal studies, repeated oral dosing of large amounts of acetone was reported to cause adverse effects in the hematological system, liver, kidney and testis. In animals, acetone administration can potentiate the toxicity of a variety of chemical toxicants, which is believed to be secondary to induction of liver enzymes.

SECTION 12 ENVIRONMENTAL FATE AND EFFECTS

This section will be updated as ecological reviews are completed.

SECTION 13 DISPOSAL CONSIDERATIONS

Product Disposal:
Under EPA RCRA (40 CFR 261) if this material becomes a waste material, it would be a corrosive hazardous waste, hazardous waste number D002. Refer to the latest EPA or state regulations regarding proper disposal.

SECTION 14 TRANSPORT INFORMATION

US Department of Transportation Classification:

Proper Shipping Name: Caustic Alkali Liquids, N.O.S.
Technical Names (s): Contains, Sodium Hydroxide, Sodium Sulfide
Identification Number: UN1719
Hazard Class/Division: 8 (Corrosive Materials)
Packing Group: II
Emergency Response Guide # 154

SECTION 15 REGULATORY INFORMATION

The regulatory information provided is not intended to be comprehensive. Other federal, state and local regulations may apply to this material.

Federal Regulatory Status

Comprehensive Environmental Release, Compensation & Liability Act (CERCLA):

Acetone	RQ 5000 lbs	Reportable Spill => 250000 lbs or 27261 gal
Benzene	RQ 10 lbs	Reportable Spill => 9994 lbs or 1090 gal
Sodium Hydrosulfide	RQ 5000 lbs	Reportable Spill => 125000 lbs or 13630 gal
Sodium Hydroxide	RQ 1000 lbs	Reportable Spill => 7692 lbs or 839 gal

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Resource Conservation & Recovery Act (RCRA) Classification:
D002 (Corrosive Hazardous Waste).

Superfund Amendment & Reauthorization Act (SARA) Title III:

SARA Hazard Categories(311/312):
Fire Hazard. Immediate (Acute) Health Hazard. Delayed (Chronic) Health Hazard.

SARA Toxic Release Inventory(TRI) (313):

Benzene (71-43-2)	0 - 0.1 %weight

State Regulatory Status

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65):

Benzene (71-43-2)	0 - 0.1 %weight	CA_65 C/R

CA_65 C/R = The chemical identified with this code is known to the state of California to cause both cancer and birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List:

Acetone (67-64-1)	0 - 2 %weight	
Benzene (71-43-2)	0 - 0.1 %weight	Carcinogen
Benzene (71-43-2)	0 - 0.1 %weight	Mutagen
Sodium Hydroxide (1310-73-2)	1 - 13 %weight	Corrosive

Pennsylvania Right-To-Know Chemical List:

Acetone (67-64-1)	0 - 2 %weight	Environmental Hazard
Benzene (71-43-2)	0 - 0.1 %weight	Spec Haz Sub/Env Haz
Sodium Hydroxide (1310-73-2)	1 - 13 %weight	Environmental Hazard
Sodium Sulfide (16721-80-5)	0 - 4 %weight	Environmental Hazard

SECTION 16 OTHER INFORMATION

HMIS Rating (Health, Fire, Reactivity): 3, 2, 1
NFPA Rating (Health, Fire, Reactivity): 4, 2, 1

Revision#: 2
Revision Date: 01/25/2002
Revisions since last change (discussion): This MSDS has been revised because Shell Chemical Company has made changes to the Material Safety Data Sheet document template. There are no changes to the health, safety, precautionary data, or regulatory data. We do, however, encourage you to take the opportunity to reread the sheet and review the information.

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The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof.

29114-12872-100R-01/25/2002

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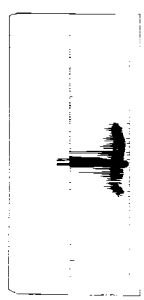

Material Safety Data Sheet

Catalog Number: 105603
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 105603

Product name: TALLOW

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
TALLOW	N/A	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May cause skin irritation and/or dermatitis

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

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5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards: Burning produces irritant fumes.
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: Not determined
Autoignition temperature: Not determined
NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment.
Environmental precautions: Prevent product from entering drains.
Methods for cleaning up: Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Powder
Formula: Not applicable
Melting point/range: No data available at this time.
Boiling point/range: No Data available at this time.
Density: No data available
Vapor pressure: No data available
Evaporation rate: No data available
Vapor density: No data available

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Solubility (in water):	No data available
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
TALLOW	Not Available	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
TALLOW	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
TALLOW	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
TALLOW	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
TALLOW	Not Listed	Not Listed	Not Listed

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Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
TALLOW	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
TALLOW	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
TALLOW	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components
TALLOW
Inventory - United States TSCA - Sect. 8(b) Not Listed
Canada DSL Inventory List - Not Listed

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
TALLOW	Not Listed	Not Listed	Not Listed	Not Listed

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Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
TALLOW	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
TALLOW	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

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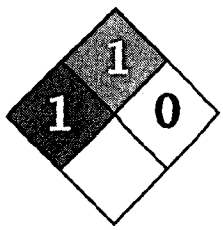
ScienceLab.com
Chemicals & Laboratory Equipment



Health	1
Fire	1
Reactivity	0
Personal Protection	A

Material Safety Data Sheet
Coal tar MSDS

Section 1: Chemical Product and Company Identification

Product Name: Coal tar

Catalog Codes: SLC1108

CAS#: 8007-45-2

RTECS: GF8600000

TSCA: TSCA 8(b) inventory: Coal tar

CI#: Not available.

Synonym: Estar; Lavatar; Zetar; Tar, coal; Pixalbol; Tar, coking; coke oven emissions

Chemical Name: Coal Tar

Chemical Formula: Not available.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Coal tar	8007-45-2	100

Toxicological Data on Ingredients: Coal tar LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, 1 (Clear evidence; known carcinogen) by NTP.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to skin.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

EPAPA005001904

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: CLOSED CUP: 96°C (204.8°F).

Flammable Limits: Not available.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances:
Slightly flammable to flammable in presence of heat.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: On ignition it burns with reddish, luminous, and very sooty flame.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions:
Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. If you feel unwell, seek medical attention and show the label when possible. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection: Safety glasses. Lab coat.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Viscous liquid.)

Odor: Tar-like; naphthalene-like

Taste: Sharp burning.

Molecular Weight: Not available.

Color: Black

pH (1% soln/water): Not applicable.

Boiling Point: 66°C (150.8°F)

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: 1.2 (Water = 1)

Vapor Pressure: <0.1 kPa (@ 20°C)

Vapor Density: >1 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:

Partially soluble in methanol, diethyl ether, acetone.
Insoluble in cold water, hot water.
uble in benzene, nitrobenzene.
Partly dissolves in alcohol, chloroform, carbon disulfide, petroleum ether, sodium hydroxide solution, hexane

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity:
It reacts violently with strong oxidizers such as liquid chlorine, sodium or potassium hypochlorite, nitric acid and peroxides.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available.
LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 1 (Proven for human.) by IARC, 1 (Clear evidence; known carcinogen.) by NTP.
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
May cause damage to the following organs: skin.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May affect genetic material (mutagenic).
May cause cancer

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: It can cause skin irritation. Existing skin disorders (e.g. eczema) may be aggravated by exposure to this material.
Eyes: It can cause eye irritation.
Inhalation: Inhalation of mist or vapor can irritate the respiratory tract.
Ingestion: Ingestion can cause severe gastrointestinal tract irriation with nausea, vomiting. It may also affect behavior/central nervous system and cause central nervous system depression. Aspiration can cause lung inflammation and damage.
Chronic Potential Health Effects:
Skin: Prolonged or repeated exposure to coal tar may cause irritation and dermatitis (including acne), melanosis, or photosensitization dermatitis.

Eyes: Repeated or prolonged exposure may cause eye damage.
Inhalation: Prolonged or repeated inhalation may contribute to gallbladder disease, pneumonitis, and pulmonary ssel thrombosis.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: No DOT per N50 Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Coal tar
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Coal tar (listed as coke oven emissions
New York release reporting list: Coal tar
Rhode Island RTK hazardous substances: Coal tar
Pennsylvania RTK: Coal tar
Massachusetts RTK: Coal tar
California Director's List of Hazardous Substances: Coal tar
TSCA 8(b) inventory: Coal tar

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Classification not yet available

DSCL (EEC):
R45- May cause cancer.
S45- In case of accident or if you feel unwell,

seek medical advice immediately (show the label where possible).
3- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: a

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Not applicable.
Lab coat.
Wear appropriate respirator when ventilation is inadequate.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 04:57 PM

Last Updated: 10/09/2005 04:57 PM

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 event shall ScienceLab.com 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 ScienceLab.com has been advised of the possibility of such damages.

pharmco-AAPER
SUBSIDIARIES OF COMMERCIAL ALCOHOLS, INC.
The Power of Three[3]

An ISO 9001:2000 Certified Company

Product Information (203) 740-3471 / Emergency Assistance CHEMTREC 1-800-424-9300 or 202-483-7616

MATERIAL SAFETY DATA SHEETS

Part Number/Trade Name: tert Butyl alcohol
This MSDS is valid for all grades that start with catalog number 306

General Information

Company's Name: PHARMCO PRODUCTS, INC.
Company's Street: 58 VALE RD.
Company's City: BROOKFIELD
Company's State: CT
Company's Zip Code: 06804
Company's Emerg Ph #: (203) 740-3471
Company's Info Ph #: (203) 740-3471
Date MSDS Revised: Nishant-8/23/99

Safety Data Review Date: 8/23/99
Preparer's Company: PHARMCO PRODUCTS, INC.
Preparer's St Or P. O. Box: 58 VALE RD.
Preparer's City: BROOKFIELD
Preparer's State: CT
Preparer's Zip Code: 06804

Ingredients/Identity Information

Ingredient: TERT-BUTYL ALCOHOL (SARA III)
Ingredient Sequence Number: 01
Percent: >99
NIOSH (RTECS) Number: EO1925000

CAS Number: 75-65-0
OSHA PEL: 100 PPM
ACGIH TLV: 100PPM 9394
Other Recommended Limit: NOT ESTABLISHED

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS, HYGROSCOPIC LIQUID OR CRYSTALS WITH CAMPOR ODOR
Boiling Point: 180F,82C
Melting Point: 78.0F,25.6C
Vapor Pressure (MM Hg/70 F): 31

Vapor Density (Air=1): 2.6
Specific Gravity: 0.80
Evaporation Rate And Ref: 1.05 (BUTYL ACETATE=1)
Solubility In Water: SOLUBLE
Autoignition Temperature: 896F

Fire and Explosion Hazard Data

Flash Point: 52.0F,11.1C
Flash Point Method: CC
Lower Explosive Limit: 2.4
Upper Explosive Limit: 8.0
Extinguishing Media: DRY CHEMICAL, CARBON DIOXIDE, HALON, WATER SPRAY OR ALCOHOL FOAM
Special Fire Fighting Proc: MOVE FROM FIRE AREA, IF POSSIBLE. USE FLOODING AMOUNTS OF WATER AS A FOG, SOLID STREAMS MAY BE INEFFECTIVE. AVOID BREATHING VAPORS, KEEP UPWIND.
Unusual Fire And Expl Hazrds: CONTAINERS MAY BURST WHEN EXPOSED TO HEAT OF FIRE.

EPAPA005001910

Reactivity Data

Stability: YES
Cond To Avoid (Stability): STABLE IN CLOSED CONTAINERS UNDER NORMAL TEMPERATURES AND PRESSURES.
Materials To Avoid: ALKALI METALS, ALUMINUM, CHROMIUM TRIOXIDE, OXIDIZERS, PLASTICS, MINERAL ACIDS, HYDROCHLORIC ACID.
Hazardous Decomp Products: STRONG MINERAL ACIDS OR THERMAL-OXIDATIVE REACTIONS CAUSE DECOMPOSITION & MAY RELEASE CARBON MONOXIDE OR ISOBUTYLENE GAS
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

Health Hazard Data

LD50-LC50 Mixture: LD50 (ORAL RAT) IS 3500 MG/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTES: INHALE- SHORTNESS OF BREATH, CNS DEPRESSION. SKIN-REDNESS, IRRITATION, ERYTHEMA, HYPEREMIA. EYE- IRRITATION, REDNESS, PAIN, BLURRED VISION. INGEST- ABDOMINAL PAIN, CNS DEPRESSION, LIVER DAMAGE. CHRONIC: EYE- CONJUNCTIVITIS. SKIN- DRYING AND CRACKING. INHALE- REVERSIBLE LIVER, KIDNEY, AND HEART.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE OF THE CHEMICALS IN THIS PRODUCT IS LISTED BY IARC, NTP OR OSHA AS A CARCINOGEN.
Signs/Symptoms Of Overexp: IRRITATION, COUGHING, SHORTNESS OF BREATH, DIZZINESS, DROWSINESS, VERTIGO, NAUSEA, VOMITING, FATIGUE, REDNESS OF THE SKIN AND EYE WITH PAIN AND BLURRED VISION.
Med Cond Aggravated By Exp: PERSONS WITH PRE-EXISTING SKIN, LIVER, KIDNEY, OR RESPIRATORY DISEASE MAY BE AT AN INCREASED RISK FROM EXPOSURE.
Emergency/First Aid Proc: INHALATION: REMOVE SUBJECT TO FRESH AIR, IF BREATHING STOPPED GIVE ARTIFICIAL RESPIRATION. EYE: FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. GET IMMEDIATE MEDICAL ATTENTION. SKIN: WASH WITH SOAP AND WATER. INGESTION: INDUCE VOMITING BY PLACING FINGER AT THE BACK OF THE THROAT. GET IMMEDIATE MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: WIPE OR SOAK UP SMALL SPILLS WITH PAPER TOWEL OR INERT ABSORBANT. DIKE TO RETAIN LARGE SPILLS. REMOVE RESIDUE WITH INERT ABSORBANT. PLACE IN DISPOSAL CONTAINER. ISOLATE HAZARD AREA AND DENY ENTRY. NO SMOKING OR OPEN FLAMES IN THE AREA.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.
Precautions-Handling/Storing: STORE IN COOL, DRY, WELL VENTILATED AREA. PROTECT FROM PHYSICAL DAMAGE, HEAT AND IGNITION SOURCES. KEEP CONTAINERS CLOSED.
Other Precautions: VAPOR HAZARD INDOORS, OUTDOORS OR IN SEWERS, RUN-OFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

Control Measures

Respiratory Protection: IF VENTILATION DOES NOT MAINTAIN INHALATION

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EXPOSURES BELOW PEL (TLV), USE NIOSH/MSHA APPROVED RESPIRATOR AS PER CURRENT 29 CFR 1910.134, INSTRUCTIONS/WARNINGS AND NIOSH-RESPIRATOR SELECTION.
Ventilation: MECHANICAL (GENERAL) VENTILATION IS REQUIRED. LOCAL EXHAUST MAY BE REQUIRED IF WORK AREA IS NOT VENTED.
Protective Gloves: RUBBER
Eye Protection: CHEMICAL SAFETY GOGGLES
Other Protective Equipment: SAFETY SHOWER AND EYE BATH. OTHER EQUIPMENT AS REQUIRED TO MINIMIZE EXPOSURE FROM PROLONGED OR REPEATED CONTACT.
Work Hygienic Practices: WASH THROUGHLY AFTER HANDLING AND BEFORE EATING. LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.

Transportation Data

DOT Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S.
DOT Class: 3
DOT ID Number: UN1993
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HIM
IMO Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. *
IMO Regulations Page Number: 3126
IMO UN Number: 1993
IMO UN Class: 3.1
IATA PSN Code: MBV
IATA UN ID Number: 1993
IATA Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. * *
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MBV
AFI Prop. Shipping Name: FLAMMABLE LIQUIDS, N.O.S. *
AFI Class: 3
AFI ID Number: UN1993
AFI Pack Group: II
AFI Label: FLAMMABLE LIQUID
AFI Basic Pac Ref: 7-7

Disposal Data

Refer to applicable regional, state and federal codes.

Label Data

Special Hazard Precautions: MAY BE POISONOUS IF INHALED OR ABSORBED THROUGH SKIN. VAPORS MAY CAUSE DIZZINESS OR SUFFOCATION. CONTACT MAY IRRITATE OR BURN SKIN AND EYES. FIRE MAY PRODUCE IRRITATING OR POISONOUS GASES. RUNOFF FROM FIRE CONTROL OR DILUTION WATER MAY CAUSE POLLUTION.

The information contained herein is based on data considered to be accurate. However, no warranty is expressed regarding the accuracy of these data or the results to be obtained from the use thereof. It is the user's obligation to determine the conditions of safe use of the product.

EPAPA005001912

Material Safety Data Sheet

Catalog Number: 211677
Revision date: 26-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 211677

Product name: tert-BUTYL ACETATE

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
tert-BUTYL ACETATE	540-88-5	90 - 100%	200 ppm TWA	200 ppm TWA; 950 mg/m³ TWA

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Flammable

Category of Danger:
Flammable , Dangerous for the environment

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard Flammable
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.
Statement of First Aid In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician if symptoms occur.
Precautions - ANSI Label Avoid prolonged contact with eyes, skin and clothing. Wash thoroughly after handling. Do not breathe vapors or spray mist Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.

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Skin contact: Rinse immediately with plenty of water for at least 15 minutes Remove and wash contaminated clothing before re-use Consult a physician
Ingestion: Do not induce vomiting without medical advice.
Eye contact: Rinse immediately with plenty of water, also under the eyelids. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	Carbon dioxide (CO2), Dry powder, Foam, Water may be ineffective., Use dry chemical, CO2, water spray or `alcohol` foam.
Specific hazards:	Burning produces irritant fumes.
Unusual hazards:	None known
Special protective equipment for firefighters:	Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire and/or explosion do not breathe fumes.
Specific methods:	Water mist may be used to cool closed containers.
Flash point:	Not determined
Autoignition temperature:	Not determined

NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Use personal protective equipment.
Environmental precautions:	Prevent product from entering drains.
Methods for cleaning up:	Ground and bond containers when transferring material

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling:	Use only in area provided with appropriate exhaust ventilation.
Safe handling advice:	Wear personal protective equipment. Remove and wash contaminated clothing before reuse.
Technical measures/storage conditions:	Keep containers tightly closed in a cool, well-ventilated place. Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition
Incompatible products:	Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation, especially in confined areas.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Impervious clothing Long sleeved clothing
Eye protection: If splashes are likely to occur, wear: Safety glasses with side-shields

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Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Colorless; fruity odor
Physical state:	Liquid
Formula:	C6-H12-O2
Molecular weight:	116.16
Melting point/range:	No data available at this time.
Boiling point/range:	98 °C (208 °F)
Density:	0.867 at 20 °C (water = 1)
Vapor pressure:	No data available
Evaporation rate:	No data available
Vapor density:	4.0 (air = 1)
Solubility (in water):	Practically not soluble
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	-
Nitrates; strong oxidizers, alkalies, and acids	
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information

Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
tert-BUTYL ACETATE	AF7400000	Oral LD50 Rat : 4100 mg/kg; Inhalation LC50 Rat : >2230 mg/m³/4H; Dermal LD50 Rabbit : >2 gm/kg

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

Components	NIOSH - Health Effects	NIOSH - Target Organs
tert-BUTYL ACETATE	Eye and throat irritation, CNS depression	respiratory system, eyes, skin, CNS

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available

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Ecotoxicity effects: No data available
Aquatic toxicity: May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
tert-BUTYL ACETATE	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
tert-BUTYL ACETATE	1	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
tert-BUTYL ACETATE	Not Listed	EC50 (5,15,30 min) Photobacterium phosphoreum: 6.38-11.1 mg/L Microtox test. Cond: 15 °C	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
tert-BUTYL ACETATE	Not Listed	Not Listed	Not Listed

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
tert-BUTYL ACETATE	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.
Contaminated packaging: Do not re-use empty containers
Methods for cleaning up: Ground and bond containers when transferring material

14. TRANSPORT INFORMATION

UN/Id No: 3082

DOT:
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s.
IATA Hazard Label(s): Miscellaneous
Hazard Class 9 - Other miscellaneous materials
Packing group: III

Emergency Response Guide Number (ERG): 171

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
tert-BUTYL ACETATE	RQ = 5000 pounds (2270 kg); (Listed under "Butyl acetate")

TDG (Canada):

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WHMIS hazard class: B2 flammable liquids

IMDG/IMO

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s.

IMDG - Hazard Classifications Not Applicable

Components	**U.S. DOT - Appendix B - Marine Pollutan**	**U.S. DOT - Appendix B - Severe Marine Pollutants**
tert-BUTYL ACETATE	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components	
tert-BUTYL ACETATE	
Inventory - United States TSCA - Sect. 8(b)	Present
Canada DSL Inventory List -	Present
Australia (AICS):	Present
Inventory - China:	Present
EU EINECS List -	208-760-7; C6H12O2
Inventory - Japan:	2-731; 2-735
Korean KECL:	KE-04180
Philippines PICCS:	Present

U.S. regulations:

Components	**California Proposition 65 -**	**Massachusetts Right to Know List:**	**New Jersey Right to Know List:**	**Pennsylvania Right to Know List:**
tert-BUTYL ACETATE	Not Listed	[present]	sn 1786	environmental hazard

Components	**Florida substance List:**	**Rhode Island Right to Know List:**	**Illinois - Toxic Air Contaminants**	**Connecticut - Hazardous Air Pollutants**
tert-BUTYL ACETATE	[present]	Toxic	Not Listed	19,000 ug/m^3 HLV; 4 ppmv HLV

Components	**SARA 313 Emission reporting/Toxic Release of Chemicals**	**CERCLA/SARA - Section 302 Extremely Haz**	**NTP:**	**IARC:**
tert-BUTYL ACETATE	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

EPAPA005001917

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001918

Material Safety Data Sheet

1-Tetradecanol

ACC# 96121

Section 1 - Chemical Product and Company Identification

MSDS Name: 1-Tetradecanol
Catalog Numbers: AC180730050, AC180730250
Synonyms: Myristyl alcohol; Tetradecyl alcohol.
Company Identification:

Acros Organics N.V.
One Reagent Lane
Fair Lawn, NJ 07410

For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
112-72-1	1-Tetradecanol	>99	204-000-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white flakes.
Caution! May cause eye, skin, and respiratory tract irritation.
Target Organs: No data found.

Potential Health Effects
Eye: Causes mild eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.
Inhalation: May cause respiratory tract irritation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

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Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Get medical aid. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Runoff from fire control or dilution water may cause pollution. Dust from this material can form explosive organic dust cloud.
Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.
Flash Point: 140 deg C (284.00 deg F)
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an

eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1-Tetradecanol	none listed	none listed	none listed

OSHA Vacated PELs: 1-Tetradecanol: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: 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: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Flakes

Appearance: white

Odor: None reported.

pH: Not available.

Vapor Pressure: Not available.

Vapor Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: 289 deg C @ 760 mm Hg

Freezing/Melting Point: 37 - 40 deg C

Decomposition Temperature: Not available.

Solubility: Insoluble.

Specific Gravity/Density: Not available.

Molecular Formula: C14H30O

Molecular Weight: 214.39

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Dust generation, excess heat.

Incompatibilities with Other Materials: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, irritating and toxic fumes and gases, carbon dioxide.

Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 112-72-1: XB8655000
LD50/LC50:
112-72-1:
Draize test, rabbit, eye: 500 mg Mild;
Oral, rat: LD50 = >5 gm/kg;
Skin, rabbit: LD50 = >5 gm/kg;

Carcinogenicity:
CAS# 112-72-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated as a hazardous material	No information available.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 112-72-1 is listed on the TSCA inventory.
'th & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313 No chemicals are 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 Substances 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:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 112-72-1 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

..alifornia Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
Not available.
Risk Phrases:

Safety Phrases:
S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)
CAS# 112-72-1: 0
Canada - DSL/NDSL
CAS# 112-72-1 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 112-72-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/02/1997
Revision #8 Date: 11/03/2005

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

Brenntag Canada Inc.

