0316000037--Cook
Baron-Blakeslee Inc.
ILD051937068

NFA-[illegible]
3/16/90

5E0401-A0403

CERCLA
Preliminary Assessment Report

no
hazy
substance

Illinois Environmental
Protection Agency
P.O. Box 19276,
Springfield, IL 62794-9276

6/11/97
J.P.

EPA Region 5 Records Ctr.
293151

Confidential Material May be Enclosed

0316000037--Cook
Baron-Blakeslee Inc.
ILD051937068

Executive Summary

Baron-Blakeslee Incorporated is a Division of Allied-Signal, Inc. The site is located at 1634 South Laramie Avenue, Cicero. The mailing address is Baron-Blakeslee, 2001 North Janice Avenue, Melrose Park, Illinois 60160.

Baron-Blakeslee manufactures vapor degreasing/carbon adsorption equipment, distribute clean solvent and recycle dirty solvent. The solvents handled at this site are trichloroethylene, 1,1,1-trichloroethane, methylene chloroide, tetrachloroethylene, fluorinated solvents and ignitable(D001, F003, and F005) solvents. This site also is a generator and a transporter of waste solvent.

Baron-Blakeslee operates a spray painting process on-site that uses two painting booths. Each booth has an exhaust system which uses paper filters to remove the paint from the air prior to exhausting it outside. When these paper filters were analyzed by Baron-Blakeslee it was found that the filters contained chromium levels which exceeded the EP Toxicity limits. These filters are therefore handled as D007 wastes. The filters are placed in metal drums and stored in the hazardous waste storage area at the Solvent Terminal(see site map) until they are disposed of offsite.

Baron-Blakeslee generates two solvent wastes. The first is that of spent paint thinner used in the painting operation. This spent thinner is an ignitable waste and is stored in sealed 55 gallon containers. The waste is stored in the Ignitable section of the Hazardous Waste Storage area until it is disposed of offsite. The second solvent waste is composed of spent chlorinated and fluorinated solvents that are used to test the vapor cleaning equipment manufactured at the the facility. These solvents(F001) are stored in 55 gallon drums at the Solvent Terminal until they are recycled on-site.

In addition to the waste generated on-site, Baron-Blakeslee operates a distribution area at the Solvent Terminal. Both chloroinated and fluorinated solvents are stored here for future sale and delivery to customers of Baron-Blakeslee. This solvent is either virgin or recycled, and is stored in both 55 gallon drums or bulk quantities. The drums are

stored in the terminal building and the bulk tanks are located on the east side of the terminal. Baron-Blakeslee blends, packages and then delivers the various solvents to their customers. Solvents generated at the distribution terminal which fails to meet the companies specifications are stored on-site until they can be recycled.

The Baron-Blakeslee site used a 10,000 gallon underground tank from the late 1960's until 1981. This tank was used to store halogenated solvents(F002). As part of the facilities application for an IEPA operating permit, the tank was decommissioned and replaced with above-ground storage. The underground tank was completely emptied and filled with a concrete and flyash slurry.

On August 29, 1989 Illinois Environmental Protection Agency personnel conducted a Preliminary Assessment Reconnaissance Inspection at Baron-Blakeslee. This facility is located in a urban area which is zoned for industrial and commercial use.

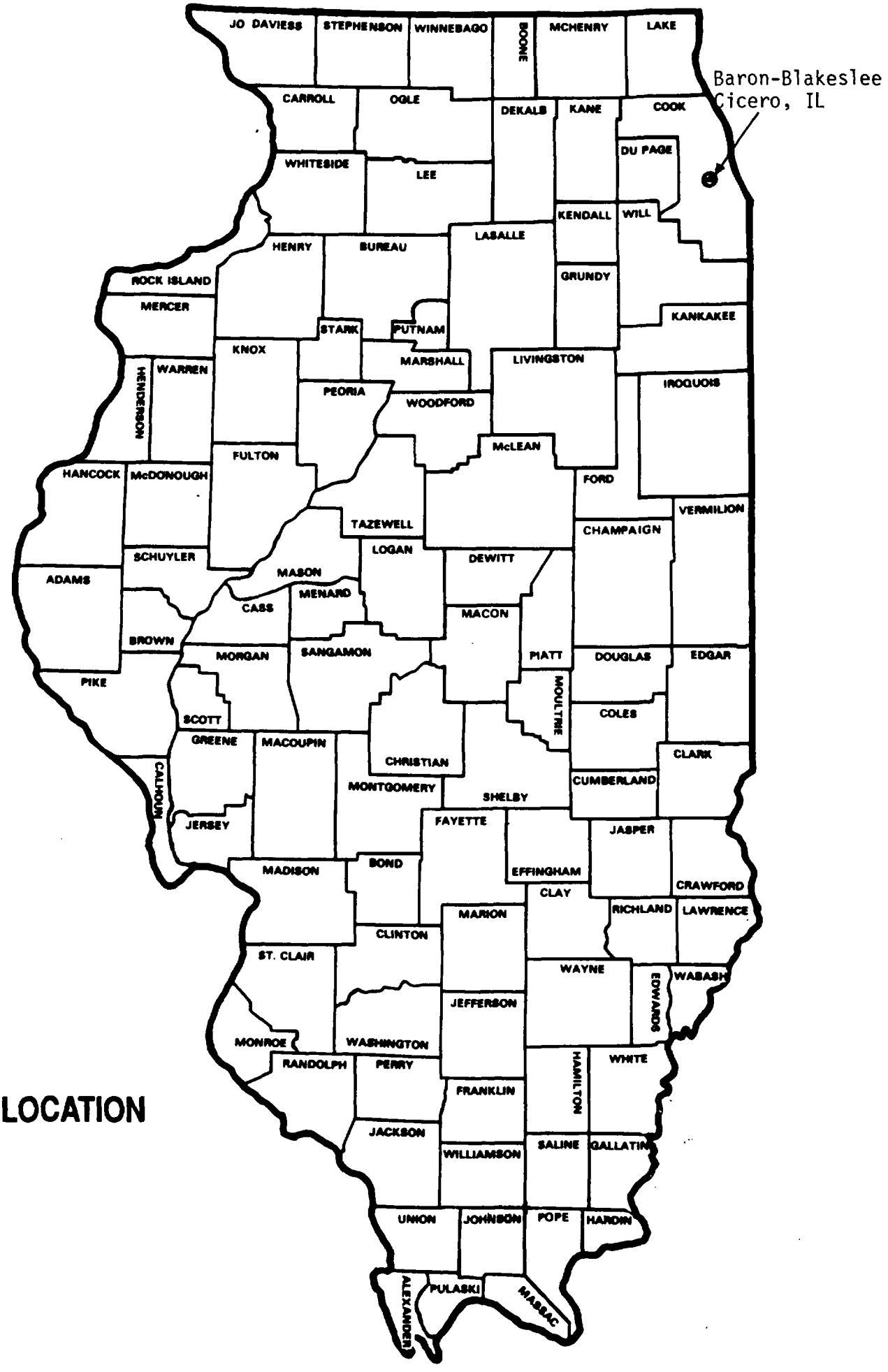
The entire site is paved with either asphalt or concrete. All of the stormwater runoff is contained by the municipal separate sewer system. The runoff from the Solvent Center is collected in a containment area for analysis prior to discharge into the sewer system. The facility does not have a IEPA Wastewater Pretreatment permit. According to IEPA records Baron-Blakeslee has never had a release of hazardous materials from this site.

The nearest surface water (Chicago Sanitary and Ship Canal) is located approximately 2 1/2 mile to the south. The site is not located in a flood plain. A review of Agency records indicate that no municipalities utilize the Ship Canal for a water supply within 15 miles downstream of the site.

Groundwater is not utilized as a source of municipal drinking water within a radius of four miles of the site.

A review of IEPA records indicate that Baron-Blakeslee is currently in compliance with RCRA requirements and possess all the necessary Agency permits. Baron-Blakeslee recieved their RCRA part B permit on September 25, 1989.

This site is recommended for no further action at this time in regard to CERCLA activities. This recommendation is based upon the absence of a release of hazardous materials and the lack of a viable route of exposure to the surrounding population. This site should continued to be monitored by IEPA personnel for any possible future RCRA deficiencies.



SITE LOCATION

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
ILD	051937068

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Baron-Blakeslee Inc.	1634 South Laramie Avenue				
03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Cicero	IL	60650	Cook	031	5
09 COORDINATES LATITUDE	LONGITUDE				
41° 51' 30".0	087° 45' 20"._				

10 DIRECTIONS TO SITE (Starting from nearest public road)

III. RESPONSIBLE PARTIES

01 OWNER (if known)	02 STREET (Business, mailing, residential)		
Allied-Signal, Inc.	2001 North Janice Avenue		
03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Melrose Park	IL	60160	(312) 450-3900
07 OPERATOR (if known and different from owner)	08 STREET (Business, mailing, residential)		
Baron-Blakeslee	1634 South Laramie Avenue		
09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
Cicero	IL	60650	(312) 450-3900

13 TYPE OF OWNERSHIP (Check one)

☒ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A. RCRA 3001 DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES DATE 8, 29, 89 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)

CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)

☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION

BEGINNING YEAR | Present (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Solvent (Toxic/Persistant)
Sludge (Toxic/Persistant)

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Groundwater (Environment)
Direct Contact (Population)

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☒ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)			03 TELEPHONE NUMBER
Mr. Fred Nelson	Baron-Blakeslee / Superintendent			(312) 450-3563
04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
Gary L. Reside	IEPA	Pre-Remedial Program	(217) 782-6760	9, 27, 89 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
ILD	051937068

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

A SOLID
B POWDER, FINES
(C) SLUDGE
D OTHER _____ (Specify)
E SLURRY
(F) LIQUID
G GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS
CUBIC YARDS Unknown
NO. OF DRUMS

03 WASTE CHARACTERISTICS (Check all that apply)

(A) TOXIC
B CORROSIVE
C RADIOACTIVE
(D) PERSISTENT
E SOLUBLE
F INFECTIOUS
(G) FLAMMABLE
(H) IGNITABLE
I HIGHLY VOLATILE
J EXPLOSIVE
K REACTIVE
L INCOMPATIBLE
M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	Unknown		
OLW	OILY WASTE			
SOL	SOLVENTS	Unknown		
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
	See Material Health and		Drums and Bulk tanks		
	Safety Bulletins in the				
	Supporting Documentation				
	Section of the Preliminary				
	Assessment				

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	Unknown		FDS	Unknown	
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Illinois Municipal Directory
IEPA/DLPC Division File
IEPA/DLPC Pre-Remedial Preliminary Assessment Reconnaissance Inspection
USGS 7.5 min Topographical Maps

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
ILD	051937068

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 A GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE) — POTENTIAL — ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

No evidence of groundwater contamination

01 ☐ B SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

No evidence of groundwater contamination

01 ☐ C CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

No evidence of contamination to the air

01 ☐ D FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

No evidence of fire/explosive conditions

01 ☐ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

No evidence of a threat to the employees/surrounding population

01 ☐ F CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE) — POTENTIAL — ALLEGED
03 AREA POTENTIALLY AFFECTED: (Acres) — 04 NARRATIVE DESCRIPTION

No evidence of contamination to the soil

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE) — ☐ POTENTIAL — ALLEGED
03 POPULATION POTENTIALLY AFFECTED — 04 NARRATIVE DESCRIPTION

No evidence of contamination to the drinking water

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE) — ☐ POTENTIAL — ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

No evidence of work exposure/injury

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION

No evidence of population exposure/injury

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
ILD	051937068

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No evidence of damage to flora

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

No evidence of damage to fauna

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No evidence of contamination to the food chain

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills, runoff, standing liquids, leaking drums) — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

No evidence of unstable containment

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No evidence of damage to offsite property

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No evidence of contamination to the sewers, storm drains or WWTPs.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No evidence of illegal or unauthorized dumping

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: 0

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

IEPA/DLPC Division File
USGS 7.5 min Topographical Maps
IDPH Public Water Supply System, Mailing List Report
IEPA/DLPC Pre-Remedial Program - Preliminary Assessment Reconnaissance Inspection - August 29, 1989.

SDMS US EPA Region V

Imagery Insert Form

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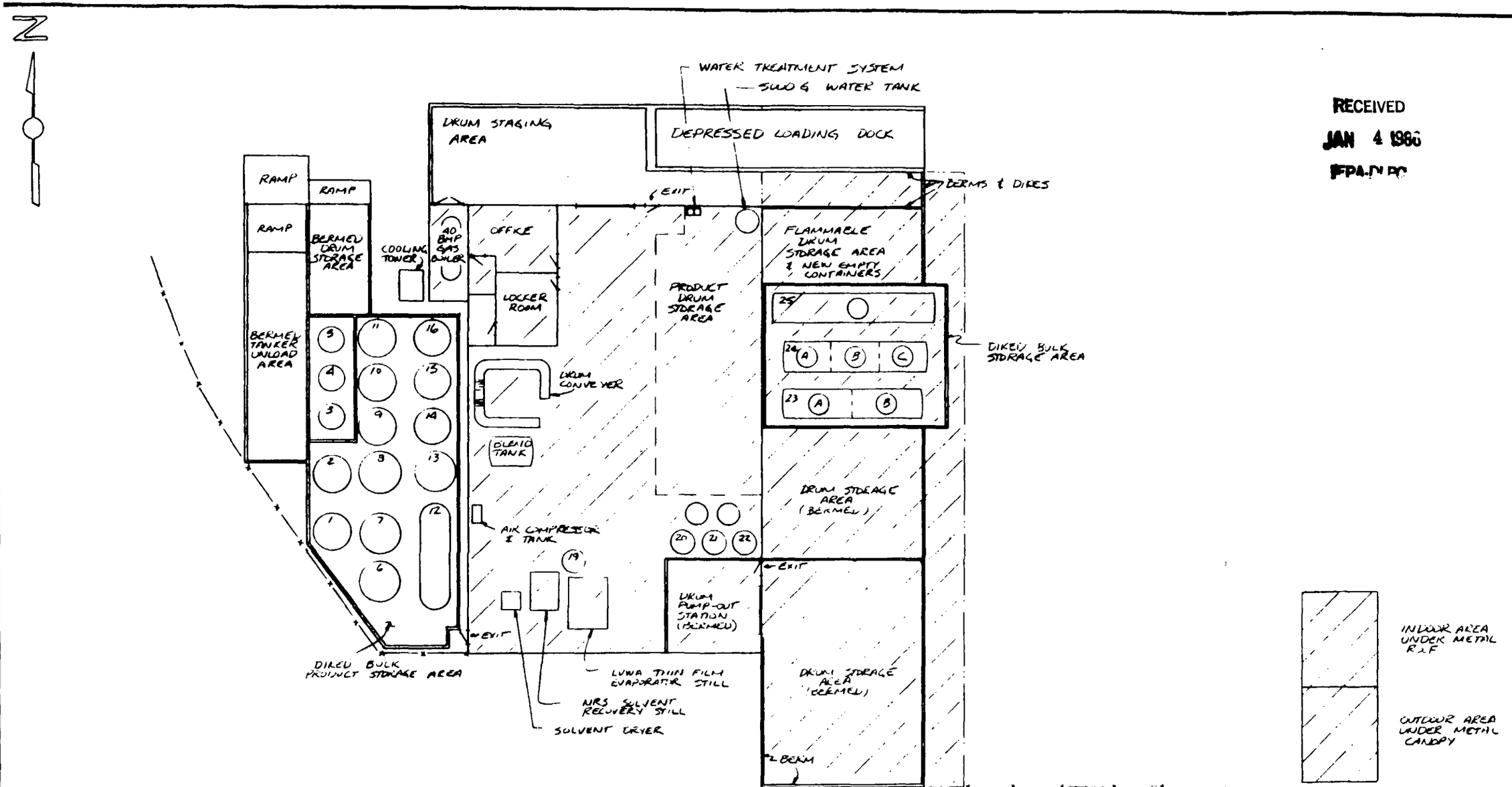
Due to certain scanning equipment capability limitations, the document page(s) is not available in SDMS.