BRENNTAG

MATERIAL SAFETY DATA SHEET

TETRAETHYLENE GLYCOL

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Rd.
Toronto, ON
M8Z 2G6
(416) 259-8231

Website: http:\\www.brenntag.ca

WHMIS#:	00063339
Index:	HCI2201/06A
Effective Date:	2006 May 15
Date of Revision:	2006 May 15

EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)

Toronto, ON (416) 226-6117	Montreal, QC (514) 861-1211	Winnipeg, MB (204) 943-8827
Edmonton, AB (780) 424-1754	Calgary, AB (403) 263-8660	Vancouver, BC (604) 685-5036

PRODUCT IDENTIFICATION

Product Name:	Tetraethylene Glycol
Chemical Name:	Ethanol, 2,2'-[oxybis(2,1-ethanediyloxy)]bis-
Synonyms:	TTEG.
Chemical Family:	Glycol ethers.
Molecular Formula:	C8H18O5 ; CH2OH - CH2 - 0 - CH2CH2 - 0 - CH2CH2 - 0 - CH2 - CH2OH
Product Use:	Industrial solvent, cleaner, degreaser. Chemical intermediate.

WHMIS Classification / Symbol:

Not regulated.

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV*	*% Concentration*
Tetraethylene Glycol	112-60-7	---	95 - 100

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Low hazard for usual industrial or commercial handling. At elevated temperatures may cause irritation of the eyes and respiratory tract. High vapour concentrations may cause drowsiness. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation:	This product has a low vapour pressure and is not expected to present an inhalation hazard at ambient conditions. Prevent aerosolization or misting of this product. (3) Contact with mist or spray may cause irritation of mucous membranes, coughing and difficulty in breathing. Vapours from warmed or heated material may be a mild respiratory irritant. See "Other Health Effects" Section.
Skin Contact:	Prolonged, confined (especially under the finger nails, under rings or watch bands) or repeated exposure may cause skin irritation. May cause defatting, drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis.
Skin Absorption:	Prolonged or wide spread skin contact may result in the absorption of potentially harmful amounts of material.
Eye Contact:	Splashes to the eye may cause irritation, redness and pain.
Ingestion:	This product causes irritation, a burning sensation of the mouth and throat and abdominal pain.

Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed. Strict adherence to first aid measures following any exposure is essential.

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical attention IMMEDIATELY.
Skin Contact:	Start flushing while removing contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, obtain medical advice.
Eye Contact:	Immediately flush eyes thoroughly for 5 minutes with running water. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.
Note to Physicians:	This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Medical conditions that may be aggravated by exposure to this product include neurological and cardiovascular disorders, diseases of the skin, eyes or respiratory tract, preexisting liver and kidney disorders.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	*AutoIgnition Temperature (°C)*	**Flammability Limits in Air (%):** *LEL*	*UEL*
202 (3)	358 (3)	Not available.	Not available.

Flammability Class (WHMIS):	Not regulated.
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include oxides of carbon and irritating gases. Heating in air may produce irritating aldehydes, acids and ketones.
Unusual Fire or Explosion Hazards:	Tetraethylene glycol or solutions of tetraethylene glycol and water can form flammable vapors with air if heated sufficiently. Spills on hot fibrous insulation may lead to the lowering of the autoignition temperature possibly resulting in spontaneous combustion. Do not direct a solid stream of foam into hot, burning pools. This may cause spattering and increase fire intensity. Closed containers exposed to heat may burst.
Sensitivity to Mechanical Impact:	Not available. Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Expected to be sensitive to static discharge when vapours are present between the lower and upper explosive limits.

EXTINGUISHING MEDIA

Fire Extinguishing Media:	Alcohol resistant foam. Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog. Do not use high volume water jet.

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters:	Isolate materials that are not involved in the fire and protect personnel. Cool containers with flooding quantities of water until well after the fire is out. Spilled material may cause floors and contact surfaces to become slippery.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Wear protective clothing. Recover spilled material on non-combustible absorbents, such as sand or vermiculite, and place in covered containers for disposal. Eliminate all sources of ignition. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices:	Use normal "good" industrial hygiene and housekeeping practices. Containers exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn. Vent container frequently, and more often in warm weather, to relieve pressure.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing vapours or mists. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Clothing and footwear that dissipates static electrical charges should be worn when handling flammable materials. Natural fibers (cotton, wool, leather and linen) should be selected in favour of synthetic materials (rayon, nylon and polyester). Do not use cutting or welding torches on empty drums that contained this material/product.

STORAGE

Storage Temperature (°C):	See below.
Ventilation Requirements:	General exhaust is acceptable.
Storage Requirements:	This product has a shelf life of approximately 6 months in an unlined bulk steel tank at ambient conditions. The shelf life can be up to 12 months if the bulk or drum is lined. High colour and a drop in pH are signs that the product is starting to deterioate. Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40° C. Store in properly lined steel/stainless steel to avoid slight discoloration from mild steel/copper. (3) Avoid moisture contamination. Avoid direct sunlight. Protect against physical damage.
Special Materials to be Used for Packaging or Containers:	Attacks some types of rubber, plastics and coatings. Copper and its alloys should not be used in equipment for storage, handling or transportation. Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	General exhaust is acceptable. Local exhaust ventilation preferred. Ventilation should be explosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect. For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue. Use the "buddy" system. The second person should be in view and trained and equipped to execute a rescue. (4)

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection:	Safety glasses with side shields are recommended to prevent eye contact. Use full face-shield or chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.

Skin Protection:	Gloves and protective clothing made from neoprene, polyethylene vinyl alcohol and butyl rubber. Prolonged and repeated contact may lead to dermatitis. User should verify impermeability under normal conditions of use prior to general use. Attacks some types of rubber, plastics and coatings. Discard contaminated gloves.
Respiratory Protection:	No specific guidelines available. A NIOSH/MSHA-approved air-purifying respirator equipped with organic vapour cartridges for concentrations up to 1000 ppm. An air-supplied respirator if concentrations are higher or unknown. If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (4)
Other Personal Protective Equipment:	Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area.

EXPOSURE GUIDELINES

None established for this product.

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Liquid.
Appearance:	Clear, colourless liquid.
Odour:	Ether odour.
Odour Threshold (ppm):	Not available.
Boiling Range (°C):	> 327.
Melting/Freezing Point (°C):	- 4.0.
Vapour Pressure (mm Hg at 20° C):	0.01 - 1.
Vapour Density (Air = 1.0):	6.7.
Relative Density (g/cc):	1.12.
Bulk Density:	1 120 kg/m3.
Viscosity:	Not available.
Evaporation Rate (Butyl Acetate = 1.0):	Not available.
Solubility:	Soluble in water.
% Volatile by Volume:	Not available.
pH:	8
Coefficient of Water/Oil Distribution:	Not available.
Volatile Organic Compounds (VOC):	6 g/L

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Stable.
Under Fire Conditions:	Flammable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition. Keep tightly closed to protect quality. Avoid moisture contamination. Avoid direct sunlight.
Materials to Avoid:	Strong oxidizers. Strong Acids. Strong bases. Oxygen exposure may lead to the formation of explosive peroxides. Avoid extended contact with air or oxygen. Attacks some types of rubber, plastics and coatings. copper and its alloys Materials reactive with hydroxyl bearing compounds.
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include oxides of carbon and irritating gases. Heating in air may produce irritating aldehydes, acids and ketones.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	LD50 (Oral, Rat)	LD50 (Dermal, Rabbit)	LC50 (Inhalation, Rat, 4h)
Tetraethylene Glycol	10 000 - 20 000 mg/kg (1)	> 20 000 mg/kg (1)	

Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.
Reproductive Data:	Not available. No adverse reproductive effects are anticipated.
Mutagenicity Data:	Mutagenicity tests have been negative or inconclusive. (3)
Teratogenicity Data:	Not available. No adverse teratogenic effects are anticipated.
Respiratory / Skin Sensitization Data:	None known.
Synergistic Materials:	Alcohols/Glycols : Alcohols may interact synergistically with chlorinated solvents (example - carbon tetrachloride, chloroform, bromotrichloromethane), dithiocarbamates (example - disulfiram), dimethylnitrosamine and thioacetamide. (4)
Other Studies Relevant to Material:	None known.

12. ECOLOGICAL INFORMATION

Ecotoxicity:	Not available. Low acute toxicity to aquatic organisms.
Environmental Fate:	This product is biodegradable. Volatilizes slowly from water surfaces. Tetraethylene Glycol is estimated to have a low potential to bioconcentrate. (3) This product has high mobility in soil. Based on a Koc value of 10, tetraethylene glycol is expected to have very high mobility in soil and is not expected to adsorb to suspended solids and sediments in water. In an OECD 301D screening test, it showed losses of 6, 20, and 40 % when incubated at 20 Degrees Celsius for 5, 15, and 28 days, respectively. This product is resistant to rapid biodegradation. The BCF value of 0.02 is indicative of low bioconcentration in aquatic organisms. (9) Low potential to persist in the environment. (3) May be harmful if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	None required.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue (liquid and/or vapour) and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not dispose of package until thoroughly washed out.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

This product is not regulated by TDG.

Label(s): Not applicable. Placard: Not applicable.

ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

This product is not regulated by DOT.

Label(s): Not applicable. Placard: Not applicable.

CERCLA-RQ: Not available. Exemptions: None known.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All constituents of this product are included on the DSL.

CEPA - NPRI: Not included.

Controlled Products Regulations Classification (WHMIS):
Not regulated.

USA

Environmental Protection Act: All constituents of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Not regulated.

NFPA: 1 Health, 1 Fire, 0 Reactivity (3)

HMIS: Health, Fire, Reactivity (Not available.)

INTERNATIONAL

Not available.

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s)
4. CHEMINFO, through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2005, American Conference of Governmental Industrial Hygienists, Cincinnati, 2005.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.
8. NFPA 325M Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1994 Edition, Quincy, MA, 1994.
9. HSDB, through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

British Columbia: 20333-102B Avenue, Langley, BC, V1M 3H1
Phone: (604) 513-9009 Facsimile: (604) 513-9010

Alberta: 6628 - 45 th. Street, Leduc, AB, T9E 7C9
Phone: (780) 986-4544 Facsimile: (780) 986-1070

Manitoba: 681 Plinquet Street, Winnipeg, MB, R2J 2X2
Phone: (204) 233-3416 Facsimile: (204) 233-7005

Ontario: 43 Jutland Road, Toronto, ON, M8Z 2G6
Phone: (416) 259-8231 Facsimile: (416) 259-6175

Quebec: 2900 Jean Baptiste Des., Lachine, PQ, H8T 1C8
Phone: (514) 636-9230 Facsimile: (514) 636-0877

Atlantic: A-105 Akerley Boulevard, Dartmouth, NS, B3B 1R7

Phone: (902) 468-9690 Facsimile: (902) 468-3085

Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.

THIODIGLYCOL

Material Safety Data Sheet

Arkema Inc.

1 PRODUCT AND COMPANY IDENTIFICATION

Thio and Fine Chemicals
Arkema Inc.
2000 Market Street
Philadelphia, PA 19103

EMERGENCY PHONE NUMBERS:
Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
Medical: Rocky Mountain Poison Control Center
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Customer Service	1-800-628-4453	8:30 to 5:30 EST

Product Name	THIODIGLYCOL
Product Synonym(s)	
Chemical Family	
Chemical Formula	C4H10O2S
Chemical Name	Ethanol, 2,2'-thiobis-
EPA Reg Num	
Product Use	

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical %	OSHA
Thiodiglycol	111-48-8	> 99 %	N

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

While this material is not classified as hazardous under Federal OSHA regulations, this MSDS contains valuable information critical to the safe handling and proper use of this product. This MSDS should be retained and available for employees and other users of this product.

The components of this product are all on the TSCA Inventory list.

3 HAZARDS IDENTIFICATION

Emergency Overview
Colorless to slightly yellow liquid, characteristic odor.

HANDLE IN ACCORDANCE WITH GOOD INDUSTRIAL HYGIENE AND SAFETY PRACTICES.

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on single exposure animal tests, it is considered to be practically non-toxic if swallowed, slightly irritating to eyes and practically non-irritating to skin.

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4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water. Get medical attention if irritation persists.

IF ON SKIN, flush the area with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention if irritation develops and persists.

IF SWALLOWED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

IF INHALED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

5 FIRE FIGHTING MEASURES

Fire and Explosive Properties

Auto-Ignition Temperature	NE	
Flash Point	313 F (156 C)	Flash Point Method
Flammable Limits- Upper	NE	
Lower	NE	

Extinguishing Media

Use water spray, carbon dioxide, foam or dry chemical.

Fire Fighting Instructions

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

Fire and Explosion Hazards

When burned, the following hazardous products of combustion can occur:
Hydrogen sulfide
Sulfur oxides
Oxides of carbon

6 ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Isolate hazard area and deny entry to unnecessary or unprotected personnel. Contain spilled liquid with sand or earth. Clean up spill immediately, observing precautions in the Personal Protection section of MSDS. Avoid runoff into storm sewers and ditches which lead to waterways.

7 HANDLING AND STORAGE

Handling

Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is

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7 HANDLING AND STORAGE

cleaned, reconditioned or destroyed.

Storage

Store in a cool, dry place. Keep container tightly closed. Use only with adequate ventilation.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures. Provide ventilation if necessary to minimize exposures. If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Eye / Face Protection

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

Skin Protection

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

Respiratory Protection

Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. If exposures cannot be kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients

The components of this product have no established Airborne Exposure Guidelines

-Only those components with exposure limits are printed in this section.
-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.
-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.
-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

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9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Colorless to slightly yellow liquid, characteristic odor.
pH	NE
Specific Gravity	1.185 @ 20 C
Vapor Pressure	<0.2 hPa (mbar)
Vapor Density	1185 kg/m3
Melting Point	-10 C
Freezing Point	NE
Boiling Point	220 C
Solubility In Water	Complete
Solubility in Other Materials	Alcohols, Chloroform
Viscosity	65 mPa. s (cP) @ 20 C
Other Physical Data	Refractive index: 1.52 @ 20 C Decomposition Temperature > 478 F

10 STABILITY AND REACTIVITY

Stability

This material is chemically stable under normal and anticipated storage and handling conditions.

Incompatibility

Avoid contact with strong oxidizers, acids and bases.

Hazardous Decomposition Products

Hydrogen sulfide and oxides of sulfur and carbon.

11 TOXICOLOGICAL INFORMATION

Toxicological Information

Data on this material and/or its components are summarized below.

Single exposure (acute) studies indicate:
Oral - Practically Non-toxic to Rats (LD50 6,610 mg/kg)
Eye Irritation - Slightly Irritating to Rabbits (72-hr 2.4/110.0)
Skin Irritation - Practically Non-irritating to Rabbits (4-hr exposure, 0.3/8.0)

This material is rapidly oxidized and excreted in the urine. No skin allergy was observed in guinea pigs following repeated exposure.

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

Data on this material and/or its components are summarized below.

This material is practically non-toxic to fish (96-hr LC0 10,000 mg/l), daphnia (48-hr EC0 5,000 mg/l), algae (72-hr EC50 >500 mg/l) and bacteria (17-hr EC50 >500 mg/l).

EPAPA005001935

12 ECOLOGICAL INFORMATION

Chemical Fate Information

Data on this material and/or its components are summarized below.

This material is not readily biodegradable (30% after 28-days). It has a half-life of 6.9 hours in air and a log Pow of -0.75. It has slight adsorption in soil (log Koc = 0.544).

13 DISPOSAL CONSIDERATIONS

Waste Disposal

Incineration is the recommended method for disposal observing all local, state and federal regulations. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14 TRANSPORT INFORMATION

DOT Name	Not Regulated by DOT
DOT Technical Name	
DOT Hazard Class	
UN Number	
DOT Packing Group	PG
RQ	
DOT Special Information	If shipped by Sea:
	Environmentally hazardous substance, Liquid, nos (Thiodiglycol) Class 9; UN 3082; PG III

15 REGULATORY INFORMATION

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	N	Fire	N
Delayed (Chronic) Health	N	Reactive	N
		Sudden Release of Pressure	N

The components of this product are all on the TSCA Inventory list.

Ingredient Related Regulatory Information:

SARA Reportable Quantities	CERCLA RQ	SARA TPQ
Thiodiglycol	NE	NE

Chemical Weapons Convention

Thiodiglycol

Massachusetts Right to Know

This product does contain the following chemicals(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

Thiodiglycol

EPAPA005001936

Pennsylvania Right to Know
This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.
Thiodiglycol

16 OTHER INFORMATION

Revision Information

Revision Date	09 NOV 2005	Revision Number 4
Supercedes Revision Dated	11-OCT-2004	

Revision Summary
Revised all sections.

Key
NE= Not Established NA= Not Applicable (R) = Registered Trademark

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EPAPA005001937

Material Safety Data Sheet

Version 3.1
Revision Date 05/17/2007
Print Date 06/26/2007

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : **Toluene**

Product Number : 244511
Brand : Aldrich

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C7H8
Molecular Weight : 92.14 g/mol

CAS-No.	EC-No.	Index-No.	Concentration [%]
Toluene			
108-88-3	203-625-9	601-021-00-3	-

3. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Flammable Liquid
Teratogen
Reproductive hazard

HMIS Classification

Health Hazard: 2
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 0

NFPA Rating

Health Hazard: 2
Fire : 3
Reactivity Hazard 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.

Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

4. 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
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	4.0 °C (39.2 °F) - closed cup
Ignition temperature	535 °C (995 °F)

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

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.Store in cool place.

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Update	Basis
Toluene	108-88-3	TWA	50 ppm 188 mg/m3	1996-05-18	US. American Conference of Governmental and Industrial Hygienists Threshold Limit Values for Chemical Substances in the Work Environment; Annual Reports for the Year 2004:Committees on Threshold Limit Values (TLVs) and Biological Exposure Indices (BEIs)
Remarks	Refers to Appendix A -- Carcinogens. 1996 Adoption				
		TWA	100 ppm 375 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
	See Table Z-2.				
		STEL	150 ppm 560 mg/m3	1989-03-01	US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A
	See Table Z-2.				
		TWA	200 ppm	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration; (OSHA) Standards, Toxic and Hazardous Substances, Subpart Z 29 CFR Part 1910.1000, Table Z-2
	(Z37.12-1967)				
		CEIL	300 ppm	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration; (OSHA) Standards, Toxic and Hazardous Substances, Subpart Z 29 CFR Part 1910.1000, Table Z-2
	(Z37.12-1967)				
		AMP	500 ppm	1993-06-30	US. Department of Labor - Occupational Safety and Health Administration; (OSHA) Standards, Toxic and Hazardous Substances, Subpart Z 29

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					CFR Part 1910.1000, Table Z-2
	(Z37.12-1967)				

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.

Eye protection
Safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid
Colour	colourless

Safety data

pH	no data available
Melting point	-93.0 °C (-135.4 °F)
Boiling point	110.6 °C (231.1 °F)
Flash point	4.0 °C (39.2 °F) - closed cup
Ignition temperature	535 °C (995 °F)
Lower explosion limit	1.2 %(V)
Upper explosion limit	7 %(V)
Vapour pressure	29.1 hPa (21.8 mmHg) at 20.0 °C (68.0 °F)
Density	0.86 g/cm3 at 25.00 °C (77.00 °F)
Water solubility	no data available

10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

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Hazardous decomposition products

Hazardous decomposition products formed under fire conditions.
Carbon oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

LD50 Oral - rat - > 5,580 mg/kg

LC50 Inhalation - rat - 4 h - 12,500 - 28,800 mg/m3

LD50 Dermal - rabbit - 12,196 mg/kg

Irritation and corrosion

Skin - rabbit - Skin irritation - 24 h

Eyes - rabbit - Severe irritation - 24 h

Sensitization

no data available

Chronic exposure

Developmental Toxicity - rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Damage to fetus possible

Reproductive toxicity - rat - Inhalation
Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Experiments have shown reproductive toxicity effects in male and female laboratory animals.

Signs and Symptoms of Exposure

Lung irritation, chest pain, pulmonary edema, Inhalation studies on toluene have demonstrated the development of inflammatory and ulcerous lesions of the penis, prepuce, and scrotum in animals.

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

no data available

Bioaccumulation	Leuciscus idus (Golden orfe) - 3 d Bioconcentration factor (BCF): 94

Ecotoxicity effects

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Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 74.00 - 340.00 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 7.63 mg/l - 96 h
	NOEC - Pimephales promelas (fathead minnow) - 5.44 mg/l - 7 d
	LOEC - Pimephales promelas (fathead minnow) - 8.04 mg/l - 7 d
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia magna (Water flea) - 8.00 mg/l - 24 h
	Immobilization EC50 - Daphnia magna (Water flea) - 6 mg/l - 48 h
Toxicity to algae	EC50 - Chlorella vulgaris (Fresh water algae) - 245.00 mg/l - 24 h
	EC50 - Selenastrum capricornutum (green algae) - 10.00 mg/l - 24 h

Further information on ecology

no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-No.: 1294 Class: 3 Packing group: II
Proper shipping name: Toluene

IMDG
UN-No.: 1294 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: TOLUENE
Marine pollutant: No

IATA
UN-No.: 1294 Class: 3 Packing group: II
Proper shipping name: Toluene

15. REGULATORY INFORMATION

OSHA Hazards
Flammable Liquid, Teratogen, Reproductive hazard

TSCA Status
On TSCA Inventory

DSL Status
All components of this product are on the Canadian DSL list.

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

	CAS-No.	Revision Date
Toluene	108-88-3	1987-01-01

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SARA 311/312 Hazards
Fire Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Toluene	108-88-3	1987-01-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Toluene	108-88-3	1987-01-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Toluene	108-88-3	1987-01-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm. Toluene	108-88-3	1992-05-09

16. OTHER INFORMATION

Further information

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Material Safety Data Sheet

TRANSMIX (Oils/Gasoline)

April 30, 1990

PHILLIPS 66 COMPANY
A Division of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency: (918) 661-8118
General MSDS Information: (918) 661-8327
For Additional MSDSs: (918) 661-5952

A. Product Identification

Synonyms: Transmix Blend
Chemical Name: Mixture
Chemical Family: Aliphatic and Aromatic Hydrocarbon Mixture
Chemical Formula: Mixture
CAS Reg. No.: Mixture
Product No.: 1014064(32320); 1014065

Product and/or Components Entered on EPA's TSCA Inventory: YES

This product is in U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals; hence, it may be subject to applicable TSCA provisions and restrictions.

B. Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
Transmix (Oils/Gasoline) blend of:	various	100	NE	NE
Gasoline	8006-61-9	0-100	300 ppm	300 ppm
Dual Purpose Fuel Oil	Various	0-100	5 mg/m3(M)	5 mg/m3(M)
Diesel Fuel No. 2	68476-34-6	0-100	NE	NE
Kerosene	8008-20-6	0-100	NE	NE
Stove Oil	Various	0-100	5 mg/m3(M)	5 mg/m3(M)

(M) As a oil mist

See Section F, for Recommended Exposure Limits for other components.

C. Personal Protection Information

Ventilation: Use adequate ventilation to control exposure below recommended levels.

Respiratory Protection: For concentrations exceeding the recommended exposure level, use NIOSH/MSHA approved air purifying respirator. In case of spill or leak

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resulting in unknown concentration, use NIOSH/ MSHA approved supplied air respirator. If conditions immediately dangerous to life or health (IDLH) exist, use NIOSH/MSHA approved self-contained breathing apparatus (SCBA).

Eye Protection: Use safety glasses with side shields.

Skin Protection: Use protective garments to prevent excessive skin contact. Use gloves of Viton, Nitrile, or Polyvinyl Alcohol (PVA) construction and full body long-sleeved garments.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Do not get in eyes, on skin, or on clothing. Do not breathe vapors. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Wash thoroughly after handling. Immediately remove any contaminated clothing. Launder contaminated clothing before reuse.

Store in cool, well-ventilated area away from ignition sources. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Keep containers closed. Protect containers from physical damage.

E. Reactivity Data

Stability: Stable
Conditions to Avoid: Not Applicable
Incompatibility (Materials to Avoid): Oxygen and strong oxidizing agents

Hazardous Polymerization: Will Not Occur
Conditions to Avoid: Not Applicable
Hazardous Decomposition Products: Carbon oxides, lead fumes (for grades containing Tetraethyl Lead) and various hydrocarbons when burned.

F. Health Hazard Data

Recommended Exposure Limits:

See Section B.

Components of Transmix (Oils/Gasoline) may include:

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
n-Octane	111-65-9	< 1	300 ppm	300 ppm
n-Nonane	111-84-2	< 3	200 ppm	200 ppm
Benzene	71-43-2	< 5	10 ppm*	10 ppm
Toluene	108-88-3	<10	200 ppm	100 ppm
Ethyl Benzene	100-41-4	< 2	100 ppm	100 ppm

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p-Xylene	106-42-3	< 3	100 ppm	100 ppm
m-Xylene	108-38-3	< 6	100 ppm	100 ppm
o-Xylene	95-47-6	< 3	100 ppm	100 ppm
1,3,5-Trimethyl Benzene	108-67-8	< 4	25 ppm**	25 ppm**
1,2,4-Trimethyl Benzene	95-63-6	< 4	25 ppm**	25 ppm**
1,2,3-Trimethyl Benzene	526-73-8	< 4	25 ppm**	25 ppm**
Tetraethyl Lead (TEL)	78-00-2	<0.25 g/gal***	0.075 mg/m3(S)	0.1 mg/m3(S)

(S) As Lead, skin notation.
* Operations covered by the Benzene Standard, 29 CFR 1910.1028, will have a 1 ppm 8 hour TWA and 5 ppm STEL.
** For Trimethylbenzenes.
*** Quarterly average equivalent to <0.1 g Pb/gal for leaded gasolines Unleaded gasolines, <0.05 g Pb/gal per sample

Acute Effects of Overexposure:

Eye: May cause slight irritation to the eyes.

Skin: May cause slight irritation to the skin. Repeated skin contact may cause severe irritation.

Inhalation: May cause headache, nausea, weakness, sedation, and unconsciousness.

Ingestion: May cause irritation to intestines. May be aspirated into the lungs if swallowed, which may result in pulmonary edema and chemical pneumonitis.

Subchronic and Chronic Effects of Overexposure:

Unleaded gasoline has produced cancer in laboratory animals. No comparable health hazard for cancer is known to occur in humans.

Jet fuel has produced kidney damage in laboratory animals. No comparable kidney damage is known in humans. May cause blood changes possibly leading to aplastic anemia. May cause liver damage.

Other Health Effects:

Gasolines and jet fuels generally contain Benzene which has been designated a carcinogen by NTP, IARC, and OSHA. Benzene may produce blood changes which include reduced platelets, reduced red blood cells, reduced white blood cells, aplastic anemia, and acute nonlymphocytic leukemia. Benzene has produced fetal death in laboratory animals and caused chromosome changes in humans and mutation changes in cells of other organisms. Health effects attributable to Benzene are not known to occur in humans exposed to gasolines and jet fuels.

Unleaded gasoline has produced kidney damage in male rats only. No comparable health hazard for kidney disease is known to occur in humans.

Gasolines containing lead anti-knock compounds should be handled in such a way to minimize contact with the body. Lead can accumulate in the body with overexposure and cause illness due to effects on the blood, nerves, kidneys and the reproductive system.

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Long term exposure to high oil mist concentrations may cause non-debilitating lung changes.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	_X_	___	Corrosive	___	___
Mutagen	_X_	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	_X_	_X_
Allergic Sensitizer	___	___	Specify - Lung-Aspiration Hazard; Blood and Liver Toxin; Kidney Toxin-Animals		
Highly Toxic	___	___			

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least fifteen minutes. If irritation develops, seek medical attention.

Skin: Wash with soap and water. If irritation develops, seek medical attention.

Inhalation: Remove from exposure. If breathing ceases, administer artificial respiration followed by oxygen.

Ingestion: Do not induce vomiting. Seek immediate medical assistance.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

G. Physical Data

Appearance:	Colorless to Red-orange Liquid
Odor:	Mild to Pungent
Boiling Point:	80-572F (27-300C)
Vapor Pressure:	< 1
Vapor Density (Air = 1):	Not Established
Solubility in Water:	Negligible
Specific Gravity (H2O = 1):	0.8 at 60/60F (15.6/15.6C) (approximately)
Percent Volatile by Volume:	100
Evaporation Rate (Butyl Acetate = 1):	Not Established
Viscosity:	Not Established

H. Fire and Explosion Data

Flash Point (Method Used):	<-35 to 150F (-37 to 66C) (Estimated)
Flammable Limits (% by Volume in Air):	LEL - Not Established UEL - Not Established
Fire Extinguishing Media:	Dry chemical, foam or carbon dioxide (CO2)
Special Fire Fighting Procedures:	Evacuate area of all unnecessary personnel. Wear appropriate safety equipment for fire conditions including NIOSH/MSHA

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	self-contained breathing apparatus (SCBA). Shut off source, if possible. Water fog or spray may be used to cool exposed containers and equipment. Do not spray water directly on fire - product will float and could be reignited on surface of water.
Fire and Explosion Hazards:	Carbon oxides and various hydrocarbons formed when burned. Gasolines containing Tetraethyl Lead will form lead fumes when burning. Highly flammable vapors which are heavier than air may accumulate in low areas and/or spread along ground away from handling site. Flashback along vapor trail may occur.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:
Evacuate area of all unnecessary personnel. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Shut off source, if possible and contain spill. Protect from ignition. Keep out of water sources and sewers. Absorb in dry, inert material. Transfer to disposal drums using non-sparking equipment.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or otherwise manage in a permitted waste management facility.

J. DOT Transportation

Shipping Name:	Petroleum Oil, n.o.s. (contains Gasoline, No. 2 diesel fuel and Kerosene)
Hazard Class:	Flammable Liquid
ID Number:	NA 1270
Marking:	Petroleum Oil, n.o.s. (contains Gasoline, No. 2 diesel fuel and Kerosene), NA 1270, RQ*, and "This End Up" on packages containing inside packaging, for non-bulk packaging; 1270 on bulk packaging
Label:	Flammable Liquid
Placard:	Flammable/1270
Hazardous Substance/RQ:	Tetraethyl Lead/10#; Benzene/10#; Toluene/1000#; Xylene/1000#; Ethylbenzene/1000#
Shipping Description:	Petroleum Oils, n.o.s., (contains Gasoline, No. 2 diesel fuel, and Kerosene), Flammable liquid,
NA1270, RQ* Packaging	References: 49 CFR 173.118 and 173.119(a)

* Include the letters "RQ" as shown if any of the Hazardous Substances listed above are present, in a quantity, in one package, which equals or exceeds the reportable quantity (RQ) shown for that substance. The name of the Hazardous Substance must be included inside the parentheses following the proper shipping name, or in parentheses following the letters "RQ".

K. RCRA Classification - Unadulterated Product as a

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Waste

Ignitable (D001) - For all gasolines.
EP Toxic (D008) - For gasolines containing TEL.

L. Protection Required for Work on Contaminated Equipment

Contact immediate supervisor for specific instructions before work is initiated. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

M. Hazard Classification

_X_ This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

___ Combustible Liquid	___ Flammable Aerosol	___ Oxidizer
___ Compressed Gas	___ Explosive	___ Pyrophoric
___ Flammable Gas	_X_ Health Hazard (Section F)	___ Unstable
_X_ Flammable Liquid	___ Organic Peroxide	___ Water Reactive
___ Flammable Solid		

___ Based on information presently available, this product does not meet any of the hazard definitions of 29 CFR Section 1910.1200.

N. Additional Comments

This product contains the following chemical(s) 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. (See Hazardous Components Section B).

Benzene
Toluene
Ethyl Benzene
p-Xylene
o-Xylene
m-Xylene
1,2,4-Trimethyl Benzene

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MATERIAL SAFETY DATA SHEET

MSDS Number
T-W130

AccuStandard
125 Market Street • New Haven, CT USA 06513
Phone No: (203) 786-5290 • Fax No: (203) 786-5287

Emergency Phone Number
203-786-5290
Mon. to Fri. 8am-5pm EDT

Product Number : T-W130

Product Name : Transformer Oil

Synonyms : Gulf Transcrest HT1

Formula : N/A **Molecular Weight :** N/A

Section 2 - Composition / Information on Ingredients

Component(s) (2)	CAS #	Appr. %	ACGIH TLV TWA mg/m3	ACGIH TLV SKIN	OSHA PEL TWA mg/m3	OSHA PEL SKIN
Transformer Oil (light naphthenic distillate)	64742-53-6	40.0%				
Transformer Oil (hydrotreated middle distillate)	64742-46-7	60.0%	5		5	

Section 3 - Hazards Identification

Symptoms of Exposure:

May be harmful if inhaled, swallowed, or absorbed through the skin.

Potential Health Effects:

No applicable information found.

Routes of Entry:

Inhalation, ingestion or skin contact.

Carcinogenicity:

Proven human carcinogenic substance. Cancer Hazard.

Section 4 - First Aid Measures

First Aid Procedures:

GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.

Skin: Immediately flush thoroughly with large amounts of water.

Eyes: Immediately flush thoroughly with water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

Inhalation: Remove to fresh air; give artificial respiration if breathing has stopped. Contact a physician

Ingestion: Get immediate medical attention.

Remove contaminated clothing and wash before reuse.

Section 5 - Fire Fighting Measures

Alteration of any information contained herein without written permission from AccuStandard strictly prohibited.

Fire fighting measures for the Solvent

Flammable Properties:

Flash Point (°F): 295-310F (coc)
Flammable Limits LEL (%): N/A
Flammable Limits UEL (%): N/A

Thermal decomposition produces toxic fumes.

Extinguishing Media:

Use water spray, dry chemical, CO2, or "alcohol" foam.

Protection of Firefighters:

Wear self-contained breathing apparatus and protective clothing.

Section 6 - Accidental Release Measures

Spill Response:

Wear suitable protective equipment listed under Expose /Personal Protection. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards. Contain the release and eliminate its source, if this can be done without risk. Dispose as hazardous waste. Comply with Federal, State and local regulations.

Section 7 - Handling and Storage

Keep container closed.
Store in a cool area away from ignition sources and oxidizers.
Do not breath vapor or mist.
Do not get in eyes, on skin, or on clothing.

Section 8 - Exposure Controls / Personal Protection

Personal Protection Equipment (PPE):

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). 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 must be worn to prevent skin contact.

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(Butyl Rubber, Viton or equivalent)

Safety glasses with side shields must be worn at all times.

General Hygiene Considerations:

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

Section 9 - Physical and Chemical Properties

Physical and chemical properties for the Solvent

Appearance: Liquid, slight hydrocarbon odor.
Boiling Point: N/A
Melting Point: N/A
Specific Gravity (Water = 1): N/A
Vapor Pressure: N/A
Vapor Density (Air = 1): N/A
Percent Volatile (by volume): N/A
Evaporation Rate (Butyl acetate = 1): N/A
Flash Point: 295-310F (coc)
Explosion Limits (%): N/A to N/A
Solubility in water (%): Negligible

Section 10 - Stability and Reactivity

Stability and reactivity for the Solvent

Stability: Stable
Materials to Avoid: Oxidizers

Hazardous Decomposition: Oxides of carbon
Hazardous Polymerization: Does not occur
Conditions to Avoid: Heat, open flames.

Section 11 - Toxicological Information

See section 3 for specific toxicological information for the ingredients of this product.

Section 12 - Ecological Information

By complying with sections 6 and 7 there will be no release to the environment

Alteration of any information contained herein without written permission from AccuStandard strictly prohibited.

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

DOT Shipping Class: NR Packing Group: NR UN Number: NR

Section 15 - Regulatory Information

In addition to Federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

The following regulations apply:

This product is a "mixture". CAS number(s) NOT listed on TSCA Inventory. For research and development use only. Not for manufacturing or commercial purposes.

Section 16 - Other Information

This document has been designed to meet the requirements of OSHA, ANSI and CHIPs regulations.

This statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. It is intended for use only by persons having the necssary technical skill and at their own discretion and risk. Since conditions and manner of use are ouside our control, we make NO WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

* * * End of document * * *

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The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

Trench Waste
L0002659 Revised 27-OCT-2006

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Tradenames and Synonyms

Waste LP-VS-71
LP-VS-71

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont
12501 Strang Road
P.O. Box 347
La Porte, TX 77572-0347

PHONE NUMBERS
Product Information : 1-800-441-7515
Transport Emergency : CHEMTREC: 1-800-424-9300
Medical Emergency : 1-800-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
Dirt/Gravel/Non-Biodegradable ABS		20-90
Polyvinyl Alcohol	9002-89-5	10-50
Tar Scale		10-50
Plastic		0-10
Wood/Paper		0-10
Crystalline Silica (contained in gravel)	14808-60-7	

HAZARDS IDENTIFICATION

Potential Health Effects

Based on experience with handling PVA, no unusual dermatitis hazard is expected from routine handling.

Eye contact with PVA may produce mechanical irritation.

PVA is supplied as a granular solid. Under certain conditions of use, dust may be formed. PVA is considered a nuisance dust. If PVA is heated above 200 C fumes irritating to the eye, nose and throat will be evolved. If exposed to these fumes, the eyes will tear, itch and turn red. The nose will burn. The throat will burn and coughing may result.

(HAZARDS IDENTIFICATION - Continued)

Gravel contains a small amount of crystalline silica. The predominant effect of overexposure to airborne crystalline silica in humans is silicosis. Silicosis is a chronic disease characterized by the formation of silica-containing scar tissue in the lungs with symptoms of coughing, dyspnea, wheezing, and nonspecific respiratory ailments.

Several recent epidemiology studies have shown, that in addition to silicosis, there is limited evidence of an excess of lung cancer in occupations involving exposures mainly to crystalline silica, such as stone cutters and granite industry workers. Occupational exposure at the recommended AEL of 0.1 mg/m3 should protect workers from silicosis and lung tumors.

Carcinogenicity Information

The following components are listed by IARC, NTP, OSHA or ACGIH as carcinogens.

Material	IARC	NTP	OSHA	ACGIH
Crystalline Silica (contained in gravel)	1	X		A2

DuPont controls the following materials as carcinogens:
Crystalline Silica (contained in gravel).

FIRST AID MEASURES

First Aid

INHALATION
If exposed to fumes from overheating or combustion, move to fresh air. Consult a physician.

SKIN CONTACT
Wash skin with soap and plenty of water.

EYE CONTACT
Wash eyes with water.

FIRE FIGHTING MEASURES

Flammable Properties

The solid polymer can be ignited and burned only with difficulty. Dust from PVA can form an explosive mixture in the air.

Complete combustion gives carbon dioxide and water. Incomplete combustion gives in addition carbon monoxide and carbon oxidation products, including organic acids, aldehyes

(FIRE FIGHTING MEASURES - Continued)

and alcohols.

Extinguishing Media

Water, Foam, CO2.

Fire Fighting Instructions

Wear self-contained breathing apparatus. Wear full protective equipment.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Accidental Release Measures

Pick up and containerize for disposal.

HANDLING AND STORAGE

Handling (Personnel)

Avoid breathing dust. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling.

Handling (Physical Aspects)

Avoid dust generation.

Storage

Store in tightly closed container.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Provide adequate ventilation to maintain employee exposure to a minimum.

(EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

Personal Protective Equipment

Eye/Face
Safety glasses with side shields.

Respiratory Protection
If ventilation is inadequate, use a NIOSH approved respirator for particulates.

Protective Clothing
Gloves and a long sleeve shirt are recommended.

Exposure Guidelines

Applicable Exposure Limits

Polyvinyl Alcohol

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 10 mg/m3, 8 & 12 Hr. TWA, total dust 5 mg/m3, 8 & 12 Hr. TWA, respirable dust

Crystalline Silica (contained in gravel)

PEL	(OSHA)	: Total dust, (30 mg/m3 / % SiO2 + 2) Respirable dust, (10 mg/m3 / % SiO2 + 2) as 8 Hr TWA's
TLV	(ACGIH)	: 0.025 mg/m3, respirable dust, 8 Hr. TWA, A2
AEL *	(DuPont)	: 0.1 mg/m3, 8 Hr. TWA, respirable dust 0.05 mg/m3, 12 Hr. TWA, respirable dust

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Odor : Sludge type
Form : Solid
Color : Black/brown

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Avoid temperatures above 200 deg. C (392 deg. F)

(STABILITY AND REACTIVITY - Continued)

Incompatibility with Other Materials

None reasonably foreseeable.

Decomposition

Hazardous decomposition products include carbon monoxide and hydrocarbon oxidation products including acids, aldehydes and alcohols.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

POLYVINYL ALCOHOL

The Oral LD50 of one type of vinyl alcohol polymer is greater than 11000 mg/kg of body weight as determined in rats, which is low toxicity. Other types of vinyl alcohol polymers are predicted to have similar LD50 values.

One type of vinyl alcohol polymer was tested on male guinea pigs. No irritation or sensitization effects were noted.

CRYSTALLINE SILICA

Oral ALD: > 11,000 mg/kg in male rats

The compound is not a skin irritant or a skin sensitizer in animals, but is a mild eye irritant.

Inhalation or intratracheal instillation: Single doses of 50 mg quartz administered by intratracheal instillation have resulted in pulmonary fibrosis at 60 and 120 days post exposure in rats. Repeated and chronic exposures as low as 0.7 mg instillation and 12 mg/m3 by inhalation resulted in pulmonary fibrosis, inflammation, edema and emphysema in animals exposed to quartz.

Lung tumors were observed in rats exposed for up to two years by inhalation to 12.4 or 51.6 mg/m3 quartz. Lung tumors were also observed in rats exposed to quartz by intratracheal instillation. Silica was positive in mammalian cell cultures for cell transformation and chromosomal effects. It was negative in cell culture assays for gene mutation in bacteria and DNA damage in mammalian cells and in a whole animal assay for chromosomal effects. No animal test reports are available to define developmental, or reproductive toxicity.

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity

Concentrations of vinyl alcohol polymer up to 10,000 milligrams per liter of water showed no mortality or other effect when tested on bluegill sunfish.

DISPOSAL CONSIDERATIONS

Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

TRANSPORTATION INFORMATION

Shipping Information

DOT
Not Regulated.

Shipping Containers

Fiber drums

REGULATORY INFORMATION

U.S. Federal Regulations

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute	: No
Chronic	: Yes
Fire	: No
Reactivity	: No
Pressure	: No

OTHER INFORMATION

NFPA, NPCA-HMIS

NPCA-HMIS Rating

Health	: 1 (Chronic Health Effects)
Flammability	: 1
Reactivity	: 0

(Continued)

Personal Protection rating to be supplied by user depending on use conditions.

Additional Information

Latest MSDS revision date: 01/12/26.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : Doris Diaz
DuPont
Address : P.O. 347
La Porte, TX 77572-0347
Telephone : 281-470-3578

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

Riverdale®

1333 Burr Ridge Parkway, Suite 125A
Burr Ridge, IL 60521-0866

Emergency Phone (Chemtrec): (800) 424-9300
Information: (800) 345-3330

Date Issued: 5/23/03
Supersedes: 9/11/97
Product Code: 1786-RIV
MSDS Number: 178-6

MATERIAL SAFETY DATA SHEET:

Triamine®

1. INFORMATION ON INGREDIENTS

Chemical Name	CAS #	Weight %	Common Name	OSHA PEL	ACGIH TLV
Dimethylamine Salt of 2,4-Dichlorophenoxy-acetic Acid	2008-39-1	16.3%	DMA Salt of 2,4-D	10 mg/m3 (for 2,4-D Acid)	N/A
Dimethylamine Salt of (+)-R-2-(2-Methyl-4-Chlorophenoxy)propionic Acid	66423-09-4	8.2%	DMA Salt of MCPP-p	N/A	N/A
Dimethylamine Salt of (+)-R-2-(2,4-Dichloro-phenoxy)propionic Acid	104786-87-0	8.2%	DMA Salt of 2,4-DP-p	N/A	N/A
Water and Sequesterents	NA	67.3%	Inert Ingredients	N/A	N/A
	Total	100.0%			

2. HEALTH DATA

PRIMARY ROUTE OF ENTRY: **Dermal/Eye:** Yes **Oral:** Yes **Inhalation:** No

SYMPTOMS OF OVEREXPOSURE: Nonspecific: muscle weakness, lethargy, loss of appetite, abdominal pains, headache, or shortness of breath.

ACUTE HEALTH EFFECTS

Inhalation: Avoid inhaling vapors or mist. May irritate the respiratory tract or cause dizziness.

Eyes: Direct and prolonged eye exposure to the concentrated product may cause corneal opacity, irreversible eye damage.

Skin: Prolonged exposure may cause mild skin irritation and dermal sensitization reactions. Harmful if absorbed through skin, may cause similar symptoms to ingestion.

Ingestion: May cause muscle weakness, nausea, diarrhea, and abdominal pain. Fall in blood pressure or myotonia (prolonged muscular spasm) may occur under extreme exposure conditions. Can be fatal.

TOXICOLOGICAL DATA

Acute Oral LD50: 2.3 g/ kg; (male rats); 1.8 g/ kg (female rats)
Acute Dermal LD50: >2 g/ kg (rabbits)
Acute Inhalation LC50: N/D

Eye Irritation: severe irritation: corrosive (rabbits)
Dermal Irritation: mild irritation (rabbits)
Dermal Sensitization: is a sensitizer (guinea pigs)

MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE: Skin exposure may aggravate existing skin conditions. Exposure to mist may aggravate existing respiratory conditions.

EPAPA005001962

CHRONIC HEALTH EFFECTS:

Agency	Listing	Carcinogen
NTP	IARC	OSHA
NO	NO	NO

Repeated or prolonged overexposure to phenoxy herbicides may cause liver, kidney, gastrointestinal or muscular system effects. The EPA's Science Advisory Panel has given 2,4-D a class D classification (not classifiable as to human carcinogenicity). Various epidemiological studies have yielded conflicting results with the majority being negative. The current scientific consensus is that there is no proven causal association between 2,4-D and cancer. Recent studies have not shown 2,4-D to be a mutagen or teratogen. Other chronic effects of 2,4-DP-p and MCPP-p have not been determined.

3. FIRST AID MEASURES

Have the product container or label with you when calling a poison control center or doctor, or going for treatment.

IF IN EYES: Hold eyelids open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 to 20 minutes. Call a poison control center or doctor for treatment advice.

IF INHALED: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control center or doctor for further treatment advice.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

4. FIRE FIGHTING MEASURES

FLASH POINT (F): N/A

FLASH POINT METHOD USED: None - aqueous solution

EXTINGUISHING MEDIA: Use CO^2 or dry chemical for small fires and foam, water fog or water stream for large fires. Use water spray to cool closed containers.

COMBUSTION PRODUCTS: May include, but are not limited to: hydrogen chloride and nitrogen oxides.

SPECIAL FIRE FIGHTING PROCEDURES: May produce toxic and noxious fumes under extreme fire conditions. Use positive pressure self-contained breathing apparatus and acid resistant protective clothing. Any water used to extinguish the fire should be contained by diking to prevent contamination of the public water system.

UNUSUAL FIRE & EXPLOSION HAZARDS: Drums of product will burst from steam pressure under prolonged fire conditions.
See Section 13, REGULATORY INFORMATION, for NFPA rating.