Specify Type of Document(s) / Comments:

USGS TOPOGRAPHIC MAP

Document is available at the EPA Region 5 Records Center.

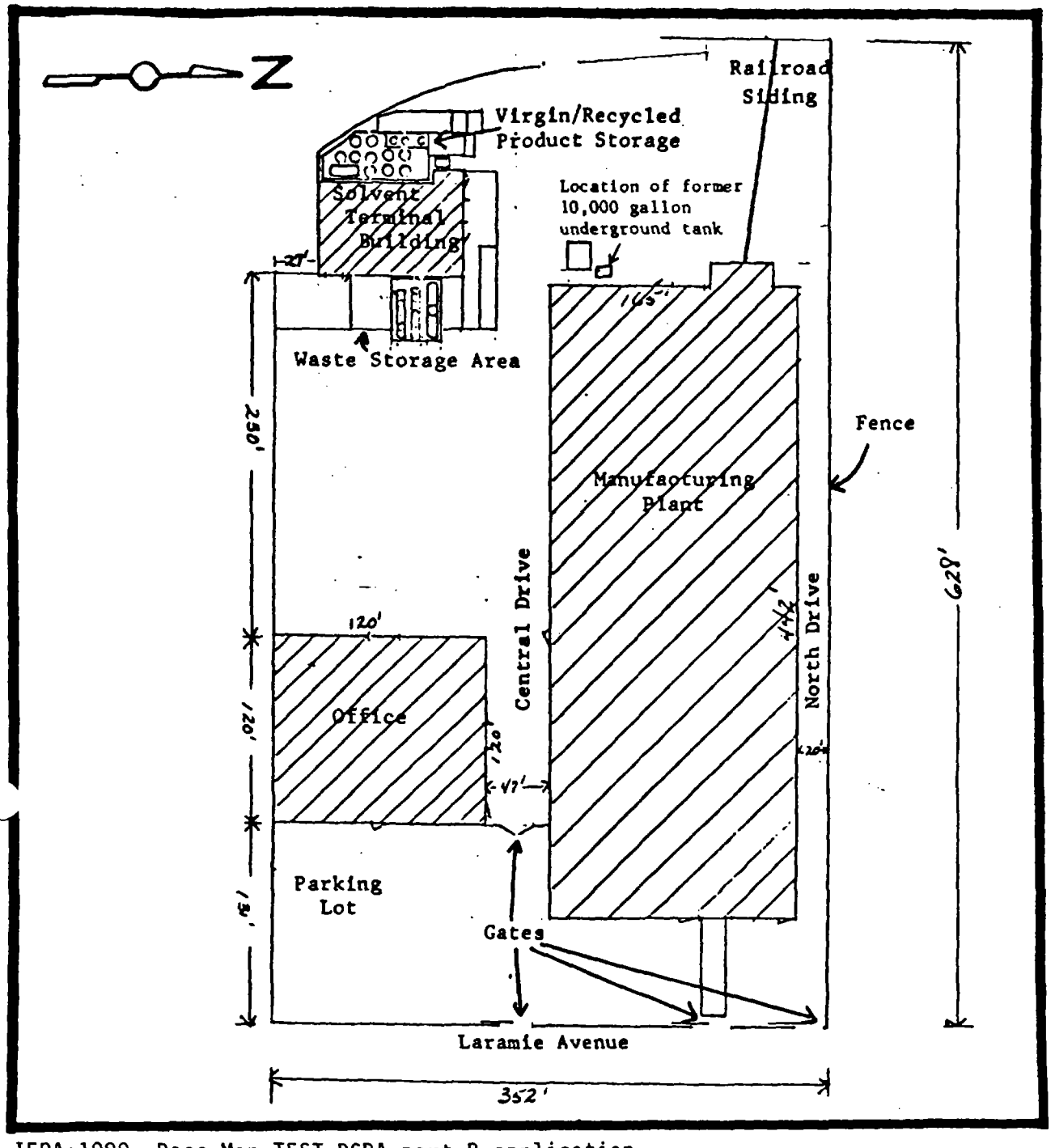
Specify Type of Document(s) / Comments:



RECEIVED
JAN 4 1986
FPA-DLPC

DRAWN FERD	BARON-BLAKESLEE CICERO, IL	JOB NO
CHECKED	SOLVENT BUILDING	SCALE 1" = 20'-0"
APPROVED	Baron·Blakeslee	DATE 12-12 88
APPROVED		DWG NO B-5

BISHOP GR... S ACCUPRESS
REORDER NO A30824



IEPA:1989.,Base Map TEST RCRA part B application

SITE MAP

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location:

Baron - Blakeslee

1634 South Laramie, Cicero, IL

Comments: Picture taken toward

View of the east side of

the Baron-Blakeslee building.

#1

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location: Baron-Blakeslee

1634 S. Laramie, Cicero, IL

Comments: Picture taken toward

Entrance (southside) to the

manufacturing building.

#2

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location:

Baron - Blakeslee

1634 South Laramie, Cicero, IL

Comments: Picture taken toward

Entrance (north side) to the

office building

#3

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location: Baron-Blakeslee

1634 S. Laramie, Cicero, IL

Comments: Picture taken toward

View to the south of the

virgin/recycled product storage

area

#4

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location:

Baron - Blakeslee

1634 South Laramie, Cicero, IL

Comments: Picture taken toward

View to the south of the

waste storage area

#5

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location: Baron-Blakeslee

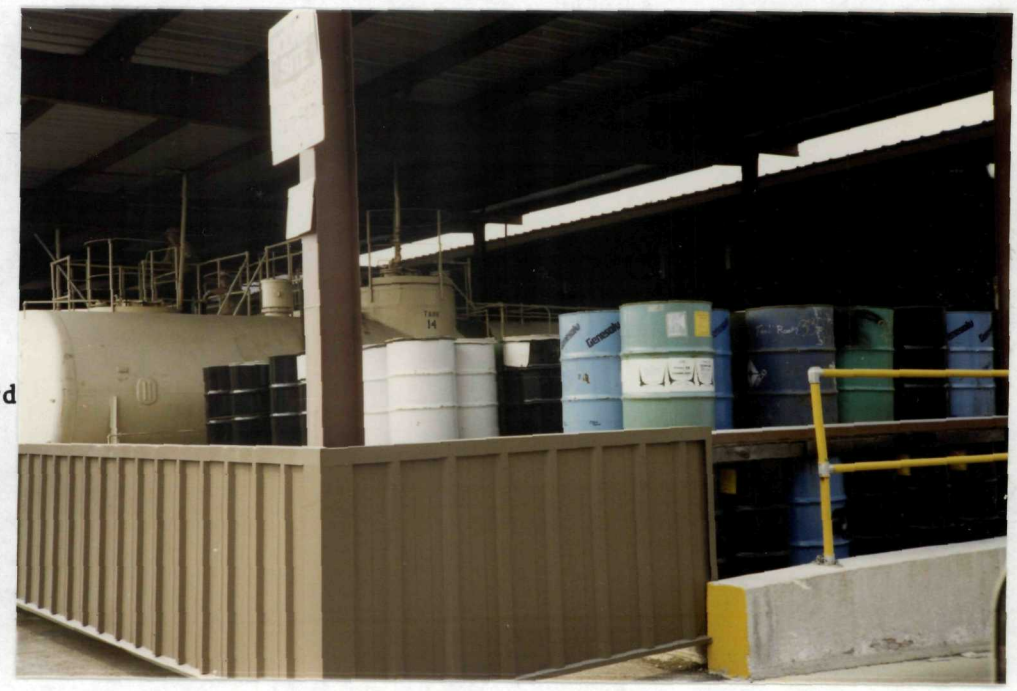
1634 S. Laramie, Cicero, IL

Comments: Picture taken toward

View to the southwest of the

solvent storage area

#6



DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location:

Baron - Blakeslee

1634 South Laramie, Cicero, IL

Comments: Picture taken toward

View of the solvent

storage area

#7

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location: Baron-Blakeslee

1634 S. Laramie, Cicero, IL

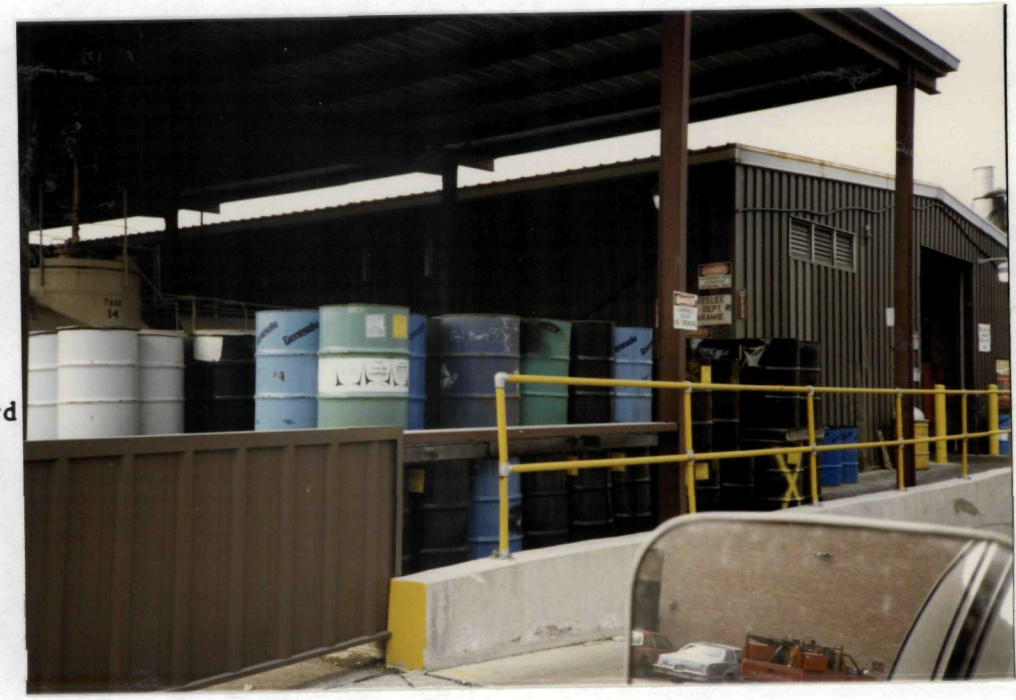
Comments: Picture taken toward

View to the southwest,

of the solvent storage

area

#8



DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location:

Baron - Blakeslee

1634 South Laramie, Cicero, IL

Comments: Picture taken toward

Drum storage north of

the solvent Terminal

Building

#9

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location: Baron-Blakeslee

1634 S. Laramie, Cicero, IL

Comments: Picture taken toward

View of the entrance (North

side) of the solvent

Terminal Building

#10

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

Location:

Baron - Blakeslee

1634 South Laramie, Cicero, IL

Comments: Picture taken toward

south entrance to the

the manufacturing building.

#11

DATE: August 29, 1989

TIME: 11:45 A.M.

Photograph by:

Gary L. Reside

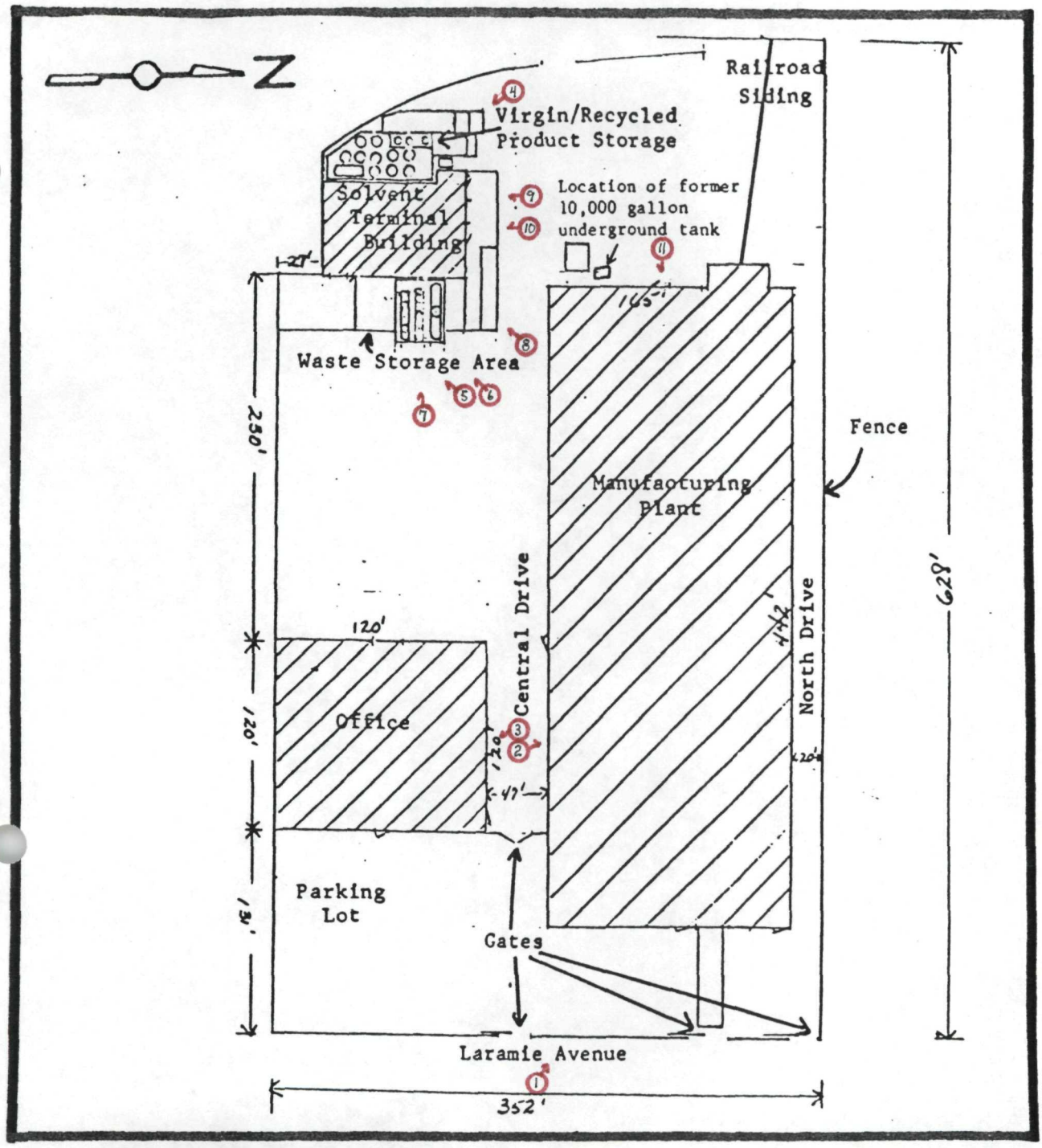
Location: Baron-Blakeslee

1634 S. Laramie, Cicero, IL

Comments: Picture taken toward

No

Photograph



IEPA:1989.,Base Map TEST RCRA part B application

PHOTOGRAPHIC LOCATION MAP

Supporting

Documentation

TABLE OF CONTENTS

Reference Number	Description
#1	Baron-Blakeslee RCRA part A permit.
#2	Material Health and Safety Bulletins for the Baron-Bldkeslee facility.

Material Safety Data Sheet

UNIROYAL

Uniroyal Chemical Company, Inc.
World Headquarters
Middlebury, CT 06749

UNIROYAL Emergency Phone: (203) 723-3670
CHEMTREC Transportation Emergency Phone: 1-800-424-93
SAFETY DATA Information (203) 573-3303

MSDS No. C210002 Date Issued: 9/12/85

IDENTIFICATION

Trade Name: NAUGARD® CHO

CAS Number: 286-20-4

Chemical Name: Cyclohexene oxide

Chemical Family: Epoxide

SPECIAL REGULATORY HAZARDS

Ingredient	CAS No.	Exposure Limit	OSHA (1910.1200)	EEC*
Product	286-20-4	ND	Flammable Mutagen Irritant Toxic	Flammable Mutagen Irritant Harmful

Hazard assessment based on available data.