EPAPA005001963

5. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS SPILLED OR RELEASED:

Wear the suggested safety equipment when cleaning large spills (section 7). Surround with impervious material such as dirt to prevent run-off. Absorb product with an inert absorbent such as clay granules or wood shavings. Contain all affected material in a closed, marked container for proper disposal. Treat contaminated area with detergent and water. 2,4-D spills are subject to CERLCA (Superfund) reporting requirements. Reportable Quantity (RQ) = 77 gallons of Triamine.

6. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Always use original container to store pesticides in a secured warehouse or storage building. Do not store near seeds, fertilizers, insecticides, or fungicides. Store at temperatures above 32°F. If allowed to freeze, remix before using. Freezing does not alter this product. Containers should be opened in well ventilated areas. Keep container tightly sealed when not in use. Do not stack cardboard cases more than two pallets high. Do not contaminate water, food, or feed by storage or disposal.

WORK HYGIENIC PRACTICE:

Wash nondisposable gloves thoroughly with soap and water before removing. After using this product, remove clothing and launder separately before reuse, and promptly and thoroughly wash hands and exposed skin with soap and water. Remove saturated clothing as soon as possible and shower.

7. EXPOSURE CONTROL/PERSONAL PROTECTION

RESPIRATORY PROTECTION:	Respiratory protection is not normally required. Use a NIOSH/MSHA approved respirator when directly exposed to mist.
VENTILATION:	Open ventilation. Reduce all mist with local exhaust.
PROTECTIVE GLOVES:	Chemical-resistant gloves.
EYE PROTECTION:	Wear splash goggles or face shield when handling.
OTHER PROTECTIVE EQUIPMENT:	Long sleeved shirt, long pants, socks and shoes. Persons engaged in open pouring must wear coveralls or a chemical resistant apron. (See Precautionary Statements on product label for details)

8. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR:	Dark amber liquid, amine odor
SOLUBILITY IN WATER:	100% in water.
BOILING POINT (F):	207°
VAPOR PRESSURE (mm Hg @ 20 C:	that of water
SPECIFIC GRAVITY (H20=1):	1.097
pH	7.5 to 8.5
FREEZING POINT (F):	32°
POUNDS PER GALLON:	9.14

9. STABILITY AND REACTIVITY

STABILITY:	Stable
CONDITIONS TO AVOID:	Avoid fire conditions.
INCOMPATIBILITY:	Strong oxidizers or acids

HAZARDOUS BYPRODUCTS: None

HAZARDOUS POLYMERIZATION: Will Not Occur

10. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE

2,4-D, MCPP and 2,4-DP each have a relatively short half-life of, on average 6 to 9, 5 to 17 and 10 days, respectively. Phenoxy herbicides are readily degraded into nontoxicological substances by soil microbes and aquatic microorganisms.

ENVIRONMENTAL FATE

This product is toxic to aquatic invertebrates. Drift or runoff may adversely affect aquatic invertebrates and nontarget plants.

11. DISPOSAL CONSIDERATIONS

PRODUCT DISPOSAL:

Pesticide wastes are toxic. Improper disposal of excess pesticide spray mixtures or rinsate is a violation of Federal law and may contaminate groundwater. If product cannot be disposed of by use according to the label, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL:

Triple rinse (or equivalent) and offer for recycling, or puncture and dispose of in a sanitary landfill. Plastic containers are also disposable by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

12. TRANSPORTATION INFORMATION

DOT REGULATED CONTAINER SIZE:	220 gal, 260 gal (All smaller container sizes are not DOT regulated)
HAZARD CLASS:	9
UN NUMBER:	UN 3082
PACKING GROUP:	III
GUIDE NUMBER:	171
PROPER SHIPPING NAME:	RQ, Environmentally Hazardous Substances, Liquid, N.O.S. (2,4-D Salt)

13. REGULATORY INFORMATION

SARA TITLE III; Section 311/312:

An immediate and delayed health hazard.

REPORTABLE QUANTITY (RQ):

100 lbs of 2,4-D acid equivalent or approximately 77 gallons of Triamine. For releases greater than the RQ, contact the National Response Center at (800)424-8802.

SARA TITLE III; SECTION 313-This product contains the following substances subject to the reporting requirements of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372

N/A

HMIS INFORMATION	
HEALTH:	2
FLAMMABILITY:	1
REACTIVITY:	0
PROTECTIVE:	D

NFPA INFORMATION	
TOXICITY:	2
FIRE:	1
REACTIVITY:	0
SPECIAL:	N

The information given herein is to the best of our knowledge true and accurate. No warranty, however, expressed or implied, is made.

EPAPA005001965

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **TRIETHANOLAMINE**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: TRIETHANOLAMINE
Synonyms: None
Chemical Family: Amine
Application: Additive

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Triethanolamine	102-71-6	60 - 100%	5 mg/m^3	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye, skin, and respiratory irritation. May be harmful if swallowed. Repeated overexposure may cause liver and kidney effects.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician
Not Applicable

EPAPA005001966

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	382
Flash Point/Range (C):	194
Flash Point Method:	Not Determined
Autoignition Temperature (F):	600
Autoignition Temperature (C):	315
Flammability Limits in Air - Lower (%):	1.3
Flammability Limits in Air - Upper (%):	8.5

Fire Extinguishing Media	Carbon Dioxide, Dry Chemicals, Foam.
Special Exposure Hazards	Decomposition in fire may produce toxic gases. Contact with strong oxidizers may produce explosive mixtures. Use water spray to cool fire exposed surfaces.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 2, Flammability 1, Reactivity 1
HMIS Ratings:	Flammability 1, Reactivity 1, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.
Storage Information	Store away from acids. Store away from oxidizers. Store in a cool well ventilated area. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	In high concentrations, supplied air respirator or a self-contained breathing apparatus.
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear colorless
Odor:	Mild ammonia
pH:	10.6

EPAPA005001967

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Gravity @ 20 C (Water=1):	1.12
Density @ 20 C (lbs./gallon):	9.33
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	531
Boiling Point/Range (C):	277
Freezing Point/Range (F):	-60
Freezing Point/Range (C):	-52
Vapor Pressure @ 20 C (mmHg):	0.01
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	149.19

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated Avoid contact with acids.
Incompatibility (Materials to Avoid)	Strong oxidizers. Strong acids. Copper and copper alloys.
Hazardous Decomposition Products	Oxides of nitrogen. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation.
Skin Contact	May cause skin irritation.
Eye Contact	May cause severe eye irritation. May cause corneal injury.
Ingestion	Causes burns of the mouth, throat and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	Repeated overexposure may cause liver and kidney effects.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 8680 mg/kg (Rat)
Dermal Toxicity:	Not determined

EPAPA005001968

Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Slowly biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

EPAPA005001969

Labels:	None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001970

MSDS Number: **T5382** * * * * * *Effective Date:* ***11/09/06*** * * * * * *Supercedes:* ***02/12/04***

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Rod School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS | J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TRIETHYLENE GLYCOL

1. Product Identification

Synonyms: Ethanol, 2,2'-[1,2-ethanediylbis(oxy)]bis-; triglycol; ethylene glycol dihydroxy-diethyl ether
CAS No.: 112-27-6
Molecular Weight: 150.20
Chemical Formula: C6H14O4
Product Codes:
J.T. Baker: W660
Mallinckrodt: 2735

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Triethylene Glycol	112-27-6	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 0 - None

EPAPA005001971

Flammability Rating: 1 - Slight
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; PROPER GLOVES
Storage Color Code: Green (General Storage)

Potential Health Effects

Inhalation:
No adverse health effects expected from inhalation.
Ingestion:
No adverse effects expected.
Skin Contact:
Prolonged exposure may cause skin irritation.
Eye Contact:
Splashing in eye causes irritation with transitory disturbances of corneal epithelium. However, these effects diminish and no permanent injury is expected. Vapors are non-irritating.
Chronic Exposure:
Possible skin irritation.
Aggravation of Pre-existing Conditions:
No information found.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. Not expected to require first aid measures.
Ingestion:
If large amounts were swallowed, give water to drink and get medical advice.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician if irritation develops..
Eye Contact:
If splash occurs, immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Call a physician.

---

5. Fire Fighting Measures

Fire:
Flash point: 177C (351F) CC
Autoignition temperature: 371C (700F)
Flammable limits in air % by volume:
lel: 0.9; uel: 9.2
Slight fire hazard when exposed to heat or flame.
Explosion:
Above the flash point, explosive vapor-air mixtures may be formed.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide. Water or foam may cause frothing.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from heat, ignition sources and oxidizing agents. Protect from freezing. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
None established.
Ventilation System:
Not expected to require any special ventilation.
Personal Respirators (NIOSH Approved):
Not expected to require personal respirator usage.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Odorless.
Solubility:
Miscible in water.
Specific Gravity:
1.1274 @ 15C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
285C (545F)
Melting Point:
-5C (23F)

Vapor Density (Air=1):
5.17
Vapor Pressure (mm Hg):
< 0.01 @ 20C (68F)
Evaporation Rate (BuAc=1):
0.01

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Hygroscopic.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 17 gm/kg; investigated as a reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Triethylene Glycol (112-27-6)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is not expected to evaporate significantly. When released into water, this material is expected to readily biodegrade. When released into water, this material is not expected to evaporate significantly. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.
Environmental Toxicity:
This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------

Ingredient	TSCA	EC	Japan	Australia
Triethylene Glycol (112-27-6)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Triethylene Glycol (112-27-6)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Triethylene Glycol (112-27-6)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Triethylene Glycol (112-27-6)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: No Fire: No Pressure: No
Reactivity: No (Pure / Liquid)

Australian Hazchem Code: None allocated.
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Call a physician.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****
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****
Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

Chem Service Inc.
Material Safety Data Sheet
Date: Monday, March 05, 2007
Last Revised Date: 12/29/05

SECTION 1 - CHEMICAL PRODUCT and COMPANY IDENTIFICATION

Catalog Number: PS-393
Description: Trifluralin
Other Name(s): a.a.a-Trifluoro-2.6-dinitro-N.N-dipropyl-p-toluidine

Supplied by CHEM SERVICE, Inc. PO BOX 599, WEST CHESTER, PA 19381 (610)-692-3026
EMERGENCY PHONE: 1-610-692-3026

SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS

CAS No.: 1582-09-8
Description: Trifluralin
EINECS No.: 216-428-8
Hazard Symbols: Xi

SECTION 3 - HAZARDS IDENTIFICATION

Contact lenses should not be worn in the laboratory.All chemicals should be considered hazardous - Avoid direct physical contact!
Can cause eye irritation. Can cause skin irritation. May be harmful if absorbed through the skin. May be harmful if inhaled. May be harmful if swallowed.

SECTION 4 - FIRST AID MEASURES

An antidote is a substance intended to counteract the effect of a poison. It should be administered only by a physician or trained emergency personnel. Medical advice can be obtained from a POISON CONTROL CENTER.
In case of contact: Flush eyes continuously with water for 15-20 minutes. Flush skin with water for 15-20 minutes. If no burns have occurred-use soap and water to cleanse skin. If inhaled remove patient to fresh air. Administer oxygen if patient is having difficulty breathing. If patient has stopped breathing administer artificial respirations. If patient is in cardiac arrest administer CPR. Continue life supporting measures until medical assistance has arrived. Remove and wash contaminated clothing. If patient is exhibiting signs of shock - Keep warm and quiet. Contact Poison Control Center immediately if necessary. Induce vomiting if swallowed. Do not administer liquids or induce vomiting to an unconscious or convulsing person. If patient is vomiting-watch closely to make sure airway does not become obstructed by vomit. Get medical attention if necessary.

SECTION 5 - FIRE AND EXPLOSION DATA

Flash Point: Not Available
Extinguishing Media: Carbon dioxide, dry chemical powder or spray.
Upper Explosion Limit: Not Available
Lower Explosion Limit: Not Available
Autoignition Temperature: Not Available
NFPA Hazard Rating: Not Available

SECTION 6 - ACCIENTAL RELEASE MEASURES

Spills or leaks: Evacuate area. Wear appropriate OSHA regulated equipment. Ventilate area. Sweep up and place in an appropriate container. Hold for disposal.

Wash contaminated surfaces to remove any residues. Remove contaminated cloting and wash before reuse.

SECTION 7 - HANDLING AND STORAGE

Handling:
This chemical should be handled only in a hood. Eye shields should be worn.
Use appropriate OSHA/MSHA approved safety equipment.
Avoid contact with skin, eyes and clothing. Avoid ingestion and inhalation
Wash thoroughly after handling.

Storage:
STORE UNDER REFRIGERATION. Store only with compatible chemicals.
Keep tightly closed.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

OSHA PEL (TWA): Not Available
ACGIH TLV (TWA): Not Available
ACGIH TLV (STEL): Not Available

Personal Protective Equipment
Eyes: Wear Safety Glasses.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 requirements must be followed whenever workplace conditions warrant a respirator's use.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Color: orange
Phase: Crystalline solid
Melting Point: 48.5-49 C
Boiling Point: 295 C
Specific Gravity: 1.36
Vapor Density: 1.30E-4mm@
Vapor Preasure: Not Available
Solubility in Water: Insoluble (immiscible)
Odor: Not Available
Evaporation Rate (Butyl acetate=1): Not Available
Molecular Weight: 335.32
Molecular Formula: C13H16F3N3O4

SECTION 10 - STABILITY AND REACTIVITY

Sensitive to light - dark color does not affect purity.

SECTION 11 - TOXICOLOGY INFORMATION

RTECS: XU9275000

Oral Rat or Mouse LD50: 500mg/kg
Dermal Rat or Mouse LD50: 5000mg/kg
Rat or Mouse LC50 : 2800 mg/m3/1H

Carcinogenicity
OSHA: No
IARC: No
NTP: No
ACGIH: No
NIOSH: No
Other: No

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: Not Available
Environmental Fate: Not Available

SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL: Burn in a chemicals incinerator equipped with an afterburner and scrubber.

SECTION 14 - TRANSPORTATION INFORMATION

UN Number: UN2811
Class: 6.1
Packing Group: III
Proper Shipping Name: Toxic solid, organic, nos *

SECTION 15 - REGULATORY INFORMATION

European Labeling in Accordance with EC Directives
Hazard Symbols: Xi

Risk Phrases:
R36: Irritating to the eyes.
R43: May cause sensitisation by skin contact.

Safety Phrase:
S24: Avoid contact with the skin.
S37: Wear suitable gloves.

SECTION 16 - OTHER INFORMATION

The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded MSDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Material Safety Data Sheet (MSDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an MSDS for a solution or mixture the user should refer to the MSDS for every component of the solution or mixture. Chem Service warrants that this MSDS is based upon the most current information available to Chem Service at the time it

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This product is furnished FOR LABORATORY USE ONLY!

Material Safety Data Sheet

Catalog Number: 219687
Revision date: 25-Apr-2006

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY INFORMATION

Catalog Number: 219687

Product name: TRIPROPYLENE GLYCOL

Supplier:
MP Biomedicals, LLC
29525 Fountain Parkway
Solon, OH 44139
tel: 440-337-1200

Emergency telephone number: CHEMTREC: 1-800-424-9300 (1-703-527-3887)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA Exposure Limits:
TRIPROPYLENE GLYCOL	N/A	90 - 100%	None	None

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: *May cause skin irritation and/or dermatitis*

Principle routes of exposure: Skin
Inhalation: May cause irritation of respiratory tract
Ingestion: May be harmful if swallowed.
Skin contact: May cause allergic skin reaction
Eye contact: Avoid contact with eyes

Statements of hazard MAY CAUSE ALLERGIC SKIN REACTION.
Statement of Spill or Leak - ANSI Label Eliminate all ignition sources. Absorb and/or contain spill with inert materials (e.g., sand, vermiculite). Then place in appropriate container. For large spills, use water spray to disperse vapors, flush spill area. Prevent runoff from entering waterways or sewers.

4. FIRST AID MEASURES

General advice: In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
Inhalation: Move to fresh air. Call a physician immediately.
Skin contact: Rinse immediately with plenty of water and seek medical advice
Ingestion: Do not induce vomiting without medical advice.
Eye contact: In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Protection of first-aiders: No information available
Medical conditions aggravated by exposure: None known

EPAPA005001981

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam
Specific hazards: Burning produces irritant fumes.
Unusual hazards: None known
Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Specific methods: Water mist may be used to cool closed containers.
Flash point: Not determined
Autoignition temperature: Not determined
NFPA rating:

NFPA Health:	1
NFPA Flammability:	1
NFPA Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment.
Environmental precautions: Prevent product from entering drains.
Methods for cleaning up: Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Storage:
ROOM TEMPERATURE

Handling: Use only in area provided with appropriate exhaust ventilation.
Safe handling advice: Wear personal protective equipment.
Incompatible products: Oxidising and spontaneously flammable products

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures: Ensure adequate ventilation.
PERSONAL PROTECTIVE EQUIPMENT
Respiratory protection: Breathing apparatus only if aerosol or dust is formed.
Hand protection: Pvc or other plastic material gloves
Skin and body protection: Usual safety precautions while handling the product will provide adequate protection against this potential effect.
Eye protection: Safety glasses with side-shields
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Formula: C9H20O4
Molecular weight: 192.2546
Melting point/range: No data available at this time.
Boiling point/range: No Data available at this time.
Density: No data available
Vapor pressure: No data available
Evaporation rate: No data available
Vapor density: No data available

EPAPA005001982

Solubility (in water):	No data available
Flash point:	Not determined
Autoignition temperature:	Not determined

10. STABILITY AND REACTIVITY

Stability:	Stable under recommended storage conditions.
Polymerization:	None under normal processing.
Hazardous decomposition products:	Thermal decomposition can lead to release of irritating gases and vapours such as carbon oxides.
Materials to avoid:	Strong oxidising agents
Conditions to avoid:	Exposure to air or moisture over prolonged periods.

11. TOXICOLOGICAL INFORMATION

Product Information
Acute toxicity

Components	RTECS Number:	Selected LD50s and LC50s
TRIPROPYLENE GLYCOL	Not Available	Not Determined

Chronic toxicity:	Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness.
Local effects:	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
Specific effects:	May include moderate to severe erythema (redness) and moderate edema (raised skin), nausea, vomiting, headache.
Primary irritation:	No data is available on the product itself.
Carcinogenic effects:	No data is available on the product itself.
Mutagenic effects:	No data is available on the product itself.
Reproductive toxicity:	No data is available on the product itself.

12. ECOLOGICAL INFORMATION

Mobility:	No data available
Bioaccumulation:	No data available
Ecotoxicity effects:	No data available
Aquatic toxicity:	May cause long-term adverse effects in the aquatic environment.

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants	United Kingdom - The Red List:
TRIPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	Germany VCI (WGK)	World Health Organization (WHO) - Drinking Water	Ecotoxicity - Fish Species Data
TRIPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Microtox Data	Ecotoxicity - Water Flea Data
TRIPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

Components	EPA - ATSDR Priority List	EPA - HPV Challenge Program Chemical List	California - Priority Toxic Pollutants
TRIPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed

EPAPA005001983

Components	California - Priority Toxic Pollutants	California - Priority Toxic Pollutants
TRIPROPYLENE GLYCOL	Not Listed	Not Listed

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority. Residue from fires extinguished with this material may be hazardous.

Contaminated packaging: Do not re-use empty containers

14. TRANSPORT INFORMATION

UN/Id No: Not regulated

DOT:

Proper shipping name: Not Regulated

Components	U.S. DOT - Appendix A Table 1 - Reportable Quantities
TRIPROPYLENE GLYCOL	Not Listed

TDG (Canada):

WHMIS hazard class: Non-controlled

IMDG/IMO

IMDG - Hazard Classifications Not Applicable

Components	U.S. DOT - Appendix B - Marine Pollutan	U.S. DOT - Appendix B - Severe Marine Pollutants
TRIPROPYLENE GLYCOL	Not Listed	Not Listed

IMO-labels:

15. REGULATORY INFORMATION

International Inventories

Components
TRIPROPYLENE GLYCOL
Inventory - United States TSCA - Sect. 8(b) Not Listed
Canada DSL Inventory List - Not Listed

U.S. regulations:

Components	California Proposition 65 -	Massachusetts Right to Know List:	New Jersey Right to Know List:	Pennsylvania Right to Know List:
TRIPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

EPAPA005001984

Components	Florida substance List:	Rhode Island Right to Know List:	Illinois - Toxic Air Contaminants	Connecticut - Hazardous Air Pollutants
TRIPROPYLENE GLYCOL	Not Listed	Not Listed	Not Listed	Not Listed

Components	SARA 313 Emission reporting/Toxic Release of Chemicals	CERCLA/SARA - Section 302 Extremely Haz	NTP:	IARC:
TRIPROPYLENE GLYCOL	Not Listed	Not Listed	None	None

SARA 313 Notification: The above is your notification as to the SARA 313 listing for this product(s) pursuant to Section 313 of Title III of the Superfund Ammendments and Reauthorization Act of 1986 and 40 CFR Part 372.

If you are unsure if you are subject to the reporting requirements of Section 313, or need more information, please call the EPA Emergency Planning and Community Right-To-Know Information Hotline: (800) 535-0202 or (202) 479-2499 (in Washington, DC or Alaska).

State Notification: The above information is your notice as to the Right-to-Know listings of the stated product(s). Individual states will list chemicals for a variety of reasons including, but not limited to, the compounds toxicity; carcinogenic, tumorigenic and/or reproductive hazards; and the compounds environmental impact if accidentally released.

16. OTHER INFORMATION

Prepared by: Health & Safety
Disclaimer: The information and recommendations contained herein are based upon tests believed to be reliable. However, MP Biomedicals does not guarantee the accuracy or completeness NOR SHALL ANY OF THIS INFORMATION CONSTITUTE A WARRANTY, WHETHER EXPRESSED OR IMPLIED, AS TO THE SAFETY OF THE GOODS, THE MERCHANTABILITY OF THE GOODS, OR THE FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE. Adjustment to conform to actual conditions of usage maybe required. MP Biomedicals assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

EPAPA005001985

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **TURPENTINE**

Revision Date: 06-Jan-2005

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: TURPENTINE
Synonyms: Oil of Turpentine; Spirit of Turpentine; Crude Sulfate Turpentine; Gum Turpentine; Pulp Mill Liquid
Chemical Family: Terpenes
Application: Solvent

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Turpentine Oil	8006-64-2	60 - 100%	20 ppm	100 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. Sensitizer Flammable.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician
Not Applicable

EPAPA005001986

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	95
Flash Point/Range (C):	35
Flash Point Method:	CC
Autoignition Temperature (F):	488
Autoignition Temperature (C):	253
Flammability Limits in Air - Lower (%):	0.8
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Carbon Dioxide, Dry Chemicals, Foam.

Special Exposure Hazards Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Decomposition in fire may produce toxic gases. Runoff to sewer may cause fire or explosion hazard. Vapors are heavier than air and may accumulate in low areas. Vapors may travel along the ground to be ignited at distant locations.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 3, Reactivity 0
HMIS Ratings: Flammability 3, Reactivity 0, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

Storage Information Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Not normally needed. But if significant exposures are possible then the following respirator is recommended:
Organic vapor respirator.

Hand Protection Nitrile gloves. Use Viton or 4H gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

EPAPA005001987

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Light yellow
Odor:	Solvent
pH:	Not Determined
Specific Gravity @ 20 C (Water=1):	0.9
Density @ 20 C (lbs./gallon):	7.51
Bulk Density @ 20 C (lbs/ft3):	56.19
Boiling Point/Range (F):	309-338
Boiling Point/Range (C):	154-170
Freezing Point/Range (F):	-72 - -105
Freezing Point/Range (C):	-58 - -76
Vapor Pressure @ 20 C (mmHg):	5
Vapor Density (Air=1):	4.7
Percent Volatiles:	98
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Soluble in or Miscible in alcohols chloroform ethers carbon disulfide and benzene
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	136

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from heat, sparks and flame.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Carbon monoxide and carbon dioxide. Hydrocarbons.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin defatting with prolonged exposure. May cause skin irritation. Contains a component which is a known or suspected skin sensitizer.
Eye Contact	May cause eye irritation.
Ingestion	Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.

Aggravated Medical Conditions	Skin disorders.
Chronic Effects/Carcinogenicity	Prolonged or repeated exposure may cause kidney damage.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 5760 mg/kg (Rat)
Dermal Toxicity:	LD50: > 5000 mg/kg (Rabbit)
Inhalation Toxicity:	LC50: 12000 mg/m^3/6 hr. (Rat); 29000mg/m^3/2 hr (Mouse)
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Slowly biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	If empty container retains product residues, all label precautions must be observed. Store away from ignition sources. Transport with all closures in place. Return for reuse or disposal according to national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Turpentine, 3, UN1299, III, (35 C)
NAERG 128

Canadian TDG

EPAPA005001989

Turpentine, 3, UN1299, III, (35 C)

ADR
UN1299, Turpentine, 3, III

Air Transportation

ICAO/IATA
UN1299, Turpentine, 3, III

Sea Transportation

IMDG
Turpentine, 3, UN1299, III, (35 C)
EmS F-E, S-E

Other Shipping Information

Labels: Flammable Liquid

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Acute Health Hazard Fire Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Ignitability D001
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	B2 Flammable Liquids D2B Toxic Materials

EPAPA005001990

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005001991

5

Material Safety Data Sheet
Urea

JC# 24680

Section 1 - Chemical Product and Company Identification

MSDS Name: Urea
Catalog Numbers: AC388050000, AC424580000, AC424580050, AC424581000, AC424585000, S71220, S79871, A4321285, A4321286, A4922551, A4922553, A4922556, A4922601, A4922603, A4922605, A4922608, BP169-10, BP169-212, BP169-500, BP1690LC, NC9434904, NC9672616, NC9772669, NC9915662, U0150, U0155, U15-10, U15-3, U15-50, U15-500, U16-10, U16-3, U16-50, U16PD40KG, U16SAM1, U1712, U1721, U17212, U17SAM1, XXAC42458-10, XXU16PD190LB, XXU16PD40KG
Synonyms: Carbamide resin; Carbamimidic acid; Carbonyl diamide; Carbonyldiamine;Isourea
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
57-13-6	Urea	>98	200-315-5

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white solid.
Caution! May cause eye, skin, and respiratory tract irritation.
Target Organs: None known.

Potential Health Effects
Eye: May cause eye irritation. Causes redness and pain.
Skin: May cause skin irritation. Causes redness and pain. May be harmful if absorbed through the skin.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause cardiac disturbances. May be harmful if swallowed.
Inhalation: May cause respiratory tract irritation. May be harmful if inhaled.
Chronic: Prolonged or repeated exposure may cause adverse reproductive effects.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water.
Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.
Flash Point: Not applicable.
Autoignition Temperature: Not applicable.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Use with adequate ventilation. Minimize dust generation and accumulation. Avoid breathing dust, mist, or vapor. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation.
Storage: Store in a cool, dry place. Store in a tightly closed container.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Urea	none listed	none listed	none listed

OSHA Vacated PELs: Urea: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: 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: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Section 9 - Physical and Chemical Properties

hysical State: Solid
ppearance: white
Odor: ammonia-like
pH: 7.5-9.5 (10% aq. solution)
Vapor Pressure: 1.25 mm Hg @ 25 deg C
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: decomposes
Freezing/Melting Point:131-135 deg C
Decomposition Temperature: Not available.
Solubility: Soluble.
Specific Gravity/Density:1.335
Molecular Formula:CH4N2O
Molecular Weight:60.06

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, dust generation, temperatures above 130°C.
Incompatibilities with Other Materials: Sodium hypochlorite, calcium hypochlorite, sodium nitrate, nitrosyl perchlorate, strong oxidizing agents, dichromates, liquid chlorine, nitrates, permanganates, chromyl chloride.
Hazardous Decomposition Products: Carbon monoxide, oxides of nitrogen, carbon dioxide, ammonia.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 57-13-6: YR6250000
LD50/LC50:
CAS# 57-13-6:
Oral, mouse: LD50 = 11 gm/kg;
Oral, rat: LD50 = 8471 mg/kg;

Carcinogenicity:
CAS# 57-13-6: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Oral, rat: TDLo = 821 gm/kg/1Y-C (Tumorigenic - neoplastic by RTECS criteria - Blood - tumors and Blood - lymphoma, including Hodgkin's disease).; Oral, mouse: TDL0 = 394 gm/kg/1Y-C (Tumorigenic - Carcinogenic by RTECS criteria - Blood - tumors and Blood - lymphoma, including Hodgkin's disease).
Teratogenicity: No information available.
Reproductive Effects: Intraplacental, woman: TDLo = 1400 mg/kg (female 16 week(s) after conception) Fertility - abortion.; Intraplacental, woman: TDLo = 1600 mg/kg (female 16 week(s) after conception) Fertility - abortion.
Mutagenicity: DNA Inhibition: Human, Lymphocyte = 600 mmol/L.; Cytogenetic Analysis: Human, Leukocyte = 50 mmol/L.; DNA Damage: Mouse, Lymphocyte = 628 mmol/L.; Mutation in Mammalian Somatic Cells: Mouse, Lymphocyte = 265 mmol/L.
Neurotoxicity: No information available.
Other Studies:

Section 12 - Ecological Information

cotoxicity: Bacteria: Phytobacterium phosphoreum: EC50 = 23914 mg/L; 5 min; Microtox test If released to water, urea can degrade readily through biotic hydrolysis as demonstrated by various screening studies. The presence of naturally-occurring phytoplankton increases the degradation rate because phytoplankton use urea as a nitrogen source and because urea is decomposed by phytoplankton photosynthesis. In phytoplankton-rich waters, degradation occurs much faster in sunlight than in the dark. Abiotic hydrolysis of urea occurs very slowly in relation to biotic hydrolysis.
Environmental: If released to the atmosphere, urea will degrade rapidly in the vapor-phase by reaction with photochemically produced hydroxyl radicals (half-life of 9.6 hr). If released to soil, urea is hydrolyzed to ammonium through soil urease activity (the basis of its use as a fertilizer). The rate of hydrolysis can be fast (24 hr); however, a number a variables (such as increasing the pellet size of the fertilizer) can decrease the degradation rate from days to weeks.
Physical: No information found.
Other: Do not empty into drains.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not Regulated.	Not Regulated.
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 57-13-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes

CAS # 57-13-6: immediate.

Section 313 No chemicals are 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 Substances 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:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 57-13-6 can be found on the following state right to know lists: Minnesota.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

Not available.

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 57-13-6: 1

anada - DSL/NDSL

CAS# 57-13-6 is listed on Canada's DSL List.

anada - WHMIS

This product has a WHMIS classification of D2B, D2A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16 - Additional Information

MSDS Creation Date: 5/28/1999
Revision #6 Date: 6/18/2007

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 event shall Fisher 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 Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Personal Protective Equipment
	WHMIS CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).	

Section 1. Product and Company Identification

Product Name / Trade name	**Varsol**	**Associated Product's Item Code**	**13-374HD**
Synonym	Petroleum Distillate	**CAS #**	64742-88-7
Chemical Family	Aliphatic hydrocarbon (Solvent.)	**Validation Date**	**June 26 2006**
Chemical Formula	Not applicable. (mixture of hydrocarbons)	**Print Date**	June 26 2006
Manufacturer	Recochem Inc. 850 Montee de Liesse Montreal, Quebec 514-341-3550	**In Case of Emergency**	Recochem Inc. Communications and Regulatory Affairs Department (905) 791-1788
Material Uses	Consumer products: Various.		

Section 2. Hazardous Ingredients

Name	CAS #	% by Weight	Exposure Limits	
			Canadian Values (ACGIH)	U.S. Values (OSHA)
Petroleum distillate	64742-88-7	100	**ACGIH (Canada, 2003).** TWA: 100 ppm 8 hour(s). TWA: 525 mg/m^3 8 hour(s).	Petroleum distillate **OSHA (United States, 2003).** TWA: 500 ppm 8 hour(s). TWA: 2900 mg/m^3 8 hour(s).

Section 3. Hazard Identification

Emergency Overview	CAUTION! Combustible liquid. HARMFUL OR FATAL IF SWALLOWED. Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Keep out of reach of children.
Potential Acute Health Effects	**See Section #11: "Toxicological Information" for further human health effects.** This product may cause mild irritatation to eyes and skin upon contact. Prolonged and repeated contact with skin can cause drying of the skin resulting in irritation and dermatitis. Inflammation of the eye is characterized by mild redness, watering, and itching. Skin inflammation is characterized by mild itching, scaling, reddening. Ingestion can cause burning sensation, vomiting, drowsiness and in severe cases pulmonary edema. Inhalation of excessive amounts may result in impairment, such as drowsiness, lack of coordination, headache and nausea.
Note to Physician	Aspiration hazard if swallowed- can enter lungs and cause damage. Small amounts of liquid aspirated into the respiratory system during ingestion or from vomiting may cause mild to severe pulmonary injury and possible death.

Continued on Next Page

Section 4. First Aid Measures

Eye Contact	Rinse with water for a few minutes. If irritation persists, seek medical attention.
Skin Contact	Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. If irritation persists, get medical attention. Wash contaminated clothing before reusing.
Inhalation	Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting. Allow the victim to rest in a well-ventilated area. Seek medical attention.

Section 5. Fire Fighting Measures

Products of Combustion	Carbon oxides (CO, CO_2), smoke, fumes.
Fire Fighting Media and Instructions	Combustible liquid, insoluble in water. SMALL FIRE: Use DRY chemicals, CO_2, alcohol foam or water spray. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Fire Hazards	Container explosion may occur under fire conditions or when heated. Vapour may travel considerable distance to source of ignition and flash back. Vigourously supports combustion. Combustible when exposed to heat or flame.
Explosion Hazards	Vapours may travel along ground and flashback along vapour trail.

Section 6. Accidental Release Measures

Small Spill and Leak	Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill and Leak	Combustible liquid, insoluble in water. *Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Prevent entry into sewers and surface waterways. Absorb with DRY earth, sand or other non-combustible material. Place in appropriate container and dispose of in accordance with regional regulations.*

Section 7. Handling and Storage

Handling	Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.
Storage	**See Section #10 for applicable incompatible materials.** Combustible materials should be stored away from extreme heat and away from strong oxidizing agents. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed in a cool, well-ventilated place. Keep out of reach of children.

Section 8. Exposure Controls, Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	
Eyes	Safety glasses.
Body	No special protective clothing is required.
Respiratory	Wear appropriate respirator when ventilation is inadequate. Be sure to use an approved/certified respirator or equivalent.
Hands	Gloves (impervious materials such as Viton®, Neoprene® or butyl rubber).

Continued on Next Page

Section 9. Physical and Chemical Properties

Physical State and Appearance	Liquid.	**Odour**	Petroleum distillates
Molecular Weight	Not applicable.	**Taste**	Not available.
pH	Not applicable.	**Colour**	Colourless.
Boiling/Condensation Point	150 to 210°C (302 to 410°F)	**Volatility**	100% (v/v). 100% (w/w).
Melting/Freezing Point	-58°C (-72.4°F)	**Evaporation Rate**	0.1 compared to Butyl acetate.
Specific Gravity	0.79 (Water = 1)	**Odour Threshold**	Not available.
Vapour Pressure	2.2 mm of Hg (@ 20°C)	**Viscosity**	Kinetic: 1.14 cS
Vapour Density	4.8 (Air = 1)	**Solubility**	Easily soluble in diethyl ether, n-octanol. Insoluble in water.
VOC Content	790 (g/l).	**Other Properties**	Not available.

The Product is:	Combustible.
Auto-ignition Temperature	229°C (444.2°F)
Flash Point	Closed cup: 42°C (107.6°F). (Tagliabue. (ASTM D56))
Flammable Limits	LOWER: 1% UPPER: 13.3%
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks and static discharge. This product is combustible if exposed to heat or when in involved in a fire and in contact with combustible materials which may act as a wick.

Section 10. Stability and Reactivity

Stability	The product is stable.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	Reactive with oxidizing agents.

Section 11. Toxicological Information

Routes of Entry	Eye contact. Inhalation. Ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): >5000 mg/kg [Rat].
Acute Effects on Humans	
Eyes	May cause mild eye irritation.
Skin	May cause mild skin irritation.
Inhalation	Slightly hazardous in case of inhalation. Exposure to very high concentrations can cause dizziness, lightheadness, headache, nausea, and blurrred vision. Higher levels may cause unconsciousness.
Ingestion	This product is of very low acute toxicity. Aspiration hazard if swallowed- can enter lungs and cause damage.

Continued on Next Page

Chronic Effects on Humans	**CARCINOGENIC EFFECTS**: Not available. **MUTAGENIC EFFECTS**: Not available. **TERATOGENIC EFFECTS**: Not available. **DEVELOPMENTAL TOXICITY**: Not available. Prolonged and repeated contact with skin can cause drying of the skin resulting in irritation and dermatitis. Effect of chronic exposure include soporific or intoxicating effect if prolonged and in sufficient concentration. Avoid breathing vapour or mist.

Section 12. Ecological Information

Ecotoxicity	**For accidential discharges into environment, see Section #6: "Accidential Release Measures" for suggested instructions.** No additional remark.

Section 13. Disposal Considerations

Waste Information	Waste must be disposed of in accordance with federal, state or provincial and local environmental control regulations.

Section 14. Transport Information

Canada Transportation of Dangerous Goods (TDG) Information	
Primary Class	Class 3: Flammable liquid.
Subsidiary Class (if applicable)	-
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.
Hazard Identification Number	UN 1268
Packing Group	III
Special Provisions	In containers of 450L or less this product is not classified as a Dangerous Goods according to TDG exemption 1.33

International Maritime Dangerous Goods (IMDG) Transportation Information	
Primary Class	Class 3: Flammable liquid.
Subsidiary Class (if applicable)	-
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.
Hazard Identification Number	UN 1268
Packing Group	III
Marine Pollutant	Not pollutant.
Special Provisions	In containers of 5 L (5Kg) capacity or less this product is classified as a "Consumer Commodity" under IMDG regulations.

No placard (handling and hazard label) required.

United States Department of Transportation (DOT) Information	
Primary Class	Class 3: Flammable liquid.
Subsidiary class (if applicable)	-
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.

Continued on Next Page

Hazard Identification Number	UN 1268	
Packing Group	III	
Special Provisions	In containers of 454L or less this product is not classified as a Gangerous Good according to exception 173.150 f(1-2)	
International Air Transport Association (IATA)	For air shipment classification and associated regulations, please refer to the latest edition of IATA Dangerous Goods Regulations.	

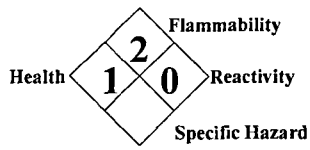
Section 15. Other Regulatory Information and Pictograms

WHMIS Classification (Canada)	WHMIS CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).	
Canada Domestic Substances List (DSL) Status	This product and/ or all of its components are on the DSL.	
HCS Classification (U.S.A.)	Combustible liquid	
U.S.A. Regulatory Lists	This product and/ or all of its components are on the TSCA inventory list.	

Hazardous Material Information System (U.S.A.)

Health	1
Flammability	2
Reactivity	0
Personal Protection	G

National Fire Protection Association (U.S.A.)



Section 16. Other Information

Validated and verified by Compliance and Technical Information Manager on June 26 2006 | Printed June 26 2006

Notice to Reader

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.

MSDS are available at www.recochem.com

FLINN SCIENTIFIC INC.

"Your Safer Source for Science Supplies"

Material Safety Data Sheet (MSDS)

MSDS #: 844.00
Revision Date: April 2, 2001

Section 1 — Chemical Product and Company Identification

Vinegar

Flinn Scientific, Inc. P.O. Box 219 Batavia, IL 60510 (800) 452-1261
CHEMTREC Emergency Phone Number: (800) 424-9300

Section 2 — Composition, Information on Ingredients

Acetic Acid (64-19-7) 4-8%, Water (7732-18-5) 92-96%

CAS#: 64-19-7

Section 3 — Hazards Identification

Clear or brown liquid with strong smell of acetic acid.
Substance not considered hazardous. However, not all health aspects of this substance have been thoroughly investigated. Not for human consumption.

FLINN AT-A-GLANCE
Health-0
Flammability-0
Reactivity-0
Exposure-0
Storage-0

0 is low hazard, 3 is high hazard

Section 4 — First Aid Measures

Call a physician, seek medical attention for further treatment, observation and support after first aid.
Inhalation: Remove to fresh air at once. If breathing has stopped give artificial respiration immediately.
Eye: Immediately flush with fresh water for 15 minutes.
External: Wash continuously with fresh water for 15 minutes.
Internal: Give large quantities of water. Call a physician or poison control at once.

Section 5 — Fire Fighting Measures

Non flammable liquid.

NFPA CODE
None established

Section 6 — Accidental Release Measures

Restrict unprotected personnel from area and ventilate area. Contain spill with sand or absorbent material; deposit in sealed bag or container. See Sections 8 and 13 for further information.

Section 7 — Handling and Storage

Flinn Suggested Chemical Storage Pattern: Organic #1. Store with acids, anhydrides and peracids.

Section 8 — Exposure Controls , Personal Protection

Avoid contact with eyes, skin and clothing. Wear chemical splash goggles, chemical-resistant gloves and chemical-resistant apron. Use exhaust ventilation to keep airborne concentrations low.

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Section 9 — Physical and Chemical Properties

Clear or brown liquid with strong smell of acetic acid.

Section 10 — Stability and Reactivity

Avoid contact with bases.
Shelf Life: Indefinite.

Section 11 — Toxicological Information

Acute effects: N.A.
Chronic effects: N.A.
Target organs: N.A.

ORL-RAT LD50: N.A.
IHL-RAT LC50: N.A.
SKN-RBT LD50: N.A.

N.A. = Not available, not all health aspects of this substance have been fully investigated.

Section 12 — Ecological Information

Data not yet available.

Section 13 — Disposal Considerations

Please consult with state and local regulations.
Flinn Suggested Disposal Method #26b is one option.

Section 14 — Transport Information

Shipping Name: Not regulated
Hazard Class: N/A
UN Number: N/A

N/A = Not applicable

Section 15 — Regulatory Information

Not listed.

Section 16 — Other Information

Consult your copy of the Flinn Scientific Catalog/Reference Manual for additional information about laboratory chemicals. This Material Safety Data Sheet (MSDS) is for guidance and is based upon information and tests believed to be reliable. Flinn Scientific Inc. makes no guarantee of the accuracy or completeness of the data and shall not be liable for any damages relating thereto. The data is offered solely for your consideration, investigation, and verification. Flinn Scientific Inc. assumes no legal responsibility for use or reliance upon this data.

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Product name	Vinyl acetate		EUIE/EN
MSDS number	80094	**Revision Date**	Nov.06.2006
Revision Number	1.00	**Issuing date**	Nov.21.2006

1. Identification of the substance/preparation and the company/undertaking

Product name
Vinyl acetate

Manufacturer, importer, supplier
Celanese Chemicals Europe GmbH
Frankfurter Straße 111
D-61476 Kronberg/Ts.

Product Information
Product Stewardship FAX +49 (0) 208 693 2053

Emergency telephone number
+49 (0) 69-305 6418

End use:
Chemical intermediate (including monomers), Plastic material

2. Composition/information on ingredients

Components	CAS-No	EC-No.	Classification	Percent %
Vinyl acetate	108-05-4	203-545-4	F;R11	99.9 min

Remarks Stabilized with 3 - 30 mg/kg Hydroquinone-monomethylether (MEHQ)

3. Hazards identification

Indication of danger Highly flammable

R-phrase(s)
R11 - Highly flammable.

4. First aid measures

General Information Remove contaminated, soaked clothing immediately and dispose of safely.

Inhalation Keep at rest. Aerate with fresh air. If symptoms persist, call a physician.

Skin Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Eyes In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Ingestion Call a physician immediately. Do not induce vomiting without medical advice.

Notes to physician

Special hazard lung irritation.

Treatment Treat symptomatically. In case of lung irritation first treatment with dexametason aerosol (spray).

5. Fire-fighting measures

Suitable extinguishing media
foam. Dry chemical. carbon dioxide (CO2).

Extinguishing media which must not be used for safety reasons
Do not use a solid water stream as it may scatter and spread fire.

Special exposure hazards arising from the substance or preparation itself, its combustion products, or released gases
Under conditions giving incomplete combustion, hazardous gases produced may consist of
carbon monoxide
carbon dioxide (CO2)
Combustion gases of organic materials must in principle be graded as inhalation poisons
vapors are heavier than air and may spread along floors

Special protective equipment for fire-fighters
self-contained breathing apparatus (EN 133).

Environmental precautions
Water runoff can cause environmental damage. Dike and collect water used to fight fire.

Other Information
Cool containers / tanks with water spray.

6. Accidental release measures

Personal precautions
Avoid contact with the skin and the eyes. Keep away from heat and sources of ignition. Provide adequate ventilation.

Environmental precautions
Prevent further leakage or spillage. Do not discharge into the drains/surface waters/groundwater.

Methods for 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. Dispose of in accordance with local regulations.

7. Handling and storage

Handling

Advice on safe handling
Provide sufficient air exchange and/or exhaust in work rooms.

Protection - fire and explosion:
Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge. Ground and bond containers when transferring material. In case of fire, emergency cooling with water spray should be available.

Temperature class
T2

Storage

Technical measures/Storage conditions
Keep tightly closed in a dry, cool and well-ventilated place. Handle and open container with care. Store at temperatures not exceeding 30 °C/ 86 F.

Incompatible products
oxidizing agents. radical initiators. strong acids. amines.

German storage class
3A: Flammable liquids.

8. Exposure controls / personal protection

National occupational exposure limits

Components	TWA	
Vinyl acetate	30 mg/m^3	10 ppm

Components	STEL	
Vinyl acetate	60 mg/m^3	20 ppm

Engineering measures
General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Personal protective equipment

General advice
Avoid contact with skin and eyes. Do not breathe vapors or spray mist. Use only in an area equipped with a safety shower. Hold eye wash fountain available.

Hygiene measures
When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Respiratory protection
respirator with A/PA filter. Full mask with above mentioned filter according to producers using requirements or self-contained breathing apparatus. Equipment should conform to EN 136 or EN 140 and EN 143.

Eye protection	tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face. Equipment should conform to EN 166.
skin protection	impervious clothing
Hand protection	
Chemicals resistant gloves	
Suitable material	butyl-rubber
Type	Butylplus (Company COMASEC) or comparable article; or refer to glove manufacturer's recommendation
Evaluation	according to EN 374: level 4
Material thickness	approx 0.3 mm
Break through time	approx 80 min
Suitable material	PE/EVAL/PE
Type	SAFETY4 4H or comparable article; or refer to glove manufacturer's recommendation
Evaluation	according to EN 374: level 6
Material thickness	approx 0.07 mm
Break through time	> 480 min

9. Physical and chemical properties

Appearance	
Form	liquid
Colour	colourless
Odor	sweet
Molecular Weight	86.1
Flash point	-8°C
Method	DIN 51755
Ignition temperature	385°C
Method	DIN 51794
Lower explosion limit	2.6 Vol. %
Upper explosion limit	13.4 Vol. %
Freezing point	-92.8 °C
Boiling point/range	72°C @ 1013 hPa
Density	0.93 g/ml @ 20°C
Method	DIN 51757
pH	Neutral
Viscosity	0.43 mPa*s @ 20°C, dynamic
Method	DIN 51562
vapor pressure	120 hPa @ 20°C 426 hPa @ 50 °C

vapor density	2.97 (Air=1 @ 20 °C)
Water solubility	23 g/l @ 20°C
Partition coefficient (n-octanol/water)	0.73 (measured), Hansch/Leo

10. Stability and reactivity

Stability	Stable under normal conditions of handling, use and transportation.
Conditions to avoid	Avoid any source of ignition. Avoid contact with heat, sparks, open flame, and static discharge.
Materials to avoid	oxidizing agents, peroxides, strong acids, strong bases.
Thermal decomposition	No decomposition if used as directed. If heated to thermal decomposition the following decomposition products may occur depending on the conditions. carbon oxides.
Hazardous reactions	Violent polymerization can occur. Polymerization is a highly exothermic reaction and may generate sufficient heat to cause thermal decomposition and/or rupture containers.