Transportation: Flammable liquid; flammable liquid N.O.S.; UN 1993 (DOT)

PHYSICAL DATA

Appearance and Odor: Colorless liquid; pungent, offensive odor

Solubility: Insoluble in water
Soluble in most organic solvents

Melting Point: NA

Boiling Point: 266°F (130°C)

Other Data: Refractive index @ 30°C: 1.450

Specific Gravity (H_2O = 1): 0.967 @ 25°C

Vapor Pressure @ 20°C. ND

Vapor Density (Air = 1): ND

Volatility @ 70°F: 100%

FIRE AND EXPLOSION HAZARD DATA

Flash Point: 80.6°F (27°C) TOC

Autoignition Temp: 705°F Fire point

Extinguishing Media: Foam, dry chemical

Flammable Limits: LEL: 1.15, UEL: 12.36

Special Fire Fighting Procedures: Protect against inhalation of combustion products.

Unusual Hazards: Flammable liquid.

REACTIVITY DATA

Stability: Stable at ambient temperatures and pressures.

Incompatibility: Highly reactive with acid, bases and many organic compounds.

Decomposition Products: Oxides of carbon under burning conditions.

NA = Not Applicable ND = Not Determined *European Economic Community

Uniroyal makes no representation or warranty with respect to the information in this Material Safety Data Sheet. The information is however, as of this date provided, true and accurate to the best of Uniroyal's knowledge. This list of information is not intended to be all inclusive. Actual conditions of use and handling may require considerations of information other than, or in addition to, that which is provided herein.

SPECIAL PROTECTION INFORMATION

Engineering Controls: Local exhaust ventilation strongly recommended to minimize vapor exposure.

Personal Protection Equipment: Avoid all personal contact. Observe good personal hygiene. Impervious gloves and goggles should be worn when handling. In the absence of adequate ventilation, use NIOSH-certified respiratory protection for organic vapors.

STORAGE, SPILLS AND DISPOSAL INFORMATION

Storage: Store away from sources of direct heat and ignition sources. Keep containers closed when not in use. Ground during transfer operations. Store in a well-ventilated area.

Spills: Remove all sources of ignition. Absorb on inert material. Using non-sparking tools, shovel into secure containers for proper disposal. Use personal protective equipment as outlined above.

Disposal: In accordance with EPA/RCRA Regulations 40CFR 261.21 (a) (1), Ignitability D001.

Environmental Information: Environmental effects have not been determined.

HEALTH RELATED DATA

Specific Hazard(s): Toxic by dermal exposure. Moderately toxic by oral exposure. Contact with eyes will cause severe irritation. Inhalation of vapors can cause respiratory irritation. Experimental evidences suggest mutagenic potential.

Primary Route(s) of Entry: Inhalation, skin absorption.

First Aid Procedures: **Eye contact:** Flush with water for 15 minutes. Get medical attention.

Skin contact: Wash thoroughly with soap and water

Inhalation: Remove to fresh air.

Toxicology Information: **Oral toxicity:** LD50 (rats) - 1.05 g/kg

Dermal toxicity: LD50 (rabbits) - 0.6 g/kg

Inhalation toxicity: LC50 (rats, 4 hr.) - 2649 ppm

Irritation eye (rabbits) - severe

Mutagenicity: Ames *Salmonella* - positive

Chronic: The feeding to mice of up to 2200 ppm and rats of up to 600 ppm for two years did not produce an increased tumor incidence.

NIOSH reports that this material enhances the carcinogenicity of ethylene dibromode in rodents.

Please print or type in the unshaded areas only
(fill—in areas are spaced for elite type, i.e., 12 characters/inch).

REFERENCE NUMBER 1

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F 1 L D 0 5 1 9 3 7 0 6 8

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, at it in the designated space. Review the infor ation carefully; if any of it is incorrect, cr through it and enter the correct data in : appropriate fill—in area below. Also, if any the preprinted data is absent *(the area to : left of the label space lists the informac that should appear)*, please provide it in proper fill—in area(s) below. If the label complete and correct, you need not comp Items I, III, V, and VI *(except VI-B wh must be completed regardless)*. Complete items if no label has been provided. Refer the instructions for detailed item desc tions and for the legal authorizations un which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold—faced terms.

SPECIFIC QUESTIONS	MARK "X" YES	MARK "X" NO	MARK "X" FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a discharge to waters of the U.S.? (FORM 2A)		X	
B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X	
D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	X		X
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP BARON-BLAKESLEE DIV of ALLIED-SIGNAL INC

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 NELSON-FRED TERMINAL SUP.	312 450 3900

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 2001 N. JANICE AVE

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 MELROSE PARK	IL	60160

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 1634 SOUTH LARAMIE AVE

B. COUNTY NAME

COOK

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 CICERO	IL	60650	

CONTINUED FROM THE FRONT

VII. SIC CODES *(4-digit, in order of priority)*

A. FIRST	B. SECOND
7 5161 (specify) Wholesaler of Chemicals	7 (specify)
C. THIRD	**D. FOURTH**
7 (specify)	7 (specify)

VIII. OPERATOR INFORMATION

A. NAME: 8 BARON-BLAKESLEE DIV OF ALLIED SIGNAL, INC

B. Is the name listed in Item VIII-A also the owner? [X] YES [ ] NO

C. STATUS OF OPERATOR *(Enter the appropriate letter into the answer box; if "Other", specify.)*
F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC *(other than federal or state)*
O = OTHER *(specify)*

P (specify)

D. PHONE *(area code & no.)*: A 312 450 3900

E. STREET OR P.O. BOX: 2001 N JANICE AVENUE

F. CITY OR TOWN: 8 MELROSE PARK

G. STATE: IL

H. ZIP CODE: 60160

IX. INDIAN LAND
Is the facility located on Indian lands? [ ] YES [X] NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES *(Discharges to Surface Water)*: 9 N	D. PSD *(Air Emissions from Proposed Sources)*: 9 P
B. UIC *(Underground Injection of Fluids)*: 9 U	E. OTHER *(specify)*: 9 00139 (specify) 111. Waste Hauler's Permit
C. RCRA *(Hazardous Wastes)*: 9 R	E. OTHER *(specify)*: 9 1981-33-OP (specify) 111. Hazardous Waste Permit

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS *(provide a brief description)*

Manufacturing of Vapor cleaning/Carbon Adsorption Equipment.
Distribution/Recycling of cleaning solvents.

XIII. CERTIFICATION *(see instructions)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE *(type or print)*	B. SIGNATURE	C. DATE SIGNED
A. J. Cipolla Manager - Baron-Blakeslee Operations	A. J. Cipolla	9-23-88

COMMENTS FOR OFFICIAL USE ONLY

C

Continued from the front.

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. **EPA HAZARDOUS WASTE NUMBER** – Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. **ESTIMATED ANNUAL QUANTITY** – For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non–listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. **UNIT OF MEASURE** – For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. **PROCESSES**

1. PROCESS CODES:
   For listed hazardous waste: For each listed hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item II to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				*included with above*

 CONTINUE ON PAGE

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-S80004

FORM 3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
HAZARDOUS WASTE PERMIT APPLICATION
Consolidated Permits Program
(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

F | I L D 0 5 1 9 3 7 0 6 8

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facilit EPA I.D. Number in Item I above.

A. FIRST APPLICATION (place an "X" below and provide the appropriate date)

☐ 1. EXISTING FACILITY (See instructions for definition of "existing" facility. Complete item below.)

☐ 2. NEW FACILITY (Complete item below.)

C 8 | YR. | MO. | DAY | FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)

| YR. | MO. | DAY | FOR NEW FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BE

B. REVISED APPLICATION (place an "X" below and complete Item I above)

X 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.
1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER (barrel, drum, etc.)	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER (Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C | DUP | T/A C | 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6		RECEIVED		
1	S 0 1	35,550	G		7		JAN 4 1986		
2	S 0 2	20,000	G		8		IEPA-DLPC		
3					9				
4					10				

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. *(enter from page 1)*

F 1 L D 0 5 1 9 3 7 0 6 8 T/A 6

See B-1, B-5, D-1

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground—level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
41 51 260	087 45 190

VIII. FACILITY OWNER

[X] A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*
E	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
A. J. Cipolla Manager - Baron-Blakeslee Operations	AJ Cipolla	9-23-88

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
A. J. Cipolla Manager - Baron-Blakeslee Operations	AJ Cipolla	9-23-88

CONTINUE ON PAGE 5

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	FOR OFFICIAL USE ONLY
W L D 0 5 1 9 3 7 0 6 8 1	W DUP 2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
1	F001	8,000,000	P	S01 S02	
2	F002	4,000,000	P	S01 S02	
3	F003	50,000	P	S01	
4	F005	50,000	P	S01	
5	D001	2,000,000	P	S01 S02	
6	U210	100,000	P	S01 S02	
7	U226	100,000	P	S01 S02	
8	U228	100,000	P	S01 S02	
9	U080	100,000	P	S01 S02	
10	D007	12,000	P	S01	
11					
12					
13					
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24					
25					
26					

union

REFERENCE NUMBER 2

MATERIAL HEALTH AND SAFETY BULLETIN

Union Chemicals Division
Petrochemical Group

3
1 0

UCD No.: 841

Product Code No.: 5450

CAS# 67-64-1

UN No. 1090

MANUFACTURER'S NAME Union Chemicals Division, Union Oil Company of California	
STREET ADDRESS 1345 North Meacham Road	
CITY, STATE, AND ZIP CODE Schaumburg, Illinois 60196	Business Phone: (312) 885-5450
EMERGENCY TELEPHONE NO. Transportation Emergencies call CHEMTREC (800) 424-9300 Health Emergencies Call Los Angeles Poison Control Center (24 hours) (213) 664-2121	

PRODUCT: Acetone COMMON NAME: AMSCO Solv 5450 GENERIC NAME: Volatile solvent CHEMICAL NAME: Acetone CHEMICAL FAMILY: Oxygenated hydrocarbon DOT PROPER SHIPPING NAME: Acetone	WARNING STATEMENT: Danger extremely flammable Induce vomiting if swallowed For inducstrial use only

Section I - - INGREDIENTS

	TLV*		TLV*
Acetone 41	1000		

*Threshold Limit Value A. OSHA [X] B. ACGIH [ ] C. See Section III [ ] D. Other [ ]

Section II - - EMERGENCY AND FIRST AID PROCEDURES

EMERGENCY: Have a physician call LOS ANGELES POISON CONTROL CENTER (24 hrs.) 213/664-2121

Eye Contact	If this product comes in contact with the eyes, flush with large quantities of water for at least 15 minutes.
Skin Contact	If this product comes in contact with the skin, wash with large quantities of water and seek medical attention if irritation from contact persists.
Inhalation	If breathing difficulties, dizziness, or lightheadedness occur when working in areas with high vapor concentrations, victim should seek air free of vapors. If breathing stops, begin artificial respiration and seek immediate medical attention.
Ingestion	If this product is swallowed, induce vomiting if the victim is conscious. Seek immediate medical advice and/or attention.

Section III - - PHYSIOLOGICAL EFFECTS AND HEALTH INFORMATION

Eye Effects	This product may be an eye irritant.
Skin Effects	This product may cause skin irritation upon prolonged or repeated contact.
Systemic Effects	Various studies have shown a possible association with exposure to this product and the following: Narcosis in high concentration. Absorption through the intact skin.

Section IV - - SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type)	The use of respiratory protection depends on vapor concentration above the time-weighted TLV; use a NIOSH approved cartridge respirator or gas mask.
Ventilation	General mechanical ventilation may be sufficient to keep product vapor concentrations within specified time-weighted TLV ranges. If general ventilation proves inadequate to maintain safe vapor concentrations, supplemental local exhaust may be required. Other special precautions such as respiratory masks or environmental containment devices may be required in extreme cases.

Protective Gloves	The use of impermeable gloves is advised to prevent skin irritation in sensitive individuals.	Eye Protection	Safety glasses, chemical goggles and/or face shields are recommended to safeguard against potential eye contact, irritation, or injury.

Other Protective Equipment	Impermeable aprons are advised when working with this product. The availability of eye washes and safety showers in work areas is recommended.

Section V - - REACTIVITY DATA

Stability	Unstable		Conditions to Avoid:
	Stable	X	
Incompatibility (Materials to Avoid)	This product is incompatible with strong oxidizing agents and strong acids or bases.		
Hazardous Decomposition Products	Thermal decomposition in the presence of air may yield carbon monoxide and/or carbon dioxide.		
Hazardous Polymerization	May Occur		Conditions to Avoid:
	Will Not Occur	X	

Section VI - - SPILL OR LEAK PROCEDURES

HIGHWAY OR RAILWAY SPILLS - CALL CHEMTREC 800/424-9300

Precautions In Case of Release or Spill	Keep sources of ignition and hot metal surfaces isolated from the spill. Flush spilled material into suitable retaining areas or containers with large quantities of water. Small amounts of spilled material may be absorbed into an appropriate absorbant.
Reportable Quantity	Notify Coast Guard National Response Center; Phone No. 800-424-8802, If Spill Is Greater Than ___ lbs (Kilograms)
Waste Disposal Method	Dispose of this product in accordance with applicable local, county, state and federal regulations.

Section VII - - STORAGE AND SPECIAL PRECAUTIONS

Handling and Storing Precautions	Keep product containers cool, dry, and away from sources of ignition. Use and store this product with adequate ventilation. (See Section IV)
Other Precautions	Personnel should avoid inhalation of vapors. (See sections I, II, III, V, VI) Personal contact with the product should be avoided. Should contact be made, remove saturated clothing and flush affected areas with water. (See sections II, IV, VI)

Section VIII - - FIRE AND EXPLOSION HAZARD DATA

DOT Flammability Classification	Flammable Liquid	Flash Point Range: ☒ Below 20° F, ☐ 20° F - 100° F ☐ 100° F - 200° F ☐ Over 200° F ☐ None to boiling
Extinguishing Media	Use foam, CO_2 or dry chemical fire fighting apparatus.	
Unusual Fire and Explosion Hazards	Keep work areas free of hot metal surfaces and other sources of ignition.	
Fire Fighting Procedures	The use of self-contained breathing apparatus is recommended for fire fighters. Water may be unsuitable as an extinguishing media, but helpful in keeping adjacent containers cool. Avoid spreading burning liquid with water used for cooling purporses.	

Section IX - - PHYSICAL DATA

Approximate Boiling Range, ° F	133°F	Vapor Density: ☒ Heavier ☐ Lighter Than Air	
Evaporation Rate: ☐ Faster ☒ Slower Than Ether		Percent Volatile: 100%	Solubility in Water: 100%
Specific Gravity: ☒ Lighter ☐ Heavier Than Water		Weight per Gallon: 6.59	
Appearance and Odor:	This product is clear, has little if any color and has a characteristic odor.		

Section X - - DOCUMENTARY INFORMATION

Product Code No.	5450	Issue Date Revised 9/25/84 10/23/80	Prepared By Paul Pfeifer
Replaces: UCD No.		Product Code No.	Issued
Reviewed By	J. Potter	Manager, Loss Prevention	
Reviewed By:	Rainer Beck	Director of Occupational Health & Toxicology	
Reviewed By:	[illegible]	Science and Technology Division	

The above information is believed to be correct as of the date hereof. However, no warranty of merchantability, fitness for any use, or any other warranty is expressed or is to be implied regarding the accuracy of these data, the results to be obtained from the use of the material, or the hazards connected with such use. Since the information contained herein 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 responsibility for the results of its use. This information is furnished on the condition that the person receiving it shall make his own determination as to the suitability of the material for his particular purpose and on the condition that he assume the risk of his use thereof.

MATERIAL SAFETY DATA SHEET

(Approved by U.S. Department of Labor "Essentially Similar" to Form LSB-OOS-4)

UNION CARBIDE

D L Donahue

CHEMICAL NAME: ANHYDROL® SOLVENT SPECIAL, PM 4083

SYNONYMS: —— CHEMICAL FAMILY: Alcohols-Ketone Mixture

FORMULA: —— MOLECULAR WEIGHT: ——

TRADE NAME AND SYNONYMS: ANHYDROL Special 200, PM 4083 (Government Form AM)

I. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	77-80°C. (170-176°F.)	FREEZING POINT	-100°C.
SPECIFIC GRAVITY (H_2O = 1)	0.7919 at 20/20°C.	VAPOR PRESSURE AT 20°C.	56 mm. Hg
VAPOR DENSITY (air = 1)	1.6	SOLUBILITY IN WATER, % by wt. at 20°C.	Complete
PER CENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl Acetate = 1)	4.0
APPEARANCE AND ODOR	White-white liquid; mild odor.		

II. HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (Units)
Ethanol (Ethyl Alcohol)	90	1,000 ACGIH OSHA
Methanol (Methyl Alcohol)	9	200 (skin) ACGIH OSHA
Hexone	~ 1	100 ACGIH OSHA
(See Sections III through VIII)		

III. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	58°F., closed cup	AUTOIGNITION TEMPERATURE	390°C. (734°F.) ASTM D 286		
FLAMMABLE LIMITS IN AIR, % by volume		LOWER	3.3 (ethanol)	UPPER	19 (ethanol)

EXTINGUISHING MEDIA	Use carbon dioxide or dry chemical for small fires. Use foam (alcohol, polymer, or ordinary) for large fires. Addition of water (fog) will aid in reducing burning rate.
SPECIAL FIRE FIGHTING PROCEDURES	None
UNUSUAL FIRE AND EXPLOSION HAZARDS	None

TECHNICAL PETROLEUM CO.
6233 N. PULASKI ROAD
CHICAGO, ILL. 60646

EMERGENCY PHONE NUMBER

304/744-3487

This number is available days, nights, weekends, and holidays.

While Union Carbide Corporation believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of the tests conducted, the data are not to be taken as a warranty or representation for which Union Carbide Corporation assumes legal responsibility. They are offered solely for your consideration, investigation, and verification. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

IV. HEALTH HAZARD DATA

HRESHOLD LIMIT VALUE	See Section II. All values are from ACGIH (1975) or OSHA – CFR 29 § 1000 G 1.
ECTS OF OVEREXPOSURE	Vapors may cause dizziness and drowsiness.
MERGENCY AND FIRST ID PROCEDURES	If swallowed, induce vomiting at once and call a physician. If inhaled, remove to fresh air. Flush skin and eye contact with water.

V. REACTIVITY DATA

STABILITY			
UNSTABLE	STABLE	CONDITIONS TO AVOID	Avoid heat, sparks, and open flames.
--	√		

COMPATIBILITY (Materials to avoid)	None
HAZARDOUS DECOMPOSITION PRODUCTS	Thermal decomposition or burning may produce carbon monoxide and/or carbon dioxide.

HAZARDOUS POLYMERIZATION			
May Occur	Will not Occur	CONDITIONS TO AVOID	None
--	√		

VI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Eliminate all sources of ignition. Small spills should be flushed with large quantities of water. Larger spills should be collected for disposal.
WASTE DISPOSAL METHOD	Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations.

VII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)		Air-supplied mask in confined areas		
VENTILATION	LOCAL EXHAUST	Preferred	SPECIAL	--
	MECHANICAL (general)	Required	OTHER	--
PROTECTIVE GLOVES		Plastic	EYE PROTECTION	Coverall goggles
OTHER PROTECTIVE EQUIPMENT		Eye bath and safety shower		

VIII SPECIAL PRECAUTIONS

PRECAUTIONARY LABELING	ANHYDROL® SOLVENT SPECIAL denatured ethyl alcohol mixture DANGER! FLAMMABLE MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED PROLONGED OR REPEATED BREATHING OF VAPOR HARMFUL Keep away from heat, sparks, and open flame. Keep container closed. Use with adequate ventilation. POISON CONTAINS METHANOL CANNOT BE MADE NON-POISONOUS CALL A PHYSICIAN FIRST AID: If swallowed, give a tablespoonful of salt in a glass of warm water and repeat until vomit fluid is clear. Give two teaspoonsful of baking soda in a glass of water. Have patient lie down and keep warm. FOR INDUSTRY USE ONLY
OTHER HANDLING AND STORAGE CONDITIONS	—

COOL-PHOS® SOLUTION.

No Reactivity Hazard

0

Slightly Combustible

1

Moderate Health Hazard

2

Ratings based on NIOSH "Identification System for Occupationally Hazardous Materials" (1974)

Metal Coatings Division
Diamond Shamrock Corporation
P O Box 127
Chardon, Ohio 44024
216/946-2064

Diamond Shamrock

Material Safety

Distributed by:
Baron-Blakeslee
2001 N. Janice Avenue
Melrose Park, IL 60160

GENERAL INFORMATION COOL-PHOS® SOLUTION L is a clear, colorless to light pink, nonflammable liquid with an ether-like odor

Data Sheet

463-A

I PRODUCT IDENTIFICATION

MANUFACTURER'S NAME DIAMOND SHAMROCK CORPORATION	REGULAR TELEPHONE NO EMERGENCY TELEPHONE NO — Contact Local Sales Office
ADDRESS 275 Industrial Parkway, Chardon, Ohio 44024	201-455-2000
TRADE NAME COOL-PHOS® SOLUTION L	
SYNONYMS Methylene Chloride - Alcohol Blend (CH_2Cl_2/CH_3OH)	

II HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	%	HAZARD DATA
METHYLENE CHLORIDE	93	PEL* = 500 ppm (8-hr. TWA)
AQUEOUS METHANOL	7	PEL* = 200 ppm (8-hr. TWA)
*OSHA Permissible Exposure Limit (PEL)		

III PHYSICAL DATA

BOILING POINT, 760 MM HG 38.3°C (101°F)	MELTING POINT	FREEZING POINT -96°C (-142°F)
SPECIFIC GRAVITY (H_2O=1) 1.27	VAPOR PRESSURE 385 mm Hg @ 20°C	
VAPOR DENSITY (AIR=1) 2.82	SOLUBILITY IN H_2O % BY WT Moderate	
% VOLATILES BY VOL. 100	EVAPORATION RATE (Ether = 1) Less than 1	
APPEARANCE AND ODOR Clear, colorless to light pink liquid with an ether-like odor.		
pH Not applicable		

EC-S-68b

All information recommendations and suggestions appearing herein concerning our product are based upon tests and data believed to be reliable however, it is the user's responsibility to determine the safety toxicity and suitability for his own use of the product described herein Since the actual use by others is beyond our control no guarantee expressed or implied is made by Diamond Shamrock Corporation as to the effects of such use the results to be obtained or the safety and toxicity of the product nor does Diamond Shamrock Corporation assume any liability arising out of use by others of the product referred to herein Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations

Data Sheet

IV FIRE AND EXPLOSION DATA

FLASH POINT (TEST METHOD)	AUTOIGNITION TEMPERATURE
None (TCC)	470°C (878°F)

FLAMMABLE LIMITS IN AIR, % BY VOL @ 25°C (77°F)	LOWER	UPPER
	14	25

EXTINGUISHING MEDIA

Fires involving COOL-PHOS® SOLUTION L are unlikely but, should one occur, it maybe controlled by carbon dioxide, dry chemicals, or water fog.

SPECIAL FIRE FIGHTING PROCEDURES

Self-contained breathing apparatus should be provided for firefighters in buildings or confined areas where COOL-PHOS® SOLUTION L is stored. Storage containers exposed to fires should be kept cool with a water spray in order to prevent pressure buildup.

UNUSUAL FIRE AND EXPLOSION HAZARD

COOL-PHOS® SOLUTION L is nonflammable and nonexplosive under normal conditions of use. At high temperatures, COOL-PHOS® SOLUTION L decomposes to give off hydrochloric acid gas plus other toxic and irritating vapors such as phosgene. If storage containers are exposed to excessive heat, overpressurization of the containers can result.

V HEALTH HAZARD INFORMATION

HEALTH HAZARD DATA

OSHA Standard - Methylene Chloride: PEL = 500 ppm (8-hour TWA)
Alcohol PEL = 200 ppm (8-hour TWA)

ROUTES OF EXPOSURE

INHALATION

Irritates respiratory tract.

SKIN CONTACT

Mildly irritating to skin. Skin contact with COOL-PHOS® SOLUTION L may produce a burning sensation. Prolonged or repeated contact may cause skin to become rough, red, and dry due to the removal of natural oils and may result in dermatitis.

SKIN ABSORPTION

COOL-PHOS® SOLUTION L is rapidly absorbed through the skin.

EYE CONTACT

An irritant of the eyes, causing pain, lacrimation, and general inflammation.

INGESTION

In industrial environments, ingestion is unlikely but, if ingested, it can irritate the gastrointestinal tract. It could produce chemical pneumonia if vomiting results in aspiration into the lungs. It may ultimately result in unconsciousness and even death.

EFFECTS OF OVEREXPOSURE

ACUTE OVEREXPOSURE Inhalation of vapors can cause headache, dizziness and stupor, nausea, and vomiting. Severe overexposure may cause muscular incoordination, unconsciousness, and death.

CHRONIC OVEREXPOSURE

Can cause headache, mental confusion, depression, fatigue, loss of appetite, nausea, vomiting, cough, loss of sense of balance and visual disturbances. Prolonged or repeated skin contact may cause dermatitis.

EMERGENCY AND FIRST AID PROCEDURES **Object is to Seek Medical Attention Immediately**

EYES Immediately flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire eye surface. Seek medical attention immediately.

SKIN Wash contaminated areas with soap and water. A soothing ointment may be applied to irritated skin after cleansing. Remove contaminated clothing and footwear and wash clothing before reuse. Discard footwear which cannot be decontaminated. Seek medical attention

INHALATION

Get person out of contaminated area to fresh air. If breathing has stopped, artificial respiration should be started. Oxygen may be administered, if readily available. Seek medical attention immediately.

INGESTION

If swallowed, DO NOT induce vomiting. If vomiting occurs spontaneously, position individual's head to keep airway clear. Never give anything by mouth to an unconscious person. Seek medical attention immediately.

NOTES TO PHYSICIAN

COOL-PHOS® SOLUTION L overexposure can produce elevated carboxyhemoglobin levels.

Data Sheet

VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Under normal conditions of use COOL-PHOS® SOLUTION L is stable.

INCOMPATIBILITY

Avoid contacting COOL-PHOS® SOLUTION L with pure oxygen, oxidizers, alkali metals, open flames, and electrical arcs.

HAZARDOUS DECOMPOSITION PRODUCTS

At high temperatures, COOL-PHOS® SOLUTION L decomposes to give off hydrogen chloride vapor and small quantities of other toxic and irritating vapors such as phosgene.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION

NONE

VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Leaks should be stopped. Spills should be cleaned up immediately. Large spills should be contained and removed by vacuum truck. Smaller spills may be soaked up with absorbent materials, which should be placed in closed containers, labeled, and stored in a safe place out of doors to await proper disposal. Persons performing this work should wear adequate personal protective equipment and clothing.

NEUTRALIZING CHEMICALS

NONE

WASTE DISPOSAL METHOD

Dispose in accordance with all federal, state and local health and pollution regulations. COOL-PHOS® SOLUTION L is normally recovered from residues by distillation. Small quantities may be disposed via an incineration-scrubber system or a licensed waste hauler. If regulations permit, wet absorbent materials may be air dried in a safe open.unoccupied area.

VIII INDUSTRIAL HYGIENE CONTROL MEASURES

VENTILATION REQUIREMENTS

Work areas employing COOL-PHOS® SOLUTION L should be isolated and contained, and provided with adequate local exhaust ventilation to maintain the air concentration of Methylene Chloride below 500 ppm (8 hour TWA) and of Alcohol below 200 ppm (8 hour TWA) as required by OSHA.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY (SPECIFY IN DETAIL)

Self-contained breathing apparatus (compressed oxygen should not be used in tanks or other confined spaces), positive-pressure hose mask, air-lined masks, and NIOSH-approved industrial canister-type gas masks (concentration not exceeding 2% by volume used for short periods of exposure only) are acceptable

EYE

Chemical safety goggles and plastic face shield should be worn when there is danger of splashing. Spectacle-type glasses do not provide satisfactory protection.

GLOVES

Gloves of polyvinyl alcohol or other solvent-resistant materials should be worn to minimize skin contact.

OTHER CLOTHING AND EQUIPMENT

Hard hats, chemical-resistant safety shoes, and plastic apron should be worn when handling COOL-PHOS® SOLUTION L. Eye bath and safety shower should be provided in all areas in which COOL-PHOS® SOLUTION L is used and/or handled.

Data Sheet

IX SPECIAL PRECAUTIONS

PRECAUTIONARY STATEMENTS

WARNING!
VOLATILE SOLVENT
HARMFUL IF INHALED

Causes irritation of the eyes, skin, and respiratory tract.
Prolonged breathing of vapor can cause loss of consciousness and may result in death.
DO NOT get in eyes, on skin, on clothing.
DO NOT take internally.
Avoid breathing vapors.
Use with adequate ventilation.
Employ respiratory protection when overexposed to vapors.
When handling, wear chemical splash goggles, protective clothing, and solvent-resistant gloves.
Wash thoroughly after handling.
Avoid contact with flame, hot glowing surfaces, or alkali metals to prevent decomposition resulting in toxic and irritating vapors.
Keep container tightly closed.
Store in a cool, ventilated place.

First Aid:
In case of contact,
For eyes: Immediately flush with plenty of water for at least 15 minutes, holding eyelids apart to ensure flushing of the entire eye surface. **Seek medical attention immediately.**

For skin: Wash with plenty of soap and water. A soothing ointment may be applied to irritated skin after cleansing. Remove contaminated clothing and footwear and wash clothing before reuse. Discard footwear which cannot be decontaminated. **Seek medical attention.**

Inhalation: Get person out of contaminated area to fresh air. If breathing has stopped artificial respiration should be started. Oxygen may be administered, if available. **Seek medical attention immediately.**

Ingestion: If swallowed. DO NOT induce vomiting. If vomiting occurs spontaneously, position individual's head to keep airway clear. NEVER give anything by mouth to an unconscious person. **Seek medical attention immediately.**

Note to Physician: COOL-PHOS® SOLUTION L overexposure can produce elevated carboxyhemoglobin levels.

For Fire: Use CO_2, dry chemicals, or water fog.

Spill or Leak: Leaks should be stopped. Spills should be cleaned up immediately. Large spills, should be contained and removed by vacuum truck. Smaller spills may be soaked up with absorbent materials, which should be placed in closed containers, labeled, and stored in a safe place out of doors to await proper disposal. Persons performing this work should wear adequate personal protective equipment and clothing.

For Industrial Use Only

OTHER HANDLING AND STORAGE REQUIREMENTS

Under normal conditions, COOL-PHOS® SOLUTION L may be stored satisfactorily in galvanized iron; black iron or steel. Aluminum is not generally recommended for storage or handling. Store drums in a cool place, bung up and closed tightly. Ventilation should be provided. Do not store in pits, depressions, basements or unventilated areas. All tanks should have a top and bottom manhold and a vent of a diameter at least equal to that of the fill or discharge pipe. Vent indoor tanks outside in a location such that escaping vapor will not contaminate any work space air. Vertical tanks should be of the closed top design. Normally, a dryer and safety seal on the vent is recommended.

DEPARTMENT OF TRANSPORTATION INFORMATION
PROPER SHIPPING NAME: METHYLENE CHLORIDE* OR DICHLOROMETHANE*
HAZARD CLASS: ORM-A*

*Regulated Only for Air Transportation

PREPARED BY: DIAMOND SHAMROCK CORPORATION
Technical Service Group

DATE: April 1, 1980

Distributed by:
Pro-Blakeslee
N. Janice Avenue
Park, IL 60160
(312) 450-3900

MATERIAL SAFETY DATA SHEET

MSDS NUMBER: M1538

PRODUCT NAME: **COOL PHOS® SOLUTION S-2**

METAL COATINGS INTERNATIONAL

MSDS DATE: NOVEMBER 1, 1985

24 HOUR EMERGENCY PHONE: (214) 922-2700

I. PRODUCT IDENTIFICATION

2 HEALTH HAZARD, 2 FIRE HAZARD, & 0 REACTIVITY rating based on NIOSH "Identification System for Occupationally Hazardous Materials" (1974)

MANUFACTURER'S NAME AND ADDRESS: Metal Coatings International Inc., 275 Industrial Parkway, P.O. Box 127, Chardon, Ohio 44024

CHEMICAL NAME: N/A CAS NUMBER: N/A

SYNONYMS/COMMON NAMES: None.

CHEMICAL FORMULA: N/A

DOT PROPER SHIPPING NAME: ORM-A NOS

DOT HAZARD CLASS: ORM-A

DOT I.D. NUMBER: NA1693 DOT HAZARDOUS SUBSTANCE: NA

II. HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	HAZARD DATA	CAS NUMBER	%
Proprietary blend of methylene chloride	PEL = 500ppm 8hr TWA PEL = 1000ppm ceiling TLV = 100ppm 8hr TWA	75-09-2	>95
methanol	PEL = 200ppm 8hr TWA TLV = 200ppm 8hr TWA (skin)	67-56-1	
substituted amine	PEL = 10ppm 8hr TWA (skin)	NA	
stabilizers and water	N/A	NA	<5

The materials in this product are listed on the TSCA Inventory.

III. PHYSICAL DATA

BOILING POINT @ 760 mm Hg: 38.3°C or 101°F

VAPOR DENSITY (Air=1): 2.1 FREEZING POINT: ~-100°F

VAPOR PRESSURE: ~250 mm Hg @ 20°C EVAPORATION RATE (BuAc=1): <1

DENSITY AT 20°C: 1.09

SPECIFIC GRAVITY (H_2O=1): 1.09 @ 20°C (68°F)

SOLUBILITY IN H_2O % BY WT: ~50%

% VOLATILES BY VOL.: 100

APPEARANCE AND ODOR: Clear pink to red non-flammable liquid with an ether-like odor at concentrations over 100 ppm

pH: NA

CAS = Chemical Abstract Service Number
PEL = OSHA Permissible Exposure Limit
TLV = TLV®, ACGIH Threshold Limit Value, Current
NA = No relevant information found or not available
NA = Not Applicable

Metal Coatings International

This Material Safety Data Sheet was prepared in accordance with 29 CFR 1910.1200. All information, recommendations and suggestions appearing herein concerning our product are based upon tests and data believed to be reliable, however, it is the user's responsibility to determine the safety, toxicity and suitability for his own use of the product described herein. Since the actual use by others is beyond our control, no guarantee expressed or implied is made by Metal Coatings International as to the effects of such use, the results to be obtained, or the safety and toxicity of the product; nor does Metal Coatings International assume any liability arising out of use by others of the product referred to herein. Nor is the information herein to be construed as absolutely complete since additional information may be necessary or desirable when particular or exceptional conditions or circumstances exist or because of applicable laws or government regulations.

IV. FIRE AND EXPLOSION DATA

FLASH POINT: No flash to boil (TCC) AUTOIGNITION TEMPERATURE: 450°C

FLAMMABLE LIMITS IN AIR, % BY VOLUME- UPPER: 36.5 LOWER: 8

EXTINGUISHING MEDIA:
Use water spray, dry chemical, alcohol foam or carbon dioxide.

SPECIAL FIRE FIGHTING PROCEDURES:
Pressure-demand, self-contained breathing apparatus should be provided for fire fighters in buildings or confined areas where product is stored. Storage containers exposed to fire should be kept cool with water spray.

UNUSUAL FIRE AND EXPLOSION HAZARD:
This product may become flammable after evaporation of 20% by volume. Reasonable precautions, proper type and arrangement of equipment, care in handling of material and adequate ventilation will keep the fire hazard from becoming acute. At high temperatures, hydrochloric acid plus other toxic and irritating vapor such as phosgene can be given off. If storage containers are exposed to excessive heat, over-pressurization of the containers can result.

V. HEALTH HAZARD INFORMATION

HEALTH HAZARD DATA:

Methylene Chloride:	Acute Oral	LD_{50} = 1-2g/kg	(rat)
	Acute Dermal	LD_{LO} = 2g/kg	(rabbit)
Methanol:	Acute Oral	LD_{50} = 13g/kg	(rat)
	Acute Dermal	LD_{50} = 20g/kg	(rabbit)

A 1985 NTP, 2 yr. animal inhalation study report states that there is "clear evidence of carcinoginicity" in mice and female rats.

Experience in industry has shown no increased incidences of cancer of any type in the worker population.

MEDICAL LIMITATIONS:
Persons with known heart conditions should avoid exposure to this product.

ROUTES OF EXPOSURE

INHALATION:
Can cause light-headedness, dizziness and central nervous system depression. May irritate respiratory passages.
SKIN CONTACT:
May cause skin irritation. Prolonged skin contact may result in systemic intoxication.
SKIN ABSORPTION:
Absorption of the methanol component may produce toxic effects.
EYE CONTACT:
Eye contact may be irritating and painful.
INGESTION:
Can cause nausea, vomiting and diarrhea. Depending on the amount ingested, systemic effects may include headache, weakness, dizziness, visual disturbances and possible loss of consciousness.

EFFECTS OF OVEREXPOSURE

ACUTE:
Inhalation or ingestion may produce headache, weakness, dizziness, visual disturbances and increasing degrees of central nervous system depression which may progress to unconsciousness and death. Exposure of the eyes and skin may produce irritation.
CHRONIC:
Can cause headache, mental confusion, depression, fatigue, loss of appetite, nausea, vomiting, cough, loss of sense of balance and visual disturbances. Repeated skin contact may cause dermatitis.

V. HEALTH HAZARD INFORMATION ...continued

EMERGENCY AND FIRST AID PROCEDURES

EYES:
OBJECT IS TO FLUSH MATERIAL OUT THEN SEEK MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire eye surface. Seek medical attention.

SKIN:
Wash contaminated areas with plenty of soap and water. Remove contaminated clothing and footwear. Wash clothing and decontaminate footwear before reuse. Seek medical attention.

INHALATION:
Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION:
Never give anything by mouth to an unconscious person. Have conscious patient drink several glasses of water, then induce vomiting by having patient tickle back of throat with finger. Keep airway clear. Seek medical attention immediately.

NOTES TO PHYSICIAN:
Methylene chloride overexposure can produce elevated carboxyhemoglobin levels.

VI. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:
Under normal conditions the material is stable.

INCOMPATIBILITY:
Avoid contact with pure oxygen, oxidizers, alkali metals, open flames, and electrical arcs.

HAZARDOUS DECOMPOSITION PRODUCTS:
At high temperatures, this product may decompose to give off hydrogen chloride vapor and small quantities of other toxic and irritating vapor such as phosgene.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:
Material is not known to polymerize.

VII. ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
Leaks should be stopped. Spills should be cleaned up immediately. Large spills should be contained and removed. Large spills, after containment, should be blanketed with alcohol foam to minimize the fire hazard. Smaller spills may be soaked up with absorbent materials which should be placed in closed container, labeled as potentially flammable and stored in a safe place out of doors to await proper disposal. After the spilled material is removed, the contaminated area should be flushed with large amounts of water to remove residual material. Persons performing this work should wear adequate personal protective equipment and clothing. Vacuum trucks should not be used due to potential electrical ignition hazard.

NEUTRALIZING CHEMICALS:
None required.

WASTE DISPOSAL METHOD:
The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable federal, state and local health and environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible federal, state and local agencies receive timely and proper notification of the spill and disposal of waste.

VIII. INDUSTRIAL HYGIENE CONTROL MEASURES

VENTILATION REQUIREMENTS:
Work in well ventilated areas. Where engineering controls are feasible, use adequate local exhaust ventilation. Utilizatio closed pump system is preferred.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY:
Respiratory protection is not required under normal use; howe use a NIOSH/MSHA approved respirator following manufactur recommendations where vapors, mists, or sprays may be generated.

EYE:
Face shield and goggles or chemical goggles should be worn.

GLOVES:
Impervious gloves should be worn. Neoprene and polyvinyl alco have been suggested as suitable materials. Gloves contaminated w the product should be discarded. Polyfluorinated or polyethylene been suggested.

OTHER CLOTHING AND EQUIPMENT:
Plastic apron or similar covering should be worn. Shower and wash facilities should be accessible.

MONITORING

BIOLOGICAL:
Reports indicate that 33 ppm Methylene Chloride in breath durin exposure is equivalent to an exposure of about 100 ppm in air. Bloo analysed for carboxyhemoglobin (COHb) may show 7 to 10% saturation following exposure to 250 and 500 ppm respectively. Amount o exertion, duration of exposure, and time samples effect these ratios.

PERSONAL/AREA:
The NIOSH P&CAM (Method) Numbers 127, S329 are applicable.

IX. SPECIAL PRECAUTIONS

SIGNAL WORD: DANGER!

STATEMENT OF HAZARDS:
- VOLATILE SOLVENT
- PROLONGED BREATHING OF VAPOR CAN CAUSE LOSS OF CONSCIOUSNESS AND MAY RESULT IN DEATH
- CAUSES IRRITATION OF SKIN, EYES AND RESPIRATORY TRACT
- SIGNIFICANT EVAPORATION (<20%) MAY CAUSE PRODUCT TO BECOME FLAMMABLE

PRECAUTIONARY STATEMENTS:
- Do not get in eyes, on skin, on clothing.
- Do not take internally.
- Avoid breathing vapor.
- When handling, wear chemical splash goggles, protective clothing, and solvent resistant gloves.
- Wash thoroughly after handling.
- Use with adequate ventilation in work area.
- Employ respiratory protection when exposure to vapor is possible.
- Avoid contact with flame, hot glowing surfaces, or alkali metals, to prevent decomposition resulting in toxic and irritating vapor.
- Keep container tightly closed.
- Store in a cool, ventilated place.
- Do not allow to evaporate more than 20% by volume.

\. SPECIAL PRECAUTIONS ...continued

RST AID:
IN CASE OF CONTACT:

For eyes:
Immediately flush with plenty of water for at least 15 minutes, holding eyelids apart to ensure flushing of the entire eye surface. Seek medical attention immediately.

For skin:
Wash with plenty of soap and water. A soothing ointment may be applied to irritated skin after cleansing. Remove contaminated clothing and footwear and wash clothing before reuse. Discard footwear which cannot be decontaminated. Seek medical attention.

IF INHALED:
Get person out of contaminated area to fresh air. If breathing has stopped, artificial respiration should be started. Oxygen may be administered, if available. Seek medical attention.

IF SWALLOWED.
If conscious, give several glasses of water to drink and induce vomiting by touching finger to back of throat. Keep airway clear. NEVER give anything by mouth to an unconscious person. Seek medical attention immediately.

OTE TO PHYSICIAN:
Overexposure can produce elevated carboxyhemoglobin levels.

IN CASE OF FIRE:
Use CO_2, dry chemicals, foam, or water fog.

IN CASE OF SPILL OR LEAK:
Leaks should be stopped. Spills should be cleaned up immediately. Large spills should be contained and removed. Large spills, after containment, should be blanketed with alcohol foam to minimize the fire hazard. Smaller spills may be soaked up with absorbent materials which should be placed in closed container, labeled as potentially flammable and stored in a safe place out of doors to await proper disposal. After the spilled material is removed, the contaminated area should be flushed with large amounts of water to remove residual material. Persons performing this work should wear adequate personal protective equipment and clothing. Vacuum trucks should not be used due to potential electric ignition hazard.

STORAGE

Mild steel lined with a phenolic coating is suitable for use as storage vessels for this product. Mild steel drums with a baked phenolic or epoxy liner are recommended for long term storage. Store drums in a cool place, bung up and closed tightly. Ventilation should be provided. Do not store in pits, depressions, basements or unventilated areas. All tanks should have a top and bottom manhole and a vent of a diameter at least equal to that of the fill or discharge pipe. Vent indoor tanks outside in a location such that escaping vapor will not contaminate any work space air. Vertical tanks should be of the closed top design. A dryer and safety seal on the vent is recommended.

FOR INDUSTRIAL USE ONLY

CYANAMID

MSDS NO. 1213-01
CAS NO. 88-24-4
DATE: 09/09/82

MATERIAL SAFETY DATA

PRODUCT IDENTIFICATION

TRADEMARK:	**CYANOX® 425 Antioxidant**
SYNONYMS:	2,2'-Methylenebis(4-ethyl-6-tertiarybutyl phenol)
CHEMICAL FAMILY:	Phenol
MOLECULAR FORMULA:	C25H36O2
MOLECULAR WGT.:	368.5

WARNING

MAY CAUSE EYE AND SKIN IRRITATION

HAZARDOUS INGREDIENTS

COMPONENT	CAS. NO.	%	TWA/CEILING	REFERENCE
No Permissible Exposure Limits (PEL), have been established by OSHA				

NFPA HAZARD RATING

Not Established

HEALTH HAZARD INFORMATION

EFFECTS OF OVEREXPOSURE:	Acute oral (rat) and acute dermal (rabbit) LD50 values are > 15.0 g/kg and > 8.0 g/kg, respectively. Mild eye irritation and mild skin irritation were produced during primary irritation studies with rabbits. Overexposure to airborne dust may cause eye or respiratory tract irritation.
FIRST AID:	In case of skin contact, wash affected areas of skin with soap and water. In case of eye contact, immediately irrigate with plenty of water for 15 minutes.

EMERGENCY PHONE: 201/835-3100

AMERICAN CYANAMID COMPANY, WAYNE, NEW JERSEY 07470

EXPOSURE CONTROL METHODS

Engineering controls are not usually necessary, if good hygiene practices are strictly followed. Respiratory protection is generally not required during normal operations. Wear the following as necessary to prevent skin contact; work pants, long sleeve work shirt and work gloves. For operations where eye or face contact can occur wear dust proof goggles.

FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT:	Not Applicable
FLAMMABLE LIMITS (% BY VOL):	Not Applicable
AUTOIGNITION TEMP:	Not Available
DECOMPOSITION TEMP:	Not Available
FIRE FIGHTING:	Use water, carbon dioxide or dry chemical to extinguish fires. Wear self-contained, positive pressure breathing apparatus and full firefighting protective clothing. Dust may be explosive if mixed with air in critical proportions and in the presence of a source of ignition.

REACTIVITY DATA

STABILITY:	Stable
CONDITIONS TO AVOID:	None known
POLYMERIZATION:	Will Not Occur
CONDITIONS TO AVOID:	None known
INCOMPATIBLE MATERIALS:	Strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition or combustion may produce carbon monoxide and/or carbon dioxide.

PHYSICAL PROPERTIES

APPEARANCE AND ODOR:	White powder; phenolic odor
BOILING POINT:	Not Applicable
MELTING POINT:	253 F (123 C)
VAPOR PRESSURE:	Not Applicable
SPECIFIC GRAVITY:	1.10
VAPOR DENSITY:	Not Applicable
% VOLATILE (BY VOL):	Negligible
OCTANOL/H_2O PARTITION COEF.:	Not Available
pH:	Not Applicable
SATURATION IN AIR (BY VOL):	Not Applicable
EVAPORATION RATE:	Not Applicable
SOLUBILITY IN WATER:	Negligible

SPILL OR LEAK PROCEDURES	STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:	Same protective clothing/equipment as in Exposure Control Methods. Sweep up spills and place in a waste disposal container. Flush area with water.
WASTE DISPOSAL	Disposal must be made in accordance with applicable governmental regulations.	
SPECIAL PRECAUTIONS	HANDLING AND STORAGE/OTHER:	Maintain good housekeeping to control dust accumulations.

Marvin A. Friedman

Marvin A. Friedman, Ph.D. Director of Toxicology and Product Safety

This information is given without any warranty or representation. We do not assume any [illegible] nor do we give permission, inducement, or recommendation to practice any patented invention without a license. [illegible] consideration, investigation and verification. Before using any product read its label.