11. Toxicological information

Vinyl acetate

Oral	LD50: 2920 mg/kg, rat
Dermal	LD50: 2335 mg/kg, rabbit
Inhalation	LC50: 4000 ppm, rat, 4h
Skin irritation	Mild skin irritation
Species	rabbit
Method	OECD 404
Skin Sensitization	nonsensitizer
Species	mouse
Method	OECD 429
Eye Irritation	Mild eye irritation
Species	rabbit eye
Method	OECD 405
Carcinogenic effects	squamous cell carcinoma at a dose level of 600 ppm in the nasal tract
Species	rats
Study	inhalation study
	NOAEL: 50 ppm
Carcinogenic effects	squamous cell carcinoma at a dose level of 10,000 ppm in the upper digestive tract
Species	rats and mice
Study	2 year drinking water study
	NOAEL: 400 ppm

in vitro Mutagenicity	Ames test - negative Human lymphocyte chromosome aberration - positive CHO cell sister-chromatid-exchange (SCE) - positive
Reproductive toxicity	Adverse reproductive effects in a multi-generation study at a dose level of 5000 based on significantly reduced average litter weight and maternal body weight
Routes of exposure	oral drinking water
Species	rat
	NOAEL= 1000 ppm
Developmental effects	no malformations at a dose level of 1000 ppm
Routes of exposure	Inhalation
Species	rat
	NOAEL: 200 ppm
Developmental effects	No significant adverse effect at a dose level of 5000 ppm
Routes of exposure	oral drinking water
Species	rat
	NOAEL: 1000 ppm
Repeated exposure	90-day study resulted in a decrease in body weight and an increase in lung weights at a dose of 5000 ppm
Routes of exposure	oral drinking water
Species	rats
	NOAEL: 1000 ppm
Repeated Exposure	90-day study resulted in a decrease in body weight and an increase in lung weights at a dose of 1000 ppm
Routes of exposure	Inhalation
Species	rats
	NOAEL: 200 ppm

12. Ecological information

Vinyl acetate

Toxicity to fish	LC50: 19 mg/l (96h)
Species	Pimephales promelas (Fathead minnow)
	LC50: 18 mg/l (96h)
Species	Lepomis macrochirus (Bluegill sunfish)
Toxicity to daphnia	EC50: 12.6 mg/l (48h)
Species	Daphnia magna
Toxicity to algae	EC50: 8.8 mg/l (72h)
Species	Selenastrum capricornutum (green algae)
Toxicity to bacteria	EC50: 6.0 mg/l
Biodegradation	51 - 62 % % (5d)
Bioconcentration factor (BCF)	2
Bioaccumulation	Bioaccumulative potential - low

13. Disposal considerations

Product information	Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.
Uncleaned empty packaging	Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

14. Transport information

ADR/RID

UN/ID No.	UN 1301
Proper Shipping Name	Vinyl Acetate, stabilized
Hazard Class	3
Packing group	II
Hazard Number	339

ADNR ADNR: Container and Tanker

UN/ID No.	UN 1301
Proper Shipping Name	Vinyl Acetate, stabilized
Hazard Class	3
Packing group	II

ICAO/IATA

UN-No.	UN 1301
Proper Shipping Name	Vinyl Acetate, stabilized
Hazard Class	3
Packing group	II

IMDG

UN/ID No.	UN 1301
Proper Shipping Name	Vinyl Acetate, stabilized
Hazard Class	3
Packing group	II
EmS Code	F-E, S-D

15. Regulatory information

Labelling in accordance with EC directives

EC label

Contains Vinyl acetate

Symbol(s) F - Highly flammable.

R-phrase(s)

R11 - Highly flammable.

S-phrase(s)

S16 - Keep away from sources of ignition - No smoking.
S23.2 - Do not breathe vapour.
S29 - Do not empty into drains.
S33 - Take precautionary measures against static discharges.

Directive 1996/82/EC Annex I, Substance list:
No 7b

Water Hazard Class (WGK):
WGK Class 2
WGK Reg-Nr. 203
WGK Source Classification according to VwVwS, Annex 1 or 2

Vinyl acetate 108-05-4
Directive 76/769/EEC Listed.
Directive 98/24/EC Listed.

16. Other information

R-phrase(s)

R11 - Highly flammable.
For further information, see:
For more information, other material safety data sheets or technical data sheets please consult the Celanese homepage (www.celanese.com).

Other Information:
Observe national and local legal requirements.

Changes against the previous version are marked by ***

Sources of key data used to compile the datasheet
Information contained in this safety data sheet is based on Celanese owned data and public sources deemed valid or acceptable. The absence of data elements required by ANSI or 2001/58/EC indicates, that no data meeting these requirements is available.

Further information
This information is based on our present state of knowledge. It shall describe our products regarding safety requirements and shall not be construed as a guarantee or statement of condition and/or quality

Lambent Technologies Corp.
Specialty Chemicals
3938 Porett Drive Gurnee, IL 60031

24 HOUR EMERGENCY RESPONSE SYSTEM: 800-832-4357

MATERIAL SAFETY DATA SHEET

PRODUCT INFORMATION

Trade Name: **WASTEWATER TANK/PIT SLUDGE**
Name and/or Family or Description: **ORGANIC WASTE STREAM**

DOT Hazard Classification: **NON-HAZARDOUS**

NFPA: HEALTH HAZARD -1-SLIGHTLY HAZARDOUS; FLAMMABILITY – 1 - ABOVE 200 DEG F.; REACTIVITY – 0 – STABLE

CAS NUMBER:	COMPLEX MIXTURE
RCRA HAZARD CLASS: (IF DISCARDED)	NON- HAZARDOUS
EPA PRIORITY POLLUTANTS	NONE
SARA TITLE III (Sec. 313) HAZARDOUS MATERIAL	NONE

HAZARDOUS INGREDIENTS

(This material contains no ingredients which are known by Lambent Technologies Corp. to be hazardous unless listed below).

MATERIAL OR COMPONENT	TLV (UNITS)	APPROX %

As established by the American Conference of Governmental Industrial Hygienists and/or standards promulgated by the Occupational Safety and Health Administration.

PHYSICAL DATA

BOILING POINT, °F	>300
SPECIFIC GRAVITY @ 25° C	VARIES
VAPOR PRESSURE, mm Hg @ 25° C	>1
VAPOR DENSITY, (AIR=1)	>1
VOLATILES, %, BY VOLUME	VARIES
APPEARANCE @ 25° C	PASTE TO LIQUID
ODOR	ORGANIC
FLASH POINT, PMCC, °F	>200

FIRE AND EXPLOSION HAZARD DATA

Flash Point: (See PHYSICAL DATA section)
Flammable Limits in Air, % by Volume: Unknown LOWER: Undetermined UPPER: Undetermined
Extinguishing Media: Use Carbon Dioxide or Dry Chemical on small fires. Use foam (alcohol, polymer or Ordinary) and water spray for large fires.
Special Fire Fighting Procedures: Self-contained breathing apparatus and protective clothing should be worn in fighting fires involving chemicals.
Unusual Fire & Explosion Hazards: None Known to Lambent Technologies Corp.

HEALTH HAZARD DATA

Threshold Limit Value: Not listed by OSHA or ACGIH.
Effects of Overexposure: Contact with skin or eyes may cause irritation.
Effects of a Single Overexposure:

Swallowing: No evidence of adverse effects from available information.
Skin Absorption: No evidence of adverse effects from available information.
Skin Contact: May cause minor irritation.
Eye Contact: May cause eye irritation.
Inhalation: No evidence of adverse effects from available information.

Effects of Repeated Overexposure:

No evidence of adverse effects from available information, other than irritation.

Emergency and First Aid Procedures:

Flush eyes with copious amounts of water for a minimum of 15 Minutes. Wash contacted skin areas with soap and water. If irritation develops, consult a physician. Soaked clothing should be changed immediately! Remove to fresh air.

Medical Conditions Aggravated by Overexposure:

A knowledge of available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

Significant Laboratory Data with Possible Relevance to Human Health Hazard Evaluation:

None currently know unless listed below.

REACTIVITY DATA

Stability: Stable [X] Unsuitable [ ]
Incompatibilities: (Materials to Avoid) Strong oxidizing material can cause a reaction.
Hazardous decomposition products: Thermal decomposition may produce carbon mono/dioxides.
Hazardous Polymerization: May occur [ ] Will not occur [X]
Conditions to Avoid: See above statements.

SPILL, LEAK AND DISPOSAL PROCEDURES

Action to take for spills: (Use appropriate Safety Equipment) Use absorbent material to collect and contain for disposal. Contain large spills and pump into a suitable tank. Wash area with suitable detergent and thoroughly rinse.
Disposal Method: All Local, State and Federal Regulations concerning health and pollution should be reviewed to determine approved disposal procedures.

SPECIAL HANDLING INFORMATION

Ventilation:

1 **Local Exhaust:** None should be needed.
2 **Mechanical (general):** Recommended
3 **Respiratory Protection (type):** None should be needed (for emergency, use a canister for organic vapors such as GMA from Mine Safety Appliance Co)

Protective Clothing: Clean, body-covering clothing. In addition, rubber gloves, boots, and apron,

depending upon the exposure likely, or as required by your company.

Eye Protection: Chemical Workers Goggles recommended.
Other Protective Equipment: Eye Fountain and Safety Shower in work area.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Store in well ventilated areas below 120 °F. Do not reuse containers. Slippery conditions May exist if material is spilled.

Last revised July 27, 2005 /GJK EH&S Department

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **Water**

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: Water
Synonyms: None
Chemical Family: Water
Application: Fluid

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Water	7732-18-5	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview No significant hazards expected.

4. FIRST AID MEASURES

Inhalation Under normal conditions, first aid procedures are not required.

Skin Under normal conditions, first aid procedures are not required.

Eyes Under normal conditions, first aid procedures are not required.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined
Flash Point/Range (C):	Not Determined
Flash Point Method:	Not Determined
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable.
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	None known.
Environmental Precautionary Measures	None known.
Procedure for Cleaning / Absorption	Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Not applicable.
Storage Information	Store in a dry location.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	None known.
Respiratory Protection	Not normally necessary.
Hand Protection	Normal work gloves.
Skin Protection	Normal work coveralls.
Eye Protection	Wear safety glasses or goggles to protect against exposure.
Other Precautions	None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Gel
Color:	Clear
Odor:	Odorless
pH:	7.2
Specific Gravity @ 20 C (Water=1):	1.0
Density @ 20 C (lbs./gallon):	8.34
Bulk Density @ 20 C (lbs/ft3):	Not Determined

EPAPA005002019

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point/Range (F):	212
Boiling Point/Range (C):	100
Freezing Point/Range (F):	32
Freezing Point/Range (C):	0
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	Not Determined
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	None known.
Hazardous Decomposition Products	None known.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	None known.
Skin Contact	None known.
Eye Contact	None known.
Ingestion	None known
Aggravated Medical Conditions	None known.
Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 1% are chronic health hazards.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined

Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Bury in a licensed landfill according to federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR Not restricted

Air Transportation

ICAO/IATA Not restricted

Sea Transportation

IMDG Not restricted

Other Shipping Information

Labels: None

15. REGULATORY INFORMATION

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information	For additional information on the use of this product, contact your local Halliburton representative. For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.
Disclaimer Statement	This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005002022

MATERIAL SAFETY DATA SHEET

Section 1: Product & Company Identification

Product Name: Marykate® Maxi Wax – Cleaner Wax
Product Number (s): MK2000, MK2001, MK20012

Manufactured By: CRC Industries, Inc. (215) 674-4300
885 Louis Drive, Warminster, PA 18974
24-Hour Emergency Information: CHEMTREC (800) 424-9300

Section 2: Composition/Information on Ingredients

Component	CAS NUMBER	ACGIH TLV	OSHA PEL	OTHER LIMITS	%
Kaolin Clay	66402-68-4	10 mg/m3	15 mg/m3	10 mg/m3	10-15
Aliphatic Hydrocarbon Blend	8052-41-3	100 ppm	500 ppm	350 mg/m3	30-40
	64742-56-7	NE	NE	NE	
VM&P Naphtha	64742-89-8	NE	NE	NE	1-5
Morpholine	110-91-8	20 ppm	20 ppm	20 ppm	1-3
Crystalline Silica	14808-60-7	0.05 mg/m3	0.1 mg/m3	NE	1-5

Section 3: Hazards Identification

Emergency Overview

Appearance & Odor: Opaque white pasty liquid, waxy odor.

CAUTION: Harmful if swallowed. Avoid breathing vapors. May irritate eyes and skin.

Potential Health Effects:

Inhalation: Inhalation of vapors can cause nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, headache, possible unconsciousness and/or asphyxiation. Aspiration of material into lungs may result in chemical pneumonitis which can be fatal.

Eyes: Contact with eyes can cause irritation, redness, tearing blurred vision, and/or swelling.

Skin: Contact with skin can cause irritation, (minor itching, burning, and/or redness), dermatitis, de-fatting; may be readily absorbed through the skin.

Ingestion: Ingestion can cause gastrointestinal irritation, nausea, vomiting, diarrhea. May be toxic.

Carcinogenicity: OSHA: Yes IARC: Yes NTP: Yes

Chronic Overexposure: Overexposure to this material has apparently been known to cause the following effects in lab animals: respiratory system, eyes, skin, kidney and liver damage.

Medical Conditions Aggravated by Exposure: Unknown

EPAPA005002023

Section 4: First Aid Measures

Inhalation: Remove to fresh air. Contact physician if breathing becomes difficult or condition persists.

Eyes: Flush with large amounts of water for at least 15 minutes. Consult a physician.

Skin: Remove contaminated clothing and wash area with soap and water.

Ingestion: If ingested, do not induce vomiting. Give victim a glass of water. Call a physician immediately.

Section 5: Fire-Fighting Measures

Flashpoint: 110°F Method: Seta flash LEL: ND UEL: ND
Extinguishing Media: Water
Hazardous Combustion Products: Unknown
Fire-fighting Instructions: Firefighters wear self-contained breathing apparatus. Fight like fuel oil fire.
Warning: Closed containers exposed to high temperatures such as fire conditions may rupture.

NFPA:	Health:	2	Flammability:	2	Reactivity:	1		
HMIS:	Health:	2	Flammability:	2	Reactivity:	1	PPE:	B

Section 6: Accidental Release Measures

Spill/Leak Procedures: Area should be ventilated. Remove sources of ignition. Absorbent should be used to pick up excess material. All used and unused product should be disposed of in accordance with federal, state and local regulations.

Section 7: Handling and Storage

Handling Procedures: Use with adequate ventilation. Avoid contact with eyes and skin. Avoid breathing vapors.
Storage Procedures: Store in a cool, dry area. Keep away from heat, open flame or other sources of ignition. Keep out of reach of children!

Section 8: Exposure Controls/Personal Protection

Engineering Controls: Provide local ventilation adequate to prevent accumulation of vapors. Use mechanical means if necessary to maintain levels below the exposure limits. If working in a confined space, follow applicable OSHA regulations.

Respiratory: Use NIOSH/MSHA compliant respirators or self-contained breathing apparatus above exposure limits. Follow OSHA regulations 29 CFR 1910.134.

Protective Clothing/Equipment: Wear neoprene or other chemically protective gloves and safety glasses. Use a splash apron and boots if splashing occurs.

EPAPA005002024

Section 9: Physical & Chemical Properties

Physical State:	Liquid	Appearance & Odor:	Opaque white pasty liquid, waxy odor.
Specific Gravity:	0.98	Boiling Point:	ND
Freezing Point:	ND	Vapor Pressure:	ND
Evaporation Rate:	< Ethyl Ether	Vapor Density (air = 1)	> 1
pH:	ND	Solubility:	Dispersible in water.

Volatile Organic Compounds:%: 81 g/L: 367 lbs./gal: 3.07

Section 10: Stability and Reactivity

Stability:	Stable Hazardous Polymerization: No
Chemical Incompatibilities:	Strong acids, alkalis, and oxidizers.
Conditions to Avoid:	Avoid open flames, sparks, heat, electrical and static discharge.
Hazardous Decomposition Products:	Carbon Dioxide, Carbon Monoxide and Carbon.

Section 11: Toxicological Information

Long-term toxicological studies have not been conducted for this product. However, morpholine has produced tumorigenic effects in laboratory animals.

Section 12: Ecological Information

Ecotoxicity:	No data available.
Environmental Fate:	No data available for biodegradation.

Section 13: Disposal Considerations

Disposal: This material, if discarded, meets the flammability characteristic and would be considered a hazardous waste under U.S. EPA RCRA regulations. If this product becomes mixed with other products, other hazardous waste classifications may become applicable. All disposal activities must comply with federal, state and local regulations. Contact your local or state environmental agency for specific rules. Do not dump into sewers, on the ground or into any body of water.

Section 14: Transportation Information

Shipping Name:	Consumer Commodity				
Hazard Class:	ORM-D	UN Number:	NA	Packing Group:	NA
Label:	NA	Placard:	NA		
Special Provisions:	NA				

EPAPA005002025

Section 15: Regulatory Information

TSCA:	All components are either listed under TSCA or are exempt.	
SARA Title III:	Section 311/312:	Acute, Chronic
	Section 313*:	None
CERCLA/Superfund (RQ):		NA
Extremely Hazardous Substances:		No
California Prop 65:		No

* See section 2 for percentage

Section 16: Additional Information

Prepared By:	Michelle Milburn	Date:	November 3, 2003
Technical Information:	(800) 521-3168	CRC #:	MK2000 / MK2001 / MK20012

This information is accurate to the best of CRC Industries' knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label.

CAS:	Chemical Abstract Service	NA:	Not Applicable
ppm:	Parts per Million	ND:	Not Determined
TCC:	Tag Closed Cup	NE:	Not Established
LEL:	Lower Explosive Limit	g/L:	grams per Liter
UEL:	Upper Explosive Limit	lbs./gal:	pounds per gallon
PPE:	Personal Protection Equipment	RQ:	Reportable Quantity

EPAPA005002026

Material Safety Data Sheet

Revision Date
17-Feb-2005

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product code KT13130
Product name White Grease
Recommended Use Lubricant

Supplier Kent Automotive
6200 Oak Tree Bvld.
Independence, OH 44131

(800) 458-3222

Emergency telephone number (888) 426-4851

2. HAZARDS IDENTIFICATION

Emergency Overview
Flammable. Irritant.

Aggravated Medical Conditions
None Known.

Principal Routes of Exposure
Inhalation. Eyes. Skin contact.

Potential health effects

Eyes Irritation. Redness. Itching. Burning sensation.

Skin Repeated or prolonged exposure may cause:. Skin Irritation. Redness. Itching. Burning sensation.

Inhalation Repeated or prolonged exposure may cause the following effects. Headaches. Dizziness. Nausea. Upper respiratory tract irritation. Central nervous system effects. Loss of coordination. Extreme overexposure may cause. Possible unconsciousness. Death.

Ingestion May be harmful if swallowed.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Weight %
Propane	74-98-6	10-30
Butane	106-97-8	3-7
Hexane	110-54-3	15-40
Isohexane Isomers	107-83-5	10-30
Paraffin Oil	8012-95-1	30-60
Paraffinic Mineral Oil	8042-47-5	5-10
Zinc oxide	1314-13-2	1-5

4. FIRST AID MEASURES

Eye contact Flush with plenty of water for at least 15 minutes. Seek medical attention.

Skin contact Wash off immediately with soap and plenty of water. Remove and wash contaminated clothing before re-use.

Ingestion Do not induce vomiting. Immediate medical attention is required.

Inhalation Remove from exposure. Restore breathing. Keep warm and quiet. Consult a physician.

5. FIRE FIGHTING MEASURES

Flash point °C < -17
Flash point °F < 0
Method No information available

Autoignition temperature
Autoignition temperature °C No data available
Autoignition temperature °F

Flammability Limits (% In Air)
Upper 9.5
Lower 1.0

Specific Information for Aerosol Products

Flame extension Unknown
Flashback Unknown

Suitable extinguishing media
Carbon dioxide (CO2). Dry chemical. Foam.

Extinguishing media which must NOT be used for safety reasons
No information available.

Specific hazards
Keep product and empty container away from heat and sources of ignition. In the event of fire and/or explosion do not breathe fumes.

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

Special Fire-Fighting Procedures
Water spray may be ineffective. If water is used, fog nozzles are preferable. Water should be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Hazardous decomposition products
See Section 10

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Fire and Explosion Hazards
During emergency conditions, overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention Water spray may be ineffective. If water is used, fog nozzles are preferable. Firefighters should wear NIOSH/MSHA approved (or equivalent) self-contained pressure-demand breathing apparatus and full protective clothing.

Sensitivity to shock
No information available.

Sensitivity to static discharge
No information available.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment.

Methods for cleaning up
Eliminate all sources of ignition. Ventilate area to maintain exposure below permissible exposure limits. Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Handling
Keep in a well-ventilated place. Turn off other sources of ignition prior to use and until all vapors have dissipated. Vapors may accumulate readily and may ignite explosively. Remove all sources of ignition. Keep away from open flame. Do not smoke. Check to make sure that all equipment is properly grounded and installed to satisfy electrical classification requirements. Ground and bond containers when transferring material. Contents under pressure. Do not puncture or incinerate. Heat from sunlight, radiators, stoves, hot water, and other heat sources could cause container to burst. Do not take internally. Keep out of reach of children.

Storage
Store in temperatures below 120 degrees F.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits

Chemical Name	OSHA PEL (TWA)	OSHA PEL (Ceiling)	ACGIH OEL (TWA)	ACGIH OEL (STEL)
Paraffin Oil	2000 mg/m³ 5 mg/m³ 500 ppm	-	5 mg/m³ sampled by method that does not collect vapor	10 mg/m³
Hexane	1800 mg/m³ 500 ppm	-	50 ppm 500 ppm	N/D
Propane	1000 ppm 1800 mg/m³	-	1000 ppm listed under aliphatic hydrocarbon gases alkane C1-C4	-
Isohexane Isomers	-	-	500 ppm	1000 ppm
Paraffinic Mineral Oil	-	-	-	-
Butane	800 ppm	-	1000 ppm listed under aliphatic hydrocarbon gases alkane C1-C4	-
Zinc oxide	15 mg/m³ total dust 5 mg/m³ fume 5 mg/m³ respirable fraction	-	2 mg/m³ respirable fraction	10 mg/m³ respirable fraction

Ventilation and Environmental Controls
Local: recommended. Adequate ventilation should be provided to keep exposure levels below current acceptable exposure limits. General: as necessary.

Hygiene measures
Wash hands before breaks and immediately after handling the product.

Personal precautions
Avoid contact with the skin and the eyes.

Respiratory protection
If the exposure limits are exceeded, a NIOSH/MSHA approved respirator is recommended.

Hand protection
Gloves are not required in normal use. The following gloves are recommended for prolonged or repeated contact: . Chemical resistant gloves.

Eye protection
Avoid contact with eyes. Wear safety glasses with side shields.

Skin and body protection
No information available

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	Aerosol
Color	White
Odor	None
Odor Threshold	No information available
pH	No data available
Specific Gravity	0.73

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Boiling point/range °C	< -18 - 81
Boiling point/range °F	< 0 - 179
Melting point/range °C	No data available
Melting point/range °F	No data available
Flash point °C	< -17
Flash point °F	< 0
Vapor pressure	No data available
Vapor density	>1 (air=1)
Evaporation Rate	>1 (ether = 1)
Water solubility	No data available
Partition Coefficient (n-octanol/water)	No data available
VOC Content	68.00 %

10. STABILITY AND REACTIVITY

Stability
Stable.