Rec'd 8-5-86

March, 1988

USA and Canada — WORLDWIDE — Other Countries

Material Safety Data Sheet

CYCLOPENTANE, 70%

Phillips 66 Company
A Subsidiary of Phillips Petroleum Company
Bartlesville, Oklahoma 74004

PHONE NUMBERS
Emergency:
Business Hours (918) 661-3865
After Hours (918) 661-8118
General MSDS Information:
(918) 661-8327

A. Product Identification

Synonyms: Pentamethylene
Chemical Name: Cyclopentane
Chemical Family: Cycloparaffinic Hydrocarbon
Chemical Formula: C5H10
CAS Reg. No.: 287-92-3
Product No.: N 22800

Product and/or Components Entered on EPA's TSCA Inventory: Yes

B. Hazardous Components

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
Cyclopentane	287-92-3	84.7	NE	600 ppm
n-Pentane	109-66-0	7.0	1000 ppm	600 ppm
2,2-Dimethylbutane	75-83-2	5.3	NE	NE
2-Methylpentane	107-83-5	1.6	NE	500 ppm*
Isopentane	78-78-4	0.7	NE	NE
2,3-Dimethylbutane	79-29-8	0.4	NE	NE
3-Methylpentane	96-14-0	0.3	NE	500 ppm*

* Hexane Isomer

C. Personal Protection Information

Ventilation: Use adequate ventilation to control exposure below recommended levels.

Respiratory Protection: Not generally required unless needed to prevent respiratory irritation. When entry into or exit from concentrations of unknown exposure, use NIOSH/MSHA approved self-contained breathing apparatus (SCBA).

Eye Protection: Use safety glasses with side shields and faceshield for splash protection.

NA - Not Applicable NE - Not Established

Skin Protection: No special garments required. Avoid unnecessary skin contamination with material. Use Neoprene, Nitrile or Viton gloves.

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

Avoid inhalation and eye and skin contact. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Wash hands after handling. Launder contaminated clothing before reuse. Store in a cool, dry, well-ventilated area away from sources of ignition. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Keep containers closed.

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 and various hydrocarbons formed when burned.

F. Health Hazard Data

Recommended Exposure Limits:

See Hazardous Components Section.

Acute Effects of Overexposure:

Eye: Exposure to the liquid or prolonged overexposure to high vapor concentrations may cause slight eye irritation including pain, inflammation of the iris and mucous membranes, redness and tearing.

Skin: Prolonged or repeated contact with the liquid may cause defatting resulting in drying, redness and possibly blistering. Prolonged overexposure to the high vapor concentrations may cause slight mucous membrane irritation.

Inhalation: Overexposure may cause dizziness, disorientation, headache, excitation, drowsiness, incoordination, anesthesia, respiratory and cardiac effects. Extreme overexposure may cause further central nervous system depression, unconsciousness and respiratory arrest.

Ingestion: May cause central nervous system depression, hemorrhaging of mucous membranes, diarrhea, or aspiration of the liquid resulting in chemical pneumonitis.

NA - Not Applicable NE - Not Established

Subchronic and Chronic Effects of Overexposure:

2,3-Dimethylbutane and 2-Methylpentane components have produced kidney damage in rats in subchronic oral laboratory studies. Other components, n-Pentane and Isopentane however produced no such damage in the same test. No comparable kidney injury has been reported in humans.

Other Health Effects:

A Toxicity Study Summary is available for Cyclopentane, 70%.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	___	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	_X_	___
Allergic Sensitizer	___	___	Specify - Kidney Toxin.		
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 skin with soap and water. If irritation develops, seek medical assistance.

Inhalation: Remove from exposure. If breathing is difficult, give oxygen and seek medical assistance.

Ingestion: Do not induce vomiting. Seek immediate medical assistance. A physician may, at his discretion, perform gastric lavage using a cuffed endotracheal tube.

G. Physical Data

Appearance:	Colorless Liquid
Odor:	Mild, Sweet
Boiling Point:	120F (49C)
Vapor Pressure:	10.4 psia at 100F
Vapor Density (Air = 1):	Approximately 2
Solubility in Water:	Negligible
Specific Gravity (H2O = 1):	0.74 at 60/60F
Percent Volatile by Volume:	100
Evaporation Rate (Butyl Acetate = 1):	> 1
Viscosity:	Not Established

H. Fire and Explosion Data

Flash Point (Method Used):	-35F (-37C) (TCC, ASTM D56)
Flammable Limits (% by Volume in Air):	LEL - 1.1 UEL - 8.7
Fire Extinguishing Media:	Dry chemical, foam or carbon dioxide (CO2).

NA - Not Applicable NE - Not Established

Special Fire Fighting Procedures:	Evacuate area of all unnecessary personnel. Shut off source, if possible. Wear appropriate safety equipment for fire conditions including NIOSH/MSHA self-contained breathing apparatus (SCBA). Water fog or spray may be used to cool exposed containers and equipment.
Fire and Explosion Hazards:	Carbon oxides and various hydrocarbons formed when burned. Highly flammable vapors which are heavier than air may accumulate in low areas and/or spread along ground away from handling site. Flash back along vapor trail may occur. Vapor may explode if ignited in a closed area. Containers may explode in a fire.

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 RCRA permitted waste management facility.

J. DOT Transportation

Shipping Name:	Cyclopentane
Hazard Class:	Flammable Liquid
ID Number:	UN 1146
Marking:	Cyclopentane and UN 1146 on containers smaller than 110 gallons; 1146 on bulk containers.
Label:	Flammable Liquid
Placard:	Flammable
Hazardous Substance/RQ:	Not Applicable
Shipping Description:	Cyclopentane, Flammable Liquid, UN 1146
Packaging References:	49 CFR 173.118 and 173.119(a)

K. RCRA Classification - Unadulterated Product as a Waste

D001 - Ignitable

L. Protection Required for Work on Contaminated Equipment

Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Contact immediate supervisor for specific instructions before work is initiated. When entry into or exit from concentrations of unknown exposure, use NIOSH/MSHA approved self-contained breathing apparatus (SCBA).

NA - Not Applicable NE - Not Established

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.

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NA - Not Applicable NE - Not Established

PHILLIPS PETROLEUM COMPANY HUMAN RESOURCES - MEDICAL DIVISION BARTLESVILLE, OK 74004 918 661-6600

TOXICITY STUDY SUMMARY

CYCLOPENTANE (70%)

Acute Oral Toxicity

Albino rats of the Sprague-Dawley strain weighing 200-300 g were selected as the experimental animals. Five male and five female animals were given a single dose of 5000 mg/kg by oral gavage. Test material was administered neat. The animals were then observed for 14 days. Pharmacotoxic signs and symptoms included depression, slight depression, red stains on the nose and/or eyes, rough coat, soft feces, a hunched appearance, and urine stains. All observations were noted from 1 hour post dose to Day 1. All animals appeared normal from Day 2 through termination of the study. All animals gained weight during the study.

On Day 14 of the observation period all animals were euthanized. Thorough necropsies were conducted on each animal. There were no gross pathological findings related to test material administration. Since no test animals died the oral LD50 for cyclopentane is considered to be greater than 5000 mg/kg.

Acute Inhalation Toxicity

Albino rats of the Sprague-Dawley strain weighing 200-350 g were selected as the experimental animals. Five male and five female animals were individually housed in stainless steel wire mesh cages which were placed in a glass and stainless steel exposure chamber. The animals were exposed to vaporized test material for 4 hours at a nominal concentration of 32.25 mg/L (actual concentration $\geq$ 5912.5 ppm**). The animals were then observed for 14 days. Pharmacotoxic signs and symptoms included hyperactivity in all males and females during the first 2 hours of exposure. All animals appeared normal throughout the remainder of the study. No exposure-related trends were apparent in the males or females mean body weight data. On Day 14 of the observation period all the animals were euthanized and submitted to thorough necropsy. Gross pathological signs included uterine horns distended with fluid and enlarged cervical lymph nodes in three of five females. No exposure-related trends were apparent in male gross pathology. One male exhibited some lung and kidney effects. Since no test animals died the acute inhalation LC50 for cyclopentane is considered to be greater than 5912.5 ppm.

The information set forth herein is furnished free of charge and is based on technical data that Phillips believes to be reliable It is intended for use by persons having technical skill and at their own discretion and risk. 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. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents

Respiratory Tract Irritancy

Male mice of the outbred SPF (CD-1,COBS) strain weighing 20-25 g were selected as the experimental animals. A group of four animals was exposed head only to vaporized test material at a nominal concentration of 32.25 mg/L (actual concentration > 5497.5 ppm**). Each animal was housed in an individual plethysmograph to permit monitoring of respiration. After the animals became acclimatized they were exposed to vaporized test material for 1 minute and permitted to recover for 10 minutes while being exposed to room air only. Following this the animals were exposed to vaporized test material for 1 minute, then to room air for 5 minutes. During this time their respiratory patterns were continually monitored.

A pattern of slight respiratory pauses was evident in two mice that exhibited slight decreases during the first exposure. However, these patterns were not present in any mice during the second exposure. Due to the lack of severity and variability of respiratory rate decreases and graphic patterns of respiratory pauses, no consistent exposure-related trends are apparent in these data.

Based on these results, exposure to 70% cyclopentane at a concentration of 5497.5 ppm via inhalation failed to produce upper airway irritancy in mice.

Eye Irritancy (Unwashed)

Six young adult albino rabbits of the New Zealand White/Dutchland strain were selected as the experimental animals. At least 24 hours prior to the start of the test, the left eye of each animal was stained with fluorescein dye and examined for corneal damage. Any animal with corneal damage was rejected and replaced with a healthy animal. One-tenth ml of liquid test material was instilled into the conjunctival sac of the left eye of each animal. The eye was then gently held closed for 1 second and released. The untreated right eye of each rabbit served as a control. The eyes were scored according to the Draize* system at 1, 24, 48 and 72 hours, and at 4 and 7 days post-instillation.

In this study the following results were noted. At 1 hour post-instillation, iritis and chemosis was present in one rabbit, and conjunctival redness was noted in all six rabbits. No corneal opacity or conjunctival discharge was noted in any of the six rabbits. All ocular lesions had cleared by Day 4. The overall eye irritation index for cyclopentane was 3.8, 1.7, 0.7, and 0.3 at 1, 24, 48 and 72 hours respectively. This score was 0.0 Day 4 through Day 7.

Eye Irritancy (Washed)

Six young adult albino rabbits of the New Zealand White/Dutchland strain were selected as the experimental animals. At least 24 hours prior to the start of the test, the left eye of each animal was stained with fluorescein dye and examined for corneal damage. Any animal with corneal damage was rejected and replaced with a healthy animal. One-tenth ml of liquid test material was instilled into the

conjunctival sac of the left eye of each test animal. The treated eyes were held closed for 4 seconds then washed with 40 ml of tap water. The untreated right eye of each animal served as a control. The eyes were scored according to the Draize* system at 1, 24, 48 and 72, and at 4 and 7 days postinstillation.

In this study the following results were noted. Conjunctival redness was noted in all six rabbits at 1 hour postinstillation and persisted in two rabbits to 24 hours and in another rabbit to 48 hours. No corneal opacity, iritis, conjunctival chemosis, or discharge was noted in any of the six rabbits. The overall eye irritation index for cyclopentane was 3.0, 1.0, 0.3 and 0.0 at 1, 24, 48 and 72 hours respectively.

Primary Dermal Irritation

Three male and three female young adult rabbits of the New Zealand White/Dutchland strain were selected as the experimental animals. The animals were clipped free of hair and 0.5 ml of liquid test material was applied to one abraded and to one non-abraded site. The sites were rotated over various areas of clipped skin. Abrasions were minor incisions through the stratum corneum but not deep enough to disturb the dermis or to produce bleeding. Test material was introduced to each application site under a 1 square inch gauze patch of double thickness. The patches were secured in place and the entire trunk of each animal was wrapped with a non-absorbent binder. The animals were then immobilized in stocks for 24 hours. After the 24 hour exposure period, the binders and patches were removed and the skin wiped to remove any test material still remaining. The skin reactions were then evaluated, according to the Draize* system, 24 and 72 hours following the initial application of test material.

In this study the following results were noted. No erythema, edema, or other dermal effects were noted at 24 or 72 hours after administration of the test material. The primary skin irritation index for cyclopentane was calculated to be 0.0.

*Draize, J. H., "Dermal Toxicity". In Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics, pp. 46-59, 1965.

**Actual concentrations were calculated from the total hydrocarbon analyzer response reported in methane equivalents.

THOMPSON-HAYWARD CHEMICAL COMPANY
KANSAS CITY, KANSAS

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: FORMIC ACID 90% DATE: 11/12/85 PAGE 01
PRODUCT CODE: 26-17451-00

CAS # 000064-18-6

FORMULA: HCOOH

CHEMICAL FAMILY: Organic Acid

CHEMICAL NAME AND SYNONYMS: Formic Acid; Formylic Acid; Methanoic Acid

MANUFACTURERS NAME:

SUPPLIERS NAME: Thompson-Hayward Chemical Company
5200 Speaker Rd
Kansas City Ks 66106
SUPPLIERS PHONE NUMBER: 913-321-3131
TRANSPROTATION EMERGENCY PHONE NUMBER: 1-800-424-9300

SECTION I Hazardous Ingredients

Ingredient	Percent	TLV
Formic Acid	90%	5 ppm TWA ACGIH '84/'85 Ref.(1) Section IX

SECTION II Health Hazards

Threshold Limit Value: 5 ppm ACGIH '84/'85

Effects of Overexposure:

THOMPSON-HAYWARD CHEMICAL COMPANY
KANSAS CITY, KANSAS

MATERIAL SAFETY DATA SHEET

SECTION IX Additional Information CONTINUED

Containers of this material may be hazardous when emptied. "Empty" containers retain product residues. Observe all hazard precautions outlined in this sheet

REFERENCES

(1) TLV's Threshold Limit Values for chemical substances in the work environment adopted by ACGIH '84/'85.

(2) NIOSH/OSHA Pocket Guide to Chemical Hazards DHEW(NIOSH) Publication No. 78-210.

NPCAHMIS 320H

********* E N D O F R E P O R T *********

NAME: EDWARD E. CHAPMAN DATE ISSUED: 10/24/1985
DATE REVISED:

< = LESS THAN N/A = NOT APPLICABLE UNK = UNKNOWN
> = MORE THAN N/D = NOT DETERMINED
N/E = NOT ESTABLISHED

The information provided in this Material Safety Data Sheet has been obtained from sources believed to be reliable. Thompson-Hayward Chemical Co. 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.

SECTION II Health Hazards CONTINUED

minutes, periodically lifting upper and lower eyelids. Seek medical assistance and the help of an ophthamologist urgently.

Skin: Flush with water while removing contaminated clothing and shoes, Follow by washing with soap and water. Do not reuse clothing or shoes until cleaned. If irritation persists, get medical attention.

Inhalation: Remove to fresh air. Give oxygen if breathing is difficult. Artificial respiration should be given, if severe breathing difficulties develop. Call a physician.

Ingestion: DO NOT induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Dilute and neutralize the acid by giving large volumes of milk to drink. Call a physician immediately.

Other Information:

NOTES TO PHYSICIAN

Most of the harmful effects of formic acid result from its marked irritating and corrosive properties. Complications of swallowing formic acid have included the following:

Burns of mouth, oropharynx, esophagus and stomach.
Mediastinitis following perforation of esophagus.
Peritonitis following gastric perforation.
Hematemesis.
Hemolysis.
Metabolic acidosis.
Disseminated intravascular coagulation syndrome.
Dyphagia from esophageal stricture.
Chemical phneumonitis from aspiration of vomit.

Induction of vomiting is contra-indicated. Gastric intubation and lavage are to be avoided because of the possibility of perforating any ulcerated areas of the esophagus or stomach. It is important to dilute and neutralize ingested formic acid, preferably by giving milk to drink.

Esposure to moderately high vapor concentrations may cause acute inflammatory changes in the respiratory tract which may predispose to a secondary infection. Pulmonary edema may occur. Laryngeal spasm has been described.

SECTION III Special Protection Information

Respiratory Protection: Self-contained breathing apparatus in high concentrations. See Section IX, Notes and Ref(2).

Ventilation Required: General (mechanical) ventilation should be satisfactory, if this product is confined within closed equipment. Provide special local ventilation where vapors may escape to the workplace air.