Conditions to avoid
None known.

Materials to avoid
None.

Hazardous decomposition products
Carbon dioxide. Carbon monoxide.

Polymerization
Will not occur.

Synergistic Products
No information available.

11. TOXICOLOGICAL INFORMATION

Component Information

Chemical Name	LD50 (oral,rat)	LD50 (dermal,rat/rabbit)	LC50 (inhalation,rat)
Paraffin Oil 8012-95-1	4300 mg/kg		
Hexane 110-54-3	28710 mg/kg		48000 ppm
Butane 106-97-8			658 g/m³ 680 g/m³

Potential health effects

Sensitization	No information available.
Chronic toxicity	No information available.
Mutagenic effects	No information available.
Teratogenic effects	No information available
Reproductive toxicity	No information available
Target Organ Effects	No information available

Carcinogenic effects
No information available

Specific Hazards Reports have associated repeated and prolonged occupational exposure to solvents with permanent brain damage Hexane has been reported to affect the central nervous system and may damage peripheral nerve tissue resulting in muscular weakness and loss of sensation

12. ECOLOGICAL INFORMATION

Aquatic toxicity

Hexane
Water Flea Data
water flea LC50=3.87 mg/L (48 h)
Zinc oxide
Water Flea Data
water flea LC50=5 µg/L (72 h)

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products
Dispose in accordance with federal, state, and local regulations.

Disposal Information
As supplied, this product is a RCRA Hazardous Waste Waste must be tested for ignitability to determine EPA hazardous waste numbers Do not puncture or incinerate Depressurize before disposal

14. TRANSPORTATION INFORMATION

DOT
Description Consumer commodity (Hexane),ORM-D,,RQ
TDG
Description AEROSOLS(Propane,Butane), Class 2.2, (5.1),UN1950,PG
IMDG/IMO
Description Aerosols(Propane,Butane),UN1950,PG
IATA
Description Aerosols, flammable, (Propane,Butane),UN1950
MEX
Description UN1950 Aerosols(Propane,Butane),2.2,

15. REGULATORY INFORMATION

Chemical Name	US EPA SARA 313 Emission Reporting
Hexane	Listed
Zinc oxide	Listed

State Regulations

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Chemical Name	New Jersey - RTK	Pennsylvania - RTK	California Prop. 65
Paraffin Oil	Not Listed	Listed	Not Listed
Hexane	Listed	Listed	Not Listed
Propane	Listed	Listed	Not Listed
Isohexane Isomers	Not Listed	Listed	Not Listed
Paraffinic Mineral Oil	Not Listed	Not Listed	Not Listed
Butane	Listed	Listed	Not Listed
Zinc oxide	Listed Listed	Listed Listed	Not Listed

International Inventories

Chemical Name	EINECS	DSL	NDSL	TSCA
Paraffin Oil	X X	X	-	X
Hexane	X	X	-	X
Propane	X	X	-	X
Isohexane Isomers	X	X	-	X
Paraffinic Mineral Oil	X	X	-	X
Butane	X X	X	-	X
Zinc oxide	X X	X	-	X

CPRC
This product has been classified in accordance with the hazard criteria of the Controlled Product Regulations and the MSDS contains all of the information required by the Controlled Product Regulations

16. OTHER INFORMATION

NFPA

HMIS
Health - 2
Flammability - 4
Physical Hazard - 0

Reason for revision No information available.

Prepared By T. Heidorn, MSDS Project Lead

The information accumulated herein is believed to be accurate, but is not warranted to be, whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

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Material Safety Data Sheet

SECTION 1 – Chemical Product and Company Identification
SECTION 2 – Composition, Information on Ingredients
SECTION 3 – Hazards Identification
SECTION 4 – First Aid Measures
SECTION 5 – Fire Fighting Measures
SECTION 6 – Accidental Release Measures
SECTION 7 – Handling and Storage
SECTION 8 – Exposure Controls and Personal Protection
SECTION 9 – Physical and Chemical Properties
SECTION 10 – Stability and Reactivity
SECTION 11 – Toxicological Information
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SECTION 13 – Disposal Considerations
SECTION 14 – Transport Information
SECTION 15 – Regulatory Information
SECTION 16 – Other Information

SECTION 1 – CHEMICAL PRODUCT and COMPANY IDENTIFICATION

1.1	Product Name	Weak Caustic Solution
	Chemical Family	Inorganic Salt Solution
	Plant Source	Splitter I Unit
	Formula	NA (mixture)
1.2	Manufacturer	Enterprise Products Operating LP 10207 FM 1942 Mont Belvieu TX 77580 281-385-4200
1.3	Emergency Contact	Matt Bowman 713-826-1329 CHEMTREC 800-424-9300

SECTION 2 – COMPOSITION and INFORMATION ON INGREDIENTS

2.1 Chemical Ingredients (% by wt)

	Typical Analysis		
Sodium Sulfide (Na2S)	CAS#: 1313-82-2	0 – 1%	
Sodium Hydroxide (NaOH)	CAS#: 1310-73-2	0 – 15%	Typical 6 to 7%
Sodium Chloride	CAS# 7647-14-50	0 – 7%	
Sodium Carbonate (Na2CO3)	CAS#: 497-19-8	0 – 4%	
Potassium Hydroxide (KOH)	CAS# 1310-58-3	0 – 10%	
Water		remaining %	

FOR ADDITIONAL INFORMATION SEE SECTION 9

SECTION 3 – HAZARDS IDENTIFICATION

NFPA: Health – 3 Flammability – 0 Reactivity – 1

EMERGENCY OVERVIEW

Warning: Solution is highly alkaline.
May evolve small amounts of hydrogen sulfide, a highly toxic gas.
EYE contact will cause marked eye irritation and possible corneal damage.
SKIN contact will result in irritation and possible corrosion of the skin.
INGESTION will irritate and burn the mouth, throat and the gastrointestinal tract; contact with stomach acid will cause hydrogen sulfide vapors to be released.
HEATING or ACID contact will cause hydrogen sulfide gas to evolve.

3.1 POTENTIAL HEALTH EFFECTS

EYE: Contact with the eyes will cause marked eye irritation and possibly severe corneal damage.

SKIN CONTACT: Contact with the skin will cause skin irritation or a burning sensation. Prolonged contact will result in corrosion of the skin.

SKIN ABSORPTION: Absorption is unlikely to occur.

INGESTION: Ingestion will result in severe burning and corrosion of mouth, throat and the gastrointestinal tract. If the ingested material contacts stomach acid, highly toxic hydrogen sulfide gas will be evolved.

INHALATION: Product solution and vapors contain some highly toxic hydrogen sulfide gas. Exposure to this gas causes headaches, nausea, dizziness and vomiting. Continued exposure can lead to loss of consciousness and death.

CHRONIC EFFECTS – CARCINOGENICITY: Not listed as a carcinogen by NTP, IARC or OSHA.

SECTION 4 – FIRST AID MEASURES

4.1 **EYES:** Immediately flush with large quantities of water for 15 minutes. Hold eyelids apart during irrigation to insure thorough flushing of the entire area of the eye. Obtain immediate medication.

4.2 **SKIN:** Immediately flush with large quantities of water. Remove contaminated clothing under a safety shower. Obtain immediate medical attention.

4.3 **INGESTION:** DO NOT INDUCE VOMITING. If victim is conscious, immediately give 2 to 4 glasses of water. If vomiting does occur, repeat fluid administration. Obtain immediate medical attention.

4.4 **INHALATION:** Remove victim form contaminated atmosphere. If breathing is labored, administer oxygen. If breathing has ceased, clear airway and start mouth to mouth resuscitation. If heart has stopped beating, external heart massage should be applied. Obtain immediate medical attention.

SECTION 5 – FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

FLASH POINT: Not Flammable METHOD USED: NA

5.2 FLAMMABLE LIMITS: Hydrogen Sulfide LFL: 4% UFL: 44%

5.3 EXTINGUISHING MEDIA: Water spray or foam or as appropriate for combustion involved in fire.

5.4 FIRE and EXPLOSIVE HAZARDS: Solution is non-flammable. However if these solutions are exposed to heat or acids, hydrogen sulfide will be released and may form explosive mixtures with air (see above). Keep containers and/or storage vessels in fire area cooled with water spray. Heating may cause the release of hydrogen sulfide vapors.

5.5 FIRE FIGHTING EQUIPMENT: Because of the possible presence of toxic gases and the corrosive nature of the product, wear self-contained breathing apparatus, positive pressure, MSHA / NIOSH (approved or equivalent) and full protective gear.

SECTION 6 – ACCIDENTIAL RELEASE MEASURES

6.1 SMALL RELEASES: Isolate for 75 feet. Confine area to qualified response personnel. Wear proper Personnel Protective equipment (See Section 8). Confine release material by berming or diverting its path Absorb on sand, earth or other inert dry absorbent. Do not allow into sewer, storm drains or any waterway. Oxidize residual reactive sulfides with a weak (3-5%) hydrogen peroxide solution to stop the release of toxic hydrogen sulfide. Remove contaminated soil and dispose of in accordance with all governmental regulations.

6.2 LARGE RELEASES: Activate Emergency Response Plan procedures. Isolate release area for 500 feet. Confine area to qualified response personnel. Wear proper Personnel Protective Equipment (See Section 8). Shut off release, if safe to do so. Dike spill area to prevent runoff into sewers, drains (potential toxic and explosive mixtures of hydrogen sulfide in confined spaces) or surface waterways (potential aquatic toxicity). Recover as much of the solution as possible. Treat remaining material as a small release (See 6.1).

SECTION 7 – HANDLING and STORAGE

7.1 HANDLING: Wear proper protective equipment (See Section 8). Avoid breathing product vapors. Avoid contact with skin and eyes. Use only in a well ventilated area. Dilute product only in enclosed containers. Wash thoroughly after handling.

7.2 STORAGE: Store in well ventilated areas. Do not store combustibles in the area of storage vessels. Keep away from any sources of heat or flame. Store tote and smaller containers out of direct sunlight at moderate temperatures [<80 F (27 C)]. (See Section 10.4 for materials of construction)

SECTION 8 – EXPOSURE CONTROLS and PERSONAL PROTECTION

8.1 RESPIRATORY PROTECTION: If working near open container or storage vessel opening or open tank truck dome cover and, the concentration of sodium sulfide is greater than 500 ppm have available self-contained breathing apparatus, positive pressure, MSHA / NIOSH (approved or equivalent). For concentrations of sodium sulfide below 500 ppm, this does not require the use of a self-contained breathing apparatus. For concentrations below 500 ppm one should have available a respirator with a cartridge rated for hydrogen sulfide.

8.2 SKIN PROTECTION: Neoprene rubber gloves, chemical suit and boots should be worn to prevent contact with the liquid. Wash contaminated clothing prior to reuse. Contaminated leather shoes cannot be cleaned and should be discarded.

8.3 EYE PROTECTION: Chemical goggles and a full face shield.

8.4 EXPOSURE GUIDELINES:

	OSHA		ACGIH	
	TWA	STEL	TLV	STEL
Hydrogen Sulfide	20 ppm (ceiling)		10 ppm (ceiling)	

8.5 ENGINEERING CONTROLS: Use adequate exhaust ventilation to prevent inhalation of product vapors. Where feasible scrub process or storage vessel vapors with caustic solution. Maintain eye wash safety shower in areas where chemical is handled.

SECTION 9 – PHYSICAL and CHEMICAL PROPERTIES

9.1 APPEARANCE:

9.2 ODOR: Hydrocarbon (mercaptan), possibly hydrogen sulfide (rotten egg) odor.
Sulfides – Less than 100 ppm (Typical 10 to 50 ppm)

9.3 BOILING POINT: Not Determined

9.4 TOC: Typical 15,000 to 30,000 ppm

9.5 OIL and Grease: Typical 20 to 40 ppm

9.6 VAPOR DENSITY: (Air = 1.0) 1.17

9.7 SOLUBILITY IN WATER: Complete

9.8 SPECIFIC GRAVITY: 1.03 – 1.3 (8.59 – 10.83 lbs/gal)

9.9 pH : 11.5 – 13.5

9.10 CHLORIDES: Less than 60,000 ppm

SECTION 10 – STABILITY and REACTIVITY

10.1 STABILITY: This is a stable material.

10.2 HAZARDOUS POLYMERIZATION: Will not occur.

10.3 HAZARDOUS DECOMPOSITION PRODUCTS: Heating product will evolve H2S gas. fire conditions will cause the production of sulfur dioxide. Hydrogen sulfide (4 – 44%) may form flammable mixtures with air.

10.4 INCOMPATIBILITY: Acids will cause the release of highly toxic hydrogen sulfide. Sulfidic caustic solution is not compatible with copper, zinc, aluminum or their alloys (i.e. bronze, brass, galvanized metals, etc.). Corrosive to steel above 150 F (65.5 C). These materials of

SECTION 10 – STABILITY and REACTIVITY (Continued)

construction should not be used in handling systems or storage containers for this product. (See Section 7.2 Storage)

SECTION 11 – TOXICOLOGICAL INFORMATION

11.1 ORAL: Data not available.

11.2 DERMAL: Data not available.

11.3 INHALATION: INH-RAT LC 50: 444 ppm (hydrogen sulfide)

11.4 CHRONIC and CARCINOGENICITY: No evidence available.

11.5 TERATOLOGY: Data not available.

11.6 REPRODUCTION: Data not available.

11.7 MUTAGENICITY: Data not available.

SECTION 12 – ECOLOGICAL INFORMATION

None Available

SECTION 13 – DISPOSAL CONSIDERATIONS

If released to the environment for other than its intended purpose, this product contains some reactive sulfides but not a sufficient quantity to meet the definition of a D003, hazardous waste. The pH may be high enough to meet the definition of a corrosive waste, D002.

SECTION 14 – TRANSPORT INFORMATION

14.1 DOT SHIPPING NAME: Corrosive liquids, n.o.s.

14.2 DOT HAZARD CLASS: 8

14.3 UN/NA NUMBER: UN1760

14.4 PACKING GROUP: II

14.5 DOT PLACARD: Corrosive

14.6 DOT LABLE(s): Corrosive

14.7 IMO SHIPPING NAME: Sodium Hydroxide Solution

14.8 RQ (REPORTABLE QUANTITY): 1,000 lbs (454 Kg) 100% basis (Approx. 538 gals)

14.9 USCG BARGE CERTIFICATION: SSH (sodium sulfide, hydrosulfide solutions, H2S 15 ppm or less). SSI (sodium sulfide, hydrosulfide solutions, H2S greater than 15 ppm but less than 200 ppm).

SECTION 15 – REGULATORY INFORMATION

15.1 OSHA: This product is listed as a hazardous material under criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200.

15.2 SARA TITLE III. a. EHS (Extremely Hazardous Substance) List:

b. Sections 311 and 312 (Tier I, II) Categories:

Immediate (acute)	Yes
Fire	No
Sudden Release	No
Reactivity	Yes
Delayed (chronic)	No

c. Section 313 (Toxic Release Report-Form R): No

d. TPQ (Threshold Planning Quantity): No

15.3 CERCLA and SUPERFUND: RQ (Reportable Quantity) 1,000 lbs

15.4 TSCA (Toxic Substance Control Act) Inventory List: Yes

15.5 RCRA (Resource Conservation and Recovery Act) Status: Yes

15.6 WHMIS (Canada) Hazard Classification: E, D1

15.7 DOT HAZARDOUS MATERIAL: (See Section 14) Yes

15.8 CAA HAZARDOUS AIR POLLUTANT (HAP): No

SECTION 16 – OTHER INFORMATION

REVISIONS: The entire MSDS was reformatted to comply to ANSI Standard Z400.1-1993.

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND OSHA, ANSI, NFPA, DOT, ERG AND CHRIS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSAREY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE THE MATERIAL SAFETY DATA SHEET PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

Material Safety Data Sheet

WEAK CAUSTIC SOLUTION CONTAINING SULFIDES

SECTION 1 – Chemical Product and Company Identification
SECTION 2 – Composition, Information on Ingredients
SECTION 3 – Hazards Identification
SECTION 4 – First Aid Measures
SECTION 5 – Fire Fighting Measures
SECTION 6 – Accidental Release Measures
SECTION 7 – Handling and Storage
SECTION 8 – Exposure Controls and Personal Protection
SECTION 9 – Physical and Chemical Properties
SECTION 10 – Stability and Reactivity
SECTION 11 – Toxicological Information
SECTION 12 – Ecological Information
SECTION 13 – Disposal Considerations
SECTION 14 – Transport Information
SECTION 15 – Regulatory Information
SECTION 16 – Other Information

SECTION 1 – CHEMICAL PRODUCT and COMPANY IDENTIFICATION

1.1	Product Name	Weak Caustic and Water Solution Containing Sulfides
	Chemical Family	Inorganic Salt Solution
	Formula	NA (mixture)
1.2	Manufacturer/Source	CES Environmental Services, Inc. 4904 Griggs Road Houston, TX 77021 713-676-1460
1.3	Emergency Contact	Matt Bowman 713-826-1329 CHEMTREC 800-424-9300

SECTION 2 – COMPOSITION and INFORMATION ON INGREDIENTS

2.1 Chemical Ingredients (% by wt)

Typical Analysis		
Sulfurized salts; sulfides and solids (e.g.Na2S)	CAS#: 1313-82-2	2 – 15%
Sodium Hydroxide (NaOH)	CAS#: 1310-73-2	2 – 15%
Sulfurized Isobutylene	CAS #: 68511-50-2	0 – 2%
Sodium Hydrosulfide (NaHS)	CAS #: 16721-80-5	3 – 5%
Water		remaining %

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SECTION 3 – HAZARDS IDENTIFICATION

NFPA: Health – 3 Flammability – 0 Reactivity – 1

EMERGENCY OVERVIEW

Warning: Solution is highly alkaline.
May evolve small amounts of hydrogen sulfide, a highly toxic gas.
EYE contact will cause marked eye irritation and possible corneal damage.
SKIN contact will result in irritation and possible corrosion of the skin.
INGESTION will irritate and burn the mouth, throat and the gastrointestinal tract; contact with stomach acid will cause hydrogen sulfide vapors to be released.
HEATING *or ACID contact will cause hydrogen sulfide gas to evolve.*

3.1 POTENTIAL HEALTH EFFECTS

EYE: Contact with the eyes will cause marked eye irritation and possibly severe corneal damage.

SKIN CONTACT: Contact with the skin will cause skin irritation or a burning sensation. Prolonged contact will result in corrosion of the skin.

SKIN ABSORPTION: Absorption is unlikely to occur.

INGESTION: Ingestion will result in severe burning and corrosion of mouth, throat and the gastrointestinal tract. If the ingested material contacts stomach acid, highly toxic hydrogen sulfide gas will be evolved.

INHALATION: Product solution and vapors may contain a small amount of hydrogen sulfide gas in ppm. Exposure to this gas causes headaches, nausea, dizziness and continued exposure can lead to loss of consciousness and death.

CHRONIC EFFECTS – CARCINOGENICITY: Not listed as a carcinogen by NTP, IARC or OSHA.

SECTION 4 – FIRST AID MEASURES

4.1 **EYES:** *Immediately flush with large quantities of water for 15 minutes. Hold eyelids apart during* irrigation to insure thorough flushing of the entire area of the eye. Obtain immediate medication.

4.2 **SKIN:** Immediately flush with large quantities of water. Remove contaminated clothing under a *safety shower. Obtain immediate medical attention.*

4.3 **INGESTION:** DO NOT INDUCE VOMITING. If victim is conscious, immediately give 2 to 4 glasses of water. If vomiting does occur, repeat fluid administration. Obtain immediate medical attention.

4.4 **INHALATION:** Remove victim form contaminated atmosphere. If breathing is labored, administer oxygen. If breathing has ceased, clear airway and start mouth to mouth resuscitation. If heart has stopped beating, external heart massage should be applied. Obtain immediate medical attention.

SECTION 5 – FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

FLASH POINT: Not Flammable METHOD USED: NA

5.2 FLAMMABLE LIMITS: Hydrogen Sulfide LFL: 4% UFL: 44%

5.3 EXTINGUISHING MEDIA: Water spray or foam or as appropriate for combustion involved in fire.

5.4 FIRE and EXPLOSIVE HAZARDS: Solution is non-flammable. However if these solutions are exposed to heat or acids, hydrogen sulfide will be released and may form explosive mixtures with air (see above). Keep containers and/or storage vessels in fire area cooled with water spray. Heating may cause the release of some hydrogen sulfide vapors.

5.5 FIRE FIGHTING EQUIPMENT: Because of the possible presence of toxic gases and the corrosive nature of the product, wear self-contained breathing apparatus, positive pressure, MSHA / NIOSH (approved or equivalent) and full protective gear.

SECTION 6 – ACCIDENTIAL RELEASE MEASURES

6.1 SMALL RELEASES: Isolate for 75 feet. Confine area to qualified response personnel. Wear proper Personnel Protective equipment (See Section 8). Confine release material by berming or diverting its path Absorb on sand, earth or other inert dry absorbent. Do not allow into sewer, storm drains or any waterway. Oxidize residual reactive sulfides with a weak (3-5%) hydrogen peroxide solution to stop the release of any hydrogen sulfide. Remove contaminated soil and dispose of in accordance with all governmental regulations.

6.2 LARGE RELEASES: Activate Emergency Response Plan procedures. Isolate release area for 500 feet. Confine area to qualified response personnel. Wear proper Personnel Protective Equipment (See Section 8). Shut off release, if safe to do so. Dike spill area to prevent runoff into sewers, drains, or surface waterways .
Treat remaining material as a small release (See 6.1).

SECTION 7 – HANDLING and STORAGE

7.1 HANDLING: Wear proper protective equipment (See Section 8). Avoid breathing product vapors. Avoid contact with skin and eyes. Use only in a well ventilated area. Dilute product only in enclosed containers. Wash thoroughly after handling.

7.2 STORAGE: Store in well ventilated areas. Do not store combustibles in the area of storage vessels. Keep away from any sources of heat or flame.

SECTION 8 – EXPOSURE CONTROLS and PERSONAL PROTECTION

8.1 RESPIRATORY PROTECTION: If working near open container or storage vessel opening or open tank truck dome cover, have available self-contained breathing apparatus, positive pressure, MSHA / NIOSH (approved or equivalent), or respirator. Normally, this caustic has a low concentration of sulfides in solution which does not require the use of a respirator.

8.2 SKIN PROTECTION: Neoprene rubber gloves, pvc rain suit and boots can be worn to prevent contact with the liquid. Wash contaminated clothing prior to reuse. Contaminated leather shoes cannot be cleaned and should be discarded.

8.3 EYE PROTECTION: Chemical goggles and a full face shield.

8.4 EXPOSURE GUIDELINES:

	OSHA		ACGIH	
	TWA	STEL	TLV	STEL
Hydrogen Sulfide	20 ppm (ceiling)		10 ppm (ceiling)	

8.5 ENGINEERING CONTROLS: Use adequate exhaust ventilation to prevent inhalation of product vapors. Where feasible scrub process or storage vessel vapors with caustic solution. Maintain eye wash safety shower in areas where chemical is handled.

SECTION 9 – PHYSICAL and CHEMICAL PROPERTIES

9.1 APPEARANCE: Light to dark brown or red liquid

9.2 ODOR: Possibly hydrogen sulfide (rotten egg) odor.

9.3 BOILING POINT: Not Determined

9.4 VAPOR PRESSURE: Not Determined

9.5 VAPOR DENSITY: (Air = 1.0) 1.17

9.6 SOLUBILITY IN WATER: Complete

9.7 SPECIFIC GRAVITY: 1.03 – 1.4 (8.59 – 11.0 lbs/gal)

9.8 pH : 11.5 – 13.5

9.9 VOLATILE: Not Determined

SECTION 10 – STABILITY and REACTIVITY

10.1 STABILITY: This is a stable material.

10.2 HAZARDOUS POLYMERIZATION: Will not occur.

10.3 HAZARDOUS DECOMPOSITION PRODUCTS: Heating product may evolve H2S gas. Fire conditions will cause the production of sulfur dioxide. Hydrogen sulfide (4 – 44%) may form flammable mixtures with air.