Protective Clothing:

Eyes: Wear monogoggles where any possibility of contact with vapor or liquid exists.

CONTINUED ON PAGE 03

THOMPSON-HAYWARD CHEMICAL COMPANY
KANSAS CITY, KANSAS

MATERIAL SAFETY DATA SHEET

SECTION III Special Protection Information CONTINUED

Skin: Butyl or PVC protective gloves, and complete protective clothing where there is danger of splashing.

Additional Protective Measures: Safety shower, eye bath and washing facilities should be available.

SECTION IV Fire & Explosion Hazard Data

Flash Point (Method): 122 deg. F (TCC)

Flammable Limits (% Volume in Air):

Upper: 57.0

Lower: 18.0

Extinguishing Media: Water spray, CO(2), dry chemical or alcohol-type or universal type foam. Apply by manufacturer's recomended technique.

Special Fire Fighting Procedures: Use self-contained breathing apparatus and protective clothing. Use water spray to cool containers.

Unusual Fire and Explosion Hazards: None

SECTION V Physical Data

Boiling Point: 214 deg. F

Specific Gravity (H(2)O=1): 1.21 at 68/68 deg. F

Vapor Pressure (MM HG.): 23 at 68 deg. F

Vapor Density (AIR=1): 1.4

Evaporation Rate (Butyl Acetate=1): 1.6

Solubility in Water: Complete

Percent Volatile by Volume: 100

pH: about 1.5

Appearance and Odor: Clear, colorless liquid, sharp irritating odor.

SECTION VI Reactivity Data

Stability: Stable

Incompatibility: Avoid contamination with alkalies, ammonia, amines, oxidizing agents, and concentrated sulfuric acid.

Hazardous Decomposition Products: Heating or burning can produce carbon monoxide and/or carbon dioxide.

CONTINUED ON PAGE 04

THOMPSON-HAYWARD CHEMICAL COMPANY
KANSAS CITY, KANSAS

MATERIAL SAFETY DATA SHEET

SECTION VI Reactivity Data CONTINUED

Hazardous Polymerization: Will not occur.

SECTION VII Spill and Leak Procedures

Steps to be taken if material is released or spilled: Wear suitable protective equipment; avoid contact with liquid and vapors! Collect for disposal. Toxic to fish; avoid discharge to natural waters.

Waste Disposal Method:

Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations. For small amounts, it may be feasible to dilute with water and, then, neutralize with a dilute base.

Formic acid can be highly toxic to fish and also to the microorganisms in a wastewater treatment plant. Avoid discharge to sewers or waterways.

EPA - Resource Conservation and Recovery Act (RCRA) Regulations As produced, this material is a product and not a waste. If discarded or intended to be discarded as is, it is a hazardous waste as defined in RCRA (40 CFR 261.33(f)). The EPA hazardous waste number is U123 - Formic Acid (6,T).

SECTION VIII D.O.T. Shipping Information

Proper Shipping Name:	FORMIC ACID SOLUTION
Hazard Class:	CORROSIVE MATERIAL
ID Number:	UN1779
Label Requirements:	CORROSIVE
Other Information:	

SECTION IX Additional Information

This information may be of importance to you:

NOTES: Minimize vinting of acid vapors, Use a vent gas scrubber to scrub vent gases before their release to the atmosphere. Carbon monoxide, which can be lethal, should be assumed to be present in any vessel containing, or formerly containing, formic acid until tests demonstrate otherwise. Do not breathe gases from the vapor space of formic acid containers.

No smoking where material is used or stored.

Minimize skin contact. Wash with soap and water before eating, drinking, smoking or using toilet facilities.

CONTINUED ON PAGE 05

Date June, 1985

MATERIAL SAFETY DATA SHEET

Product Name:

ISOHEXANES

PHILLIPS CHEMICAL COMPANY
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY
Bartlesville, Oklahoma 74004

Emergency Phone Nos.
918-661-3865 (during business)
918-661-8118 (after hours)

PHILLIPS 66 — USA AND CANADA

WORLDWIDE

PHILLIPS PETROLEUM 66 — OTHER COUNTRIES

PRODUCT IDENTIFICATION

Synonyms: Isomeric Hexanes

Chemical Name: Mixture

Chemical Family: Aliphatic Hydrocarbon

Chemical Formula: Mixture

CAS Reg. No: Mixture

Product No: I36200

Product and/or Components Entered on EPA's TSCA Inventory: Yes ☒ No ☐

HAZARDOUS COMPONENTS

Ingredients	CAS Number	% By Wt.	OSHA PEL	ACGIH TLV
2-Methylpentane	107-83-5	44.6	NE	NE
3-Methylpentane	96-14-0	22.2	NE	NE
2,3-Dimethylbutane	79-29-8	15.7	NE	NE
2,2-Dimethylbutane	75-83-2	14.4	NE	NE
n-Hexane	110-54-3	1.0	500 ppm	50 ppm
Isopentane	78-78-4	0.5	NE	600 ppm
n-Pentane	109-66-0	0.4	1000 ppm	600 ppm
Cyclopentane	287-92-3	0.6	NE	600 ppm
Unidentified	NE	0.6	NE	NE

NA-NOT APPLICABLE NE — NOT ESTABLISHED

PERSONAL PROTECTION INFORMATION

Ventilation: Use adequate ventilation to control below recommended exposure levels.

Respiratory Protection: For concentrations exceeding the recommended exposure level, use NIOSH/MSHA approved air purifying respirator. In case of spill or leak resulting in unknown concentration, use NIOSH/MSHA approved supplied air respirator.

Eye Protection: Use chemical goggles. For splash protection use chemical goggles and face shield.

Skin Protection: See Page 6.

Note: Personal protection information shown above 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.

HANDLING AND STORAGE PRECAUTIONS

Avoid inhalation and skin and eye contact. Wear protective equipment and/or garments described above if exposure conditions warrant. Wash hands after handling. Store in a cool, well-ventilated area away from ignition sources. Provide means of controlling leaks and spills. Bond and ground during liquid transfer. Keep containers closed. Launder contaminated clothing before reuse.

REACTIVITY DATA

Stability: Stable ☒ Unstable ☐ Conditions to Avoid:

Incompatibility (Materials to Avoid): Oxygen and strong oxidizing agents.

Hazardous Polymerization: Will not Occur ☒ May Occur ☐ Conditions to Avoid

Hazardous Decomposition Products: Carbon oxides formed when burned.

HEALTH HAZARD DATA

RECOMMENDED EXPOSURE LIMITS: ACGIH TLV for hexane isomers is 500 ppm.

ACUTE EFFECTS OF OVEREXPOSURE:

EYE: May cause mild irritation.

SKIN: May cause mild irritation. Can be absorbed through skin in harmful amounts.

INHALATION: Dizziness, headache, sedation, central nervous system depression. May be aspirated into lungs if swallowed.

INGESTION: May cause irritation to intestines.

SUBCHRONIC AND CHRONIC EFFECTS OF OVEREXPOSURE:

Causes harm to the nervous system producing a lack of feeling in extremities and more severe nerve damage.

OTHER HEALTH EFFECTS: No known applicable information.

HEALTH HAZARD CATEGORIES:

	Animal	Human		Animal	Human
Known Carcinogen	☐	☐	Toxic	☐	☐
Suspect Carcinogen	☐	☐	Corrosive	☐	☐
Mutagen	☐	☐	Irritant	☐	☐
Teratogen	☐	☐	Target Organ Toxin	☒	☒
Allergic Sensitizer	☐	☐	Specify Causes nerve damage.		
Highly Toxic	☐	☐	Isoparaffins have caused kidney damage in laboratory animals. See Page 6.		

FIRST AID AND EMERGENCY PROCEDURES:

EYE: Flush eyes with running water for at least 15 minutes. If irritation develops, seek medical attention.

SKIN: Flush skin with water for 15 minutes. If irritation develops, seek medical attention.

INHALATION: Remove from exposure. If illness or adverse symptoms develop, seek medical attention.

INGESTION: Do not induce vomiting. Seek immediate medical assistance. A physician may, at his discretion, perform gastric lavage using a cuffed endotracheal tube.

PHYSICAL DATA

Appearance: Colorless liquid.

Odor: Mild

Boiling Point: 141°F (61°C)

Vapor Pressure: 6.8 psia (352 mm Hg) at 100°F

Vapor Density (Air = 1): 3

Solubility in Water: Negligible

Specific Gravity (H_2O = 1): 0.66 at 60/60°F

Percent Volatile by Volume: 100

Evaporation Rate (Ethyl Ether = 1): < 1

Viscosity: NE

FIRE and EXPLOSION DATA

Flash Point (Method Used): -20°F (-29°C) (TCC, ASTM D56)

Flammable Limits (% By Volume in Air): LEL 1.2 UEL 7.7

Fire Extinguishing Media: Dry chemical, foam or carbon dioxide (CO_2).

Special Fire Fighting Procedures: See Page 6.

Fire and Explosion Hazards: Carbon oxides formed when burned. Highly flammable vapors which are heavier than air may accumulate in low areas and/or spread along ground away from handling site.

SPILL, LEAK and DISPOSAL PROCEDURES

Precautions Required if Material is Released or Spilled: Evacuate area of all unnecessary personnel. In case of spill or leak 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) equipment. Shut off source, if possible, and contain spill. Protect from ignition. Keep out of water sources and sewers. Absorb in dry, inert material (sand, clay, sawdust, etc.). Transfer to disposal drums using nonsparking equipment.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):

Incinerate or place in RCRA permitted waste management facility.

DOT TRANSPORTATION

Shipping Name: Hexane
Hazard Class: Flammable Liquid
ID Number: UN 1208
Marking: Hexane/UN 1208
Label: Flammable Liquid
Placard: Flammable/1208
Hazardous Substance/RQ: NA
Shipping Description: Hexane, Flammable Liquid, UN1208
Packaging References: 49 CFR 173.118 and 173.119(a)

RCRA CLASSIFICATION *(FOR UNADULTERATED PRODUCT AS A WASTE)*

Ignitable

PROTECTIVE MEASURES DURING REPAIR AND MAINTENANCE OF CONTAMINATED EQUIPMENT

Use NIOSH/MSHA approved respiratory protection, such as air-supplied mask, in confined spaces or other poorly ventilated areas. See Page 2 for protective clothing requirements. Contact immediate supervisor for specific instructions before work is initiated.

HAZARD CLASSIFICATION

THIS PRODUCT MEETS THE FOLLOWING HAZARD DEFINITION(S) AS DEFINED BY OCCUPATIONAL SAFETY AND HEALTH REGULATIONS (29 CFR PART 1910. 1200):

☐ Not Hazardous	☐ Flammable Solid	☐ Oxidizer
☐ Combustible Liquid	☐ Flammable Aerosol	☐ Pyrophoric
☐ Compressed Gas	☐ Explosive	☐ Unstable
☐ Flammable Gas	☒ Health Hazard (See Page 3)	☐ Water Reactive
☒ [illegible]	☐ [illegible]	

ADDITIONAL COMMENTS (Continued)

SKIN PROTECTION: Use full-body, long sleeved garments impervious to the material. Use gloves impervious to the material being used. Use boots impervious to the material being used. (Do not wear leather boots.)

HEALTH HAZARD CATEGORIES: Blood changes have been reported in laboratory animals for n-hexane. Fetal death has been reported in laboratory animals but not found in two additional studies.

SPECIAL FIRE FIGHTING PROCEDURES: Evacuate area of all unnecessary personnel. Use NIOSH/MSHA approved self-contained breathing apparatus and other protective equipment and/or garments described on Page 2 if conditions warrant. 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.

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BARON-BLAKESLEE
2001 N JANICE
MELROSE PARK IL 60160
PAT DEYOUNG

MATERIAL SAFETY DATA SHEET

DATE: 05/22/85 CONTROL: 05-22-85-346 PAGE: 1

SECTION I PRODUCT IDENTIFICATION

10906-1 ISOPROPYLAMINE, 99%
CAS # 75-31-0
MOLECULAR FORMULA: C3H9N

SECTION II TOXICITY HAZARDS

RTECS # NT8400000
ISOPROPYLAMINE

ORL-RAT LD50:820 MG/KG UCDS** 11/15/71
ORL-MUS LD50:2200 MG/KG GISAAA 45(3),79,80
ORL-RBT LD50:3200 MG/KG GISAAA 45(3),79,80
SKN-RBT LD50:382 MG/KG AMIHBC 4,119,51
ORL-GPG LD50:2700 MG/KG GISAAA 45(3),79,80
IHL-MAM LC50:1800 MG/M3 TPKVAL 14,80,75
UNK-MAM LD50:500 MG/KG TPKVAL 14,80,75
TLV-TWA 5 PPM: STEL 10 PPM DTLVS* 4,239,80
OSHA STANDARD-AIR:TWA 5 PPM (SCP-K) FEREAC 39,23540,74
"NIOSH MANUAL OF ANALYTICAL METHODS" VOL 1 221, VOL 3 S147 NIMAM*
"NIOSH MANUAL OF ANALYTICAL METHODS" TO BE REVISED BY JUNE, 1985
REPORTED IN EPA TSCA INVENTORY, 1983
MEETS CRITERIA FOR PROPOSED OSHA MEDICAL RECORDS RULE FEREAC 47,30420,82

SECTION III PHYSICAL DATA

MELTING POINT: -101 C
BOILING POINT: 33 C TO 34 C
DENSITY: 0.694

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 1 F

EXTINGUISHING MEDIA:

CARBON DIOXIDE, DRY CHEMICAL POWDER, ALCOHOL OR POLYMER FOAM.
WATER MAY BE EFFECTIVE FOR COOLING, BUT MAY NOT AFFECT EXTINGUISHMENT.

SPECIAL FIRE FIGHTING PROCEDURES:

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.
EXTREMELY FLAMMABLE.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO SOURCE OF IGNITION AND FLASH BACK.
CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS.
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

MATERIAL SAFETY DATA SHEET

FORMS EXPLOSIVE MIXTURES IN AIR.

SECTION V HEALTH HAZARD DATA

HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN.
MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.
INHALATION MAY BE FATAL AS A RESULT OF SPASM, INFLAMMATION AND EDEMA OF THE LARYNX AND BRONCHI, CHEMICAL PNEUMONITIS AND PULMONARY EDEMA.
PROLONGED CONTACT CAN CAUSE:
SEVERE IRRITATION OR BURNS
FIRST AID:
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
ASSURE ADEQUATE FLUSHING OF THE EYES BY SEPARATING THE EYELIDS WITH FINGERS.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION, PREFERABLY MOUTH-TO-MOUTH. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION VI REACTIVITY DATA

INCOMPATIBILITY:

ACIDS
ACID CHLORIDES
ACID ANHYDRIDES
STRONG OXIDIZING AGENTS
CARBON DIOXIDE.

HAZARDOUS DECOMPOSITION PRODUCTS:

THERMAL DECOMPOSITION MAY PRODUCE CARBON MONOXIDE, CARBON DIOXIDE, AND NITROGEN OXIDES.

SECTION VII SPILL OR LEAK PROCEDURES

SPILLS OR LEAKS:

EVACUATE AREA.
SHUT OFF ALL SOURCES OF IGNITION.
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
COVER WITH DRY-LIME, SAND, OR SODA ASH, PLACE IN COVERED CONTAINERS USING NON-SPARKING TOOLS AND TRANSPORT OUTSIDE OF BUILDING.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

WASTE DISPOSAL:

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 & LOCAL LAWS CONCERNING HEALTH & POLLUTION.

MATERIAL SAFETY DATA SHEET

DATE: 05/22/85 CONTROL: 05-22-85-346 CATALOG # 10906-1 PAGE: 3

SECTION VIII PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

WEAR APPROPRIATE OSHA/MSHA-APPROVED RESPIRATOR, CHEMICAL-RESISTANT GLOVES, SAFETY GOGGLES, OTHER PROTECTIVE CLOTHING.
SAFETY SHOWER AND EYE BATH.
USE ONLY IN A CHEMICAL FUME HOOD.
DO NOT BREATHE VAPOR.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
CORROSIVE.
HARMFUL LIQUID AND FUMES.
TOXIC.
KEEP TIGHTLY CLOSED.
KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME.
STORE IN A COOL DRY PLACE.