10.4 INCOMPATIBILITY: Acids will cause the release of highly toxic hydrogen sulfide. Sulfidic caustic solution is not compatible with copper, zinc, aluminum or their alloys (i.e. bronze, brass, galvanized metals, etc.).
(See Section 7.2 Storage)

SECTION 11 – TOXICOLOGICAL INFORMATION

11.1 ORAL: Data not available.

11.2 DERMAL: Data not available.

11.3 INHALATION: INH-RAT LC 50: 444 ppm (hydrogen sulfide)

11.4 CHRONIC and CARCINOGENICITY: No evidence available.

11.5 TERATOLOGY: Data not available.

11.6 REPRODUCTION: Data not available.

11.7 MUTAGENICITY: Data not available.

SECTION 12 – ECOLOGICAL INFORMATION

None Available

SECTION 13 – DISPOSAL CONSIDERATIONS

If released to the environment for other than its intended purpose, this product contains some reactive sulfides. The pH may be high enough to meet the definition of a corrosive waste, D002.

SECTION 14 – TRANSPORT INFORMATION

14.1 DOT SHIPPING NAME: Corrosive liquids, n.o.s.

14.2 DOT HAZARD CLASS: 8

14.3 UN/NA NUMBER: UN1760

14.4 PACKING GROUP: II

14.5 DOT PLACARD: Corrosive

14.6 DOT LABLE(s): Corrosive

14.7 IMO SHIPPING NAME: Sodium Hydroxide Solution

14.8 RQ (REPORTABLE QUANTITY): 1,000 lbs (454 Kg) 100% basis (Approx. 538 gals)

14.9 USCG BARGE CERTIFICATION: SSH (sodium sulfide, hydrosulfide solutions, H2S 15 ppm or less). SSI (sodium sulfide, hydrosulfide solutions, H2S greater than 15 ppm but less than 200 ppm).

SECTION 15 – REGULATORY INFORMATION

15.1 OSHA: This product is listed as a hazardous material under criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200.

15.2 SARA TITLE III. a. EHS (Extremely Hazardous Substance) List:

b. Sections 311 and 312 (Tier I, II) Categories:

Immediate (acute)	Yes
Fire	No
Sudden Release	No
Reactivity	Yes
Delayed (chronic)	No

c. Section 313 (Toxic Release Report-Form R): No

d. TPQ (Threshold Planning Quantity): No

15.3 CERCLA and SUPERFUND: RQ (Reportable Quantity) 1,000 lbs

15.4 TSCA (Toxic Substance Control Act) Inventory List: Yes

15.5 RCRA (Resource Conservation and Recovery Act) Status: No

15.6 WHMIS (Canada) Hazard Classification: E, D1

15.7 DOT HAZARDOUS MATERIAL: (See Section 14) Yes

15.8 CAA HAZARDOUS AIR POLLUTANT (HAP): No

SECTION 16 – OTHER INFORMATION

REVISIONS: The entire MSDS was reformatted to comply to ANSI Standard Z400.1-1993.

THE INFORMATION PUBLISHED IN THIS MATERIAL SAFETY DATA SHEET HAS BEEN COMPILED FROM OUR EXPERIENCE AND OSHA, ANSI, NFPA, DOT, ERG AND CHRIS. IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE SUITABILITY OF THIS INFORMATION FOR THE ADOPTION OF NECESSAREY SAFETY PRECAUTIONS. WE RESERVE THE RIGHT TO REVISE THE MATERIAL SAFETY DATA SHEET PERIODICALLY AS NEW INFORMATION BECOMES AVAILABLE.

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: XYLENE

Revision Date: 02-Jan-2007

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: XYLENE
Synonyms: None
Chemical Family: Aromatic hydrocarbon
Application: Solvent

Manufacturer/Supplier
Halliburton Energy Services
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Ethyl benzene	100-41-4	16-20	100 ppm	100 ppm
Xylene	1330-20-7	79-83	100 ppm	100 ppm

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye, skin, and respiratory irritation. May cause headache, dizziness, and other central nervous system effects. May be harmful if swallowed. May be absorbed through the skin. Repeated overexposure may cause liver and kidney effects. Flammable.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Get medical attention! If vomiting occurs, keep head lower than hips to prevent aspiration.

Notes to Physician
Not Applicable

EPAPA005002044

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	79
Flash Point/Range (C):	26
Flash Point Method:	Not Determined
Autoignition Temperature (F):	930
Autoignition Temperature (C):	498
Flammability Limits in Air - Lower (%):	1
Flammability Limits in Air - Upper (%):	7

Fire Extinguishing Media Carbon Dioxide, Dry Chemicals, Foam.

Special Exposure Hazards May be ignited by heat, sparks or flames. Use water spray to cool fire exposed surfaces. Closed containers may explode in fire. Avoid spraying water directly into storage containers due to danger of boilover. Decomposition in fire may produce toxic gases. Vapors are heavier than air and may accumulate in low areas. Vapors may travel along the ground to be ignited at distant locations.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 2, Flammability 3, Reactivity 0
HMIS Ratings: Flammability 3, Reactivity 0, Health 2

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Wear self-contained breathing apparatus in enclosed areas.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse. Ground and bond containers when transferring from one container to another.

Storage Information Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Respiratory Protection Organic vapor respirator.

Hand Protection Impervious rubber gloves.

Skin Protection Rubber apron.

Eye Protection Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Clear to water white
Odor:	Aromatic hydrocarbon
pH:	7
Specific Gravity @ 20 C (Water=1):	0.86
Density @ 20 C (lbs./gallon):	7.16
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	281
Boiling Point/Range (C):	138
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	21
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	100
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Insoluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	106

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization:	Will Not Occur
Conditions to Avoid	Keep away from heat, sparks and flame.
Incompatibility (Materials to Avoid)	Strong oxidizers.
Hazardous Decomposition Products	Toxic fumes. Carbon monoxide and carbon dioxide.
Additional Guidelines	Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	May cause respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.
Skin Contact	May cause skin defatting with prolonged exposure. May be absorbed through the skin and produce effects similar to those caused by inhalation and/or ingestion.
Eye Contact	Causes severe eye irritation May cause eye burns.

EPAPA005002046

Ingestion	Irritation of the mouth, throat, and stomach. May cause central nervous system depression including headache, dizziness, drowsiness, muscular weakness, incoordination, slowed reaction time, fatigue blurred vision, slurred speech, giddiness, tremors and convulsions. Aspiration into the lungs may cause chemical pneumonitis including coughing, difficulty breathing, wheezing, coughing up blood and pneumonia, which can be fatal.
Aggravated Medical Conditions	Skin disorders. Lung disorders. Eye ailments.
Chronic Effects/Carcinogenicity	Prolonged or repeated exposure may cause eye, blood, lung, liver, kidney, heart, central nervous system and spleen damage.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 4300 mg/kg (Rat)
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	Not determined
Genotoxicity:	Not determined
Reproductive / Developmental Toxicity:	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined
Persistence/Degradability	Slowly biodegradable
Bio-accumulation	Not Determined

Ecotoxicological Information

Acute Fish Toxicity:	Not determined
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT

EPAPA005002047

Xylene, 3, UN1307, III, (26.1 C)
RQ (Xylene - 45.4 kg.)
NAERG 130

Canadian TDG
Xylene, 3, UN1307, III, (26.1 C)

ADR
UN1307,Xylene, 3, III

Air Transportation

ICAO/IATA
UN1307,Xylene, 3, III
RQ (Xylene - 45.4 kg.)

Sea Transportation

IMDG
UN1307,Xylene, 3, III, (26.1 C)
RQ (Xylene - 45.4 kg.)
EmS F-E, S-D

Other Shipping Information

Labels: Flammable Liquid

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	Fire Hazard Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product contains toxic chemical(s) listed below which is(are) subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372: Ethyl Benzene//100-41-4 Xylene//1330-20-7
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	EPA Reportable Spill Quantity is 17 Gallons based on Xylene (CAS: 1330-20-7).
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of: Ignitability D001 Listed Waste U239
California Proposition 65	The California Proposition 65 regulations apply to this product.

EPAPA005002048

MA Right-to-Know Law	One or more components listed.
NJ Right-to-Know Law	One or more components listed.
PA Right-to-Know Law	One or more components listed.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	B2 Flammable Liquids D1A Very Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

END OF MSDS

EPAPA005002049

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **ZINC BROMIDE**

Revision Date: 23-Jan-2006

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: ZINC BROMIDE
Synonyms: None.
Chemical Family: Metal Bromide
Application: Additive

Manufacturer/Supplier
Baroid Drilling Fluids
a Product Service Line of Halliburton Energy Services, Inc.
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335.

2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE	CAS Number	PERCENT	ACGIH TLV-TWA	OSHA PEL-TWA
Zinc bromide.	7699-45-8	60 - 100%	Not applicable.	Not applicable.

3. HAZARDS IDENTIFICATION

Hazard Overview
May cause eye, skin, and respiratory burns. May cause allergic skin reaction. May be harmful if swallowed.

4. FIRST AID MEASURES

Inhalation
If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention.

Skin
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse.

Eyes
In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing.

Ingestion
Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

Notes to Physician
Not Applicable.

EPAPA005002050

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined.
Flash Point/Range (C):	Not Determined.
Flash Point Method:	Not Determined.
Autoignition Temperature (F):	Not Determined.
Autoignition Temperature (C):	Not Determined.
Flammability Limits in Air - Lower (%):	Not Determined.
Flammability Limits in Air - Upper (%):	Not Determined.

Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Decomposition in fire may produce toxic gases.
Special Protective Equipment for Fire-Fighters	Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.
NFPA Ratings:	Health 3, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 3

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures	Use appropriate protective equipment.
Environmental Precautionary Measures	Prevent from entering sewers, waterways, or low areas.
Procedure for Cleaning / Absorption	Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions	Avoid contact with eyes, skin, or clothing. Wash hands after use. Launder contaminated clothing before reuse.
Storage Information	Store in a cool, dry location. Keep container closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls	Use in a well ventilated area.
Respiratory Protection	Dust/mist respirator. (95%)
Hand Protection	Impervious rubber gloves.
Skin Protection	Rubber apron.
Eye Protection	Chemical goggles; also wear a face shield if splashing hazard exists.
Other Precautions	Eyewash fountains and safety showers must be easily accessible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Powder
Color:	Colorless to white
Odor:	Odorless
pH:	4
Specific Gravity @ 20 C (Water=1):	4.22
Density @ 20 C (lbs./gallon):	Not Determined.

EPAPA005002051

9. PHYSICAL AND CHEMICAL PROPERTIES

Bulk Density @ 20 C (lbs/ft3):	Not Determined.
Boiling Point/Range (F):	Not Determined.
Boiling Point/Range (C):	Not Determined.
Freezing Point/Range (F):	Not Determined.
Freezing Point/Range (C):	Not Determined.
Vapor Pressure @ 20 C (mmHg):	Not Determined.
Vapor Density (Air=1):	Not Determined.
Percent Volatiles:	Not Determined.
Evaporation Rate (Butyl Acetate=1):	Not Determined.
Solubility in Water (g/100ml):	Miscible
Solubility in Solvents (g/100ml):	Not Determined.
VOCs (lbs./gallon):	Not Determined.
Viscosity, Dynamic @ 20 C (centipoise):	Not Determined.
Viscosity, Kinematic @ 20 C (centistrokes):	Not Determined.
Partition Coefficient/n-Octanol/Water:	Not Determined.
Molecular Weight (g/mole):	225.21

10. STABILITY AND REACTIVITY

Stability Data:	Stable.
Hazardous Polymerization:	Will Not Occur.
Conditions to Avoid	None known.
Incompatibility (Materials to Avoid)	Potassium. Sodium.
Hazardous Decomposition Products	Hydrogen bromide. Toxic fumes.
Additional Guidelines	Not Applicable.

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Causes severe respiratory irritation.
Skin Contact	Causes severe skin irritation. May cause skin burns on prolonged contact.
Eye Contact	Causes severe eye irritation May cause eye burns.
Ingestion	Causes burns of the mouth, throat and stomach. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation and central nervous system depression.
Aggravated Medical Conditions	Central nervous system disorders.
Chronic Effects/Carcinogenicity	May cause bromism characterized by disturbances of the central nervous system, skin and digestive tract. May cause birth defects.
Other Information	None known.

Toxicity Tests

Oral Toxicity:	LD50: 1470 mg/kg (Rat)
Dermal Toxicity:	Not determined.
Inhalation Toxicity:	Not determined.

Primary Irritation Effect:	Not determined.
Carcinogenicity	Not determined.
Genotoxicity:	Not determined.
Reproductive / Developmental Toxicity:	Not determined.

12. ECOLOGICAL INFORMATION

Mobility (Water/Soil/Air)	Not determined.
Persistence/Degradability	Not determined.
Bio-accumulation	Not Determined.

Ecotoxicological Information

Acute Fish Toxicity:	Not determined.
Acute Crustaceans Toxicity:	Not determined.
Acute Algae Toxicity:	Not determined.
Chemical Fate Information	Not determined.
Other Information	Not applicable.

13. DISPOSAL CONSIDERATIONS

Disposal Method	Disposal should be made in accordance with federal, state, and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Corrosive Solid, Acidic, Inorganic, N.O.S., 8, UN3260, II
(Contains Zinc Bromide), Marine Pollutant
RQ (Zinc Bromide - 454 kg.)
NAERG 154

Canadian TDG
Corrosive Solid, Acidic, Inorganic, N.O.S.(Contains Zinc Bromide), 8, UN3260, II, Marine Pollutant

ADR
UN3260,Corrosive Solid, Acidic, Inorganic, N.O.S.(Contains Zinc Bromide), 8, II, Marine Pollutant

Air Transportation

ICAO/IATA
UN3260,Corrosive Solid, Acidic, Inorganic, N.O.S., 8, II
(Contains Zinc Bromide Mixture), Marine Pollutant
RQ (Zinc Bromide - 454 kg.)

Sea Transportation

EPAPA005002053

IMDG
Corrosive Solid, Acidic, Inorganic, N.O.S.(Contains Zinc Bromide), 8, UN3260, II
, Marine Pollutant
RQ (Zinc Bromide - 454 kg.)
EmS F-A, S-B

Other Shipping Information

Labels:	Corrosive Marine Pollutant

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable.
EPA SARA (311,312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	EPA Reportable Spill Quantity is 1000 Pounds based on Zinc bromide (CAS: 7699-45-8)
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2B Toxic Materials

16. OTHER INFORMATION

The following sections have been revised since the last issue of this MSDS
Not applicable.

EPAPA005002054

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Material Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

EPAPA005002055

1 PRODUCT AND COMPANY IDENTIFICATION

Thio and Fine Chemicals
Arkema Inc.
2000 Market Street
Philadelphia, PA 19103

EMERGENCY PHONE NUMBERS:
Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
Medical: Rocky Mountain Poison Control Center
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Customer Service	1-800-628-4453	8:30 to 5:30 EST

Product Name	SULFUR ORGANIC LIQUID
Product Synonym(s)	
Chemical Family	Mixture
Chemical Formula	
Chemical Name	
EPA Reg Num	
Product Use	Fuel Oil Cutter Stock

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical %	OSHA
Didodecyl sulfide	2469-45-6	40-55% By Wt.	Y
sec-Dodecyl mercaptan	14402-50-7	25-40% By Wt.	Y
n-Dodecyl mercaptan	112-55-0	< 10% By Wt.	Y
Propylene tetramer	6842-15-5	< 10% By Wt.	Y
tert-Dodecanethiol	25103-58-6	< 10% By Wt.	Y
Alkenes, C8-10-branched, C9-rich	97593-01-6	< 10% By Wt.	Y
C7-14 sulfides and disulfides	NE	< 10% By Wt.	Y
Dodecene	112-41-4	< 5% By Wt.	Y
Hydrogen sulfide	7783-06-4	< 50PPM By Wt.	Y

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

COMPONENTS OF THIS BYPRODUCT ARE NOT ON THE TSCA INVENTORY. THIS BYPRODUCT IS PROVIDED UNDER THE TSCA PREMANUFACTURE NOTICE EXEMPTION AT 40 CFR 720.30(G) ONLY FOR BURNING AS FUEL OR MIXING (NOT REACTING) WITH OTHER MATERIALS FOR BURNING AS FUEL.

3 HAZARDS IDENTIFICATION

Emergency Overview
Brown liquid with strong odor
WARNING!
COMBUSTIBLE LIQUID AND VAPOR.
CAUSES EYE IRRITATION.
CAUSES RESPIRATORY TRACT IRRITATION.
MAY CAUSE ALLERGIC SKIN REACTION.
MAY CAUSE NAUSEA, HEADACHE OR DIZZINESS.

EPAPA005002056

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on its composition, it is anticipated to be severely irritating to the eyes and respiratory tract. This material has a strong objectionable odor that may cause nausea, headache, or dizziness. Repeated exposure may cause an allergic skin reaction. Medical conditions which may be aggravated by exposure to this material include lung disease or limited respiratory capacity.

4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention.

IF ON SKIN, immediately wash with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Thoroughly clean shoes before reuse.

IF SWALLOWED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

5 FIRE FIGHTING MEASURES

Fire and Explosive Properties

Auto-Ignition Temperature	NE	
Flash Point	>170F	Flash Point Method
Flammable Limits- Upper	NE	
Lower	NE	

Extinguishing Media

Use water spray, carbon dioxide, foam or dry chemical.

Fire Fighting Instructions

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

Fire and Explosion Hazards

None known.

6 ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Isolate hazard area and deny entry to unnecessary or unprotected personnel. Contain spilled liquid with sand or earth. Clean up spill immediately, observing precautions in the Personal Protection section of MSDS. Avoid runoff into storm sewers and ditches which lead to waterways.

EPAPA005002057

7 HANDLING AND STORAGE

Handling

Avoid contact with eyes. Wash thoroughly after handling. Avoid prolonged or repeated contact with skin. Avoid breathing vapor or mist. Keep container closed. Use only with adequate ventilation.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Storage

This material is not hazardous under normal storage conditions; however, material should be stored in closed containers, in a secure area to prevent container damage and subsequent spillage.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

Eye / Face Protection

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment immediately available.

Skin Protection

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

Respiratory Protection

Avoid breathing vapor or mist. When airborne exposure limits are exceeded (see below), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients

Exposure Limit		Value
n-Dodecyl mercaptan		
ACGIH Sensitizer Designator	-	Y
ACGIH TWA	-	0.1 ppm
Hydrogen sulfide		
ACGIH STEL	-	15 ppm (21 mg/m3)
ACGIH TWA	-	10 ppm (14 mg/m3)
OSHA Ceiling PEL	-	20 ppm

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tert-Dodecanethiol

Arkema 8-hour TWA	-	5 ppm

-Only those components with exposure limits are printed in this section.
-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.
-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.
-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Brown liquid with strong odor
pH	5 - 7
Specific Gravity	0.84
Vapor Pressure	NE
Vapor Density	NE
Melting Point	85 F
Freezing Point	NE
Boiling Point	NE
Solubility In Water	Insoluble

10 STABILITY AND REACTIVITY

Stability

This material is chemically stable under normal and anticipated storage and handling conditions.

Incompatibility

There are no known incompatibilities to this product.

Hazardous Decomposition Products

None known.

11 TOXICOLOGICAL INFORMATION

Toxicological Information

Data on this material and/or its components are summarized below.

n-Dodecyl Mercaptan

Single exposure (acute) studies indicate that this material is slightly toxic to practically non-toxic if swallowed (rat LD50 1,960 - >5,000 mg/kg) or inhaled (rat 4-hr LC50 >8-9 ppm; no deaths following exposure to saturated vapor), no more than slightly toxic if absorbed through skin (rat LD0 >2,000 mg/kg), corrosive to rabbit eyes and severely irritating to rabbit skin (24-hr exposure, PII 8.0/8.0)

Skin allergy was observed in guinea pigs following repeated exposure in some tests, but not others. A potential for irritation and allergic reactions in humans has been reported. Following repeated inhalation exposures, rats and mice exhibited eye, nasal and respiratory tract irritation and breathing difficulties, followed by death which was associated with lung damage. A repeated inhalation exposure study in mice produced microscopic liver changes. Following a longer-term inhalation exposure study, rats showed reduced growth, reduced liver and adrenal function, general congestion of the internal organs and microscopic changes in lungs, liver, kidney,

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11 TOXICOLOGICAL INFORMATION

heart and brain. No birth defects were observed in the offspring of rats exposed by inhalation during pregnancy, even at amounts which produced significant adverse effects on the mothers. No genetic changes were observed in tests using bacteria or animal cells.

Paraffin
This material is neither digested nor absorbed and is considered non-toxic. When ingested, it has been reported to have a mild laxative effect.

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

Data on this material and/or its components are summarized below.

n-Dodecyl mercaptan
This material is practically non-toxic to Daphnia magna, rainbow trout and algae (no effect up to the limit of solubility).

Chemical Fate Information

Data on this material and/or its components are summarized below.

Paraffin
This material is reported to be biodegradable.

n-Dodecyl mercaptan
This material is not readily biodegradable (39.2% after 28-days). The log Pow is 6.18

13 DISPOSAL CONSIDERATIONS

Waste Disposal

Incineration is the recommended method for disposal observing all local, state and federal regulations. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14 TRANSPORT INFORMATION

DOT Name	Non Bulk Domestic/ Bulk and Non bulk international: Not Regulated
DOT Technical Name	
DOT Hazard Class	
UN Number	
DOT Packing Group	PG
RQ	
DOT Special Information	Domestic Bulk shipments Combustible liquid, n.o.s. (Didodecyl sulfide) 3; NA 1993; PGIII

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15 REGULATORY INFORMATION

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	Y	Fire	N
Delayed (Chronic) Health	N	Reactive	N
		Sudden Release of Pressure	N

COMPONENTS OF THIS BYPRODUCT ARE NOT ON THE TSCA INVENTORY. THIS BYPRODUCT IS PROVIDED UNDER THE TSCA PREMANUFACTURE NOTICE EXEMPTION AT 40 CFR 720.30(G) ONLY FOR BURNING AS FUEL OR MIXING (NOT REACTING) WITH OTHER MATERIALS FOR BURNING AS FUEL.

Ingredient Related Regulatory Information:

SARA Reportable Quantities	CERCLA RQ	SARA TPQ
Dodecene	NE	
n-Dodecyl mercaptan	NE	
Hydrogen sulfide	100 LBS	500 LBS
Didodecyl sulfide	NE	
tert-Dodecanethiol	NE	NE
sec-Dodecyl mercaptan	NE	
Propylene tetramer	NE	NE
C7-14 sulfides and disulfides	NE	NE
Alkenes, C8-10-branched, C9-rich	NE	NE

SARA Title III, Section 302

This product does contain chemical(s), as indicated below, currently on the Extremly Hazardous Substance List, Section 302, SARA Title III. See Section 2 for further details regarding concentrations and registry numbers.

Hydrogen sulfide

Massachusetts Right to Know

This product does contain the following chemicals(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

Hydrogen sulfide
tert-Dodecanethiol

New Jersey Right to Know

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.

Hydrogen sulfide
Propylene tetramer

Pennsylvania Environmental Hazard

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Environmental Hazard List.

Hydrogen sulfide

Pennsylvania Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.

Hydrogen sulfide
n-Dodecyl mercaptan
tert-Dodecanethiol

16 OTHER INFORMATION

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Revision Information

Revision Date	31 OCT 2006	Revision Number 7
Supercedes Revision Dated	08-MAR-2006	

Revision Summary
Revised section 2.

Key
NE= Not Established NA= Not Applicable (R) = Registered Trademark

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