SECTION IX SPECIAL PRECAUTIONS AND COMMENTS

NOT APPLICABLE

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. ALDRICH 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.

MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: MAY 1, 1985

Union Carbide Corporation urges the customer receiving this Material Safety Data Sheet to study it carefully to become aware of hazards, if any, of the product involved. In the interest of safety you should (1) notify your employees, agents, and contractors of the information on this sheet, (2) furnish a copy to each of your customers for the product, and (3) request your customers to inform their employees and customers as well.

PRODUCT INFORMATION

PRODUCT NAME:	ISOPROPANOL, ANHYDROUS		
CHEMICAL NAME:	Isopropyl Alcohol	CHEMICAL FAMILY:	Alcohols
FORMULA:	$(CH_3)_2CHOH$	MOLECULAR WEIGHT:	60.10
SYNONYMS:	Isopropyl alcohol; 2-propanol; dimethyl carbinol		

DEPARTMENT OF TRANSPORTATION	Hazard Classification Shipping Name	Flammable Liquid Isopropanol	Distributed By: Baron-Blakeslee ~~2001 N. Janice Ave~~ Melrose Park, IL
CAS # 67-63-0	CAS NAME	2-Propanol	Emergency No. (201)-455-2000

PHYSICAL DATA

BOILING POINT, 760 mm Hg	82.26°C (180.07°F)	FREEZING POINT	-88.5°C (-127.3°F)
SPECIFIC GRAVITY (H_2O = 1)	0.7864 at 20/20°C	VAPOR PRESSURE at 20°C	33 mm Hg
VAPOR DENSITY (air = 1)	2.07	SOLUBILITY IN WATER, % by wt.	Complete at 20°C
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl Acetate = 1)	2.88
APPEARANCE AND ODOR	Colorless liquid; characteristic odor		

INGREDIENTS

MATERIAL	%	TLV	HAZARD
Isopropanol	~100	400 ppm	Eye irritant; Flammable

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	53°C, Tag Closed Cup, ASTM D 56; 63°F, Tag Open Cup, ASTM D 1310			
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	2.0	UPPER	12.7 at 200°F

EXTINGUISHING MEDIA	Use water spray, carbon dioxide, dry chemical, alcohol-type, or universal-type foams applied by manufacturers' recommended techniques.
SPECIAL FIRE FIGHTING PROCEDURES	Use self-contained breathing apparatus and protective clothing.
UNUSUAL FIRE AND EXPLOSION HAZARDS	Vapors form from this product and may travel or be moved by air currents and ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equip., static discharges, or other ignition sources at locations distant from handling point.

400 ppm, ACGIH 1984-5; OSHA 29 CFR, para. 1910.1000, Table Z-1

SWALLOWING	Slightly toxic. Ingestion of a large quantity may cause drowsiness and loss of consciousness. Stomach cramps, pain, nausea, vomiting, and diarrhea may also occur.
SKIN ABSORPTION	No evidence of adverse effects from available information.
INHALATION	Low concentrations may cause mild irritation of eyes, nose, and throat. Concentrations above the TLV may result in headache and drowsiness.
SKIN CONTACT	Prolonged contact may cause drying and cracking of skin.
EYE CONTACT	Causes slight to moderate irritation, with possible [illegible] l injury.

No evidence of adverse effects from available information.

None currently known.

SWALLOWING	Give two glasses of water and induce vomiting. If a significant quantity has been swallowed, get medical attention promptly.
SKIN	Remove contaminated clothing and flush skin with water.
INHALATION	Remove to fresh air. If breathing stops, give artificial respiration and get medical attention as soon as possible.
EYES	Flush eyes immediately with large quantities of water. Get medical attention.

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

STABILITY		CONDITIONS TO AVOID	Heat; sparks; flame
UNSTABLE	STABLE		
	X		

INCOMPATIBILITY (materials to avoid)	Avoid concentrated nitric and sulfuric acids, strong oxidizers, aldehydes, halogens, and halogen compounds.
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS	Burning may produce carbon monoxide and/or carbon dioxide.

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID	None
May Occur	Will Not Occur		
	X		

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Extinguish and do not turn on any ignition source until area is determined to be free from explosion or fire hazards. Collect large spills for disposal. Flush small spills with water.
WASTE DISPOSAL METHOD	Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations. See Section IX.

RESPIRATORY PROTECTION	Self-contained breathing apparatus in high concentrations.
VENTILATION	This product should be confined within closed equipment, in which case general (mechanical) room ventilation should be satisfactory. Special, local ventilation is needed at points where vapors can be expected to escape to the workplace air.

PROTECTIVE GLOVES	Butyl	EYE PROTECTION	Monogoggles
OTHER PROTECTIVE EQUIPMENT	Eye bath; safety shower		

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep away from heat, sparks, and flame. Avoid contact with eyes. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS
At very low concentrations in water (~10 ppm), isopropanol is readily biodegradable in a wastewater treatment plant.

The opinions expressed herein are those of qualified experts within Union Carbide Corporation. 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 these opinions and the conditions of use of the product are not within the control of Union Carbide Corporation, it is the user's obligation to determine the conditions of safe use of the product.

SECTION II - EMERGENCY AND FIRST AID PROCEDURES

EMERGENCY
Have physician call LOS ANGELES POISON INFORMATION CENTER (24 hrs.) (213) 664-2121

SKIN CONTACT:

REMOVE CONTAMINATED CLOTHING. CLEANSE AFFECTED AREA(S) THOROUGHLY BY WASHING WITH MILD SOAP AND WATER. IF IRRITATION OR REDNESS DEVELOPS AND PERSISTS, SEEK MEDICAL ATTENTION.

INHALATION (BREATHING):

IF SYMPTOMS OF EXPOSURE DEVELOP (SEE SECTION III), MOVE VICTIM AWAY FROM SOURCE OF EXPOSURE AND INTO FRESH AIR. IF SYMPTOMS PERSIST, SEEK IMMEDIATE MEDICAL ATTENTION. IF VICTIM IS NOT BREATHING, ARTIFICIAL RESPIRATION SHOULD BE ADMINISTERED BY QUALIFIED PERSONNEL. IF BREATHING DIFFICULTIES DEVELOP, OXYGEN SHOULD BE ADMINISTERED BY QUALIFIED PERSONNEL. SEEK IMMEDIATE MEDICAL ATTENTION.

INGESTION (SWALLOWING):

SEEK EMERGENCY MEDICAL ATTENTION. IF VICTIM IS DROWSY OR UNCONSCIOUS, PLACE ON THE LEFT SIDE WITH THE HEAD DOWN. DO NOT GIVE ANYTHING BY MOUTH. IF VICTIM IS CONSCIOUS AND ALERT, VOMITING SHOULD BE INDUCED PERFERABLY WITH SYRUP OF IPECAC UNDER DIRECTION FROM A PHYSICIAN OR POISON CENTER. IF SYRUP OF IPECAC IS NOT AVAILABLE, VOMITING CAN BE INDUCED BY GIVING 3 TABLESPOONS OF LIQUID DISHWASHING SOAP IN A GLASS OF WATER, OR BY GENTLY PLACING 2 FINGERS IN THE BACK OF THE THROAT. IF POSSIBLE, DO NOT LEAVE VICTIM UNATTENDED.

COMMENTS:

NOTE TO PHYSICIANS: METHANOL IS METABOLIZED TO FORMALDEHYDE AND FORMIC ACID. THIS IN TURN MAY CAUSE METABOLIC ACIDOSIS, VISUAL DISTURBANCES AND BLINDNESS. BECAUSE METABOLISM MUST OCCUR BEFORE THE TOXIC EFFECTS, THE ONSET OF TOXIC SYMPTOMS MAY BE DELAYED FROM 6 TO 30 HOURS FOLLOWING INGESTION. ETHANOL COMPETES FOR THE SAME METABOLIC PATHWAY AND HAS BEEN USED AS AN ANTIDOTE.

SECTION III - HEALTH HAZARDS/ROUTES OF ENTRY

EYE CONTACT:

THIS PRODUCT MAY CAUSE EYE IRRITATION. DIRECT CONTACT WITH THE LIQUID OR EXPOSURE TO ITS VAPORS OR MISTS MAY CAUSE BURNING, TEARING AND REDNESS.

SKIN CONTACT:

THIS PRODUCT MAY CAUSE SKIN IRRITATION. PROLONGED OR REPEATED EXPOSURE TO THIS MATERIAL MAY CAUSE REDNESS AND BURNING, DRYING AND CRACKING OF THE SKIN AND DERMATITIS. THIS PRODUCT MAY BE ABSORBED THROUGH THE SKIN. PERSONS WITH PRE-EXISTING SKIN DISORDERS MAY BE MORE SUSCEPTIBLE TO THE EFFECTS OF THIS MATERIAL.

INHALATION (BREATHING):

INHALATION OF EXCESSIVE CONCENTRATIONS OF VAPORS OR MISTS MAY CAUSE: IRRITATION OF THE NOSE AND THROAT. SIGNS OF NERVOUS SYSTEM DEPRESSION (E.G., DROWSINESS, DIZZINESS, LOSS OF COORDINATION, AND FATIGUE). PROLONGED OR REPEATED EXPOSURE TO VAPORS OR MISTS MAY CAUSE: VISUAL DISTURBANCES. (INCLUDING BLINDNESS). PERSONS WITH IMPAIRED LUNG FUNCTION OR ASTHMA-LIKE CONDITIONS MAY EXPERIENCE ADDITIONAL BREATHING DIFFICULTIES DUE TO THE IRRITANT PROPERTIES OF THIS MATERIAL.

INGESTION (SWALLOWING):

THIS PRODUCT IS HIGHLY TOXIC BY INGESTION. INGESTION MAY CAUSE: IRRITATION OF THE DIGESTIVE TRACT. SIGNS OF NERVOUS SYSTEM DEPRESSION (E.G., DROWSINESS, DIZZINESS, LOSS OF COORDINATION, AND FATIGUE). ABDOMINAL PAIN. VISUAL DISTURBANCES. (INCLUDING BLINDNESS). CONVULSIONS. COMA. DEATH.

SECTION III - HEALTH HAZARDS/ROUTES OF ENTRY

COMMENTS:

THIS SUBSTANCE HAS NOT BEEN IDENTIFIED AS A CARCINOGEN OR PROBABLE CARCINOGEN BY NTP, IARC OR OSHA.

SECTION IV - SPECIAL PROTECTION INFORMATION

VENTILATION:

IF CURRENT VENTILATION PRACTICES ARE NOT ADEQUATE TO MAINTAIN AIRBORNE CONCENTRATIONS BELOW THE ESTABLISHED EXPOSURE LIMITS (SEE SECTION I), ADDITIONAL VENTILATION OR EXHAUST SYSTEMS MAY BE REQUIRED. WHERE EXPLOSIVE MIXTURES MAY BE PRESENT, SYSTEMS SAFE FOR SUCH LOCATIONS SHOULD BE USED.

RESPIRATORY PROTECTION:

IF AIRBORNE CONCENTRATIONS EXCEED ESTABLISHED EXPOSURE LIMITS (SEE SECTION I), USE A SUPPLIED AIR RESPIRATOR. DO NOT USE A CHEMICAL CARTRIDGE RESPIRATOR.

PROTECTIVE GLOVES:

THE USE OF GLOVES IMPERMEABLE TO THE SPECIFIC MATERIAL HANDLED IS ADVISED TO PREVENT SKIN CONTACT, POSSIBLE IRRITATION AND ABSORPTION.

EYE PROTECTION:

APPROVED EYE PROTECTION TO SAFEGUARD AGAINST POTENTIAL EYE CONTACT, IRRITATION OR INJURY IS RECOMMENDED.

OTHER PROTECTIVE EQUIPMENT:

IT IS SUGGESTED THAT A SOURCE OF CLEAN WATER BE AVAILABLE IN WORK AREA FOR FLUSHING EYES AND SKIN. IMPERVIOUS CLOTHING SHOULD BE WORN AS NEEDED.

SECTION V - REACTIVITY DATA

STABILITY:

STABLE

HAZARDOUS POLYMERIZATION:

WILL NOT OCCUR

SECTION VI - SPILL OR LEAK PROCEDURES

HIGHWAY OR RAILWAY SPILLS
Call CHEMTREC (800) 424-9300 Cont. U.S.
(Collect) (202) 483-7616 from Alaska & Hawaii

PRECAUTIONS IN CASE OF RELEASE OR SPILL:

STAY UPWIND AND AWAY FROM SPILL. KEEP ALL SOURCES OF IGNITION AND HOT METAL SURFACES AWAY FROM SPILL. IF SPILL IS INDOORS, VENTILATE AREA OF SPILL. FOAM, ESPECIALLY HIGH EXPANSION FOAM, MAY BE USED TO SUPPRESS VAPORS. KEEP OUT OF DRAINS, SEWERS OR WATERWAYS. USE SAND OR OTHER INERT MATERIAL TO DAM AND CONTAIN SPILL. DO NOT FLUSH AREA WITH WATER. FOR SMALL SPILLS, DO NOT FLUSH WITH WATER; USE ABSORBANT PADS. CALL SPILL RESPONSE TEAM IF LARGE SPILL. NOTIFY APPROPRIATE STATE/LOCAL AGENCIES. IF SPILL IN EXCESS OF EPA REPORTABLE QUANTITY IS MADE INTO THE ENVIRONMENT, IMMEDIATELY NOTIFY THE NATIONAL RESPONSE CENTER (PHONE NUMBER: 800-424-8802).
REPORTABLE QUANTITY: 5000 LBS.

SECTION VI - SPILL OR LEAK PROCEDURES

HIGHWAY OR RAILWAY SPILLS
Call CHEMTREC (800) 424-9300 Cont. U.S.
(Collect) (202) 483-7616 from Alaska & Hawaii

WASTE DISPOSAL METHOD:

DISPOSE OF PRODUCT IN ACCORDANCE WITH LOCAL, COUNTY, STATE, AND FEDERAL REGULATIONS.

SECTION VII - STORAGE AND SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS:

KEEP CONTAINERS TIGHTLY CLOSED. KEEP CONTAINERS COOL, DRY, AND AWAY FROM SOURCES OF IGNITION. USE AND STORE THIS PRODUCT WITH ADEQUATE VENTILATION. AVOID INHALATION OF VAPORS AND PERSONAL CONTACT WITH THE PRODUCT. USE GOOD PERSONAL HYGIENE PRACTICE. "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 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 OTHER 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 PRODUCT, REFER TO OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS, ANSI Z49.1, AND OTHER GOVERNMENTAL AND INDUSTRIAL REFERENCES PERTAINING TO CLEANING, REPAIRING, WELDING, OR OTHER CONTEMPLATED OPERATIONS.

SECTION VIII - FIRE AND EXPLOSION HAZARD DATA

			HAZARD RANKING	FLASH POINT
NFPA HAZARD CLASS	HEALTH HAZARD:	1	0 = LEAST	
	FLAMMABILITY:	3	1 = SLIGHT	
	REACTIVITY:	0	2 = MODERATE	
	OTHER:	-	3 = HIGH	52, TCC F
			4 = EXTREME	

LOWER EXPLOSIVE LIMIT (% VOL.)	UPPER EXPLOSIVE LIMIT (% VOL.)
7.3	36.0

EXTINGUISHING MEDIA:

SMALL FIRES: EXTINGUISH WITH DRY CHEMICAL, CO_2, WATER SPRAY OR ALCOHOL FOAM. LARGE FIRES: THE USE OF DRY CHEMICAL OR ALCOHOL/UNIVERSAL FOAM IS RECOMMENDED. FLOOD WITH WATER FROM A SAFE DISTANCE.

FIRE & EXPLOSION HAZARDS:

THIS MATERIAL IS FLAMMABLE AND MAY BE IGNITED BY HEAT, SPARKS, FLAME OR STATIC ELECTRICITY.

FIRE FIGHTING PROCEDURES:

THE USE OF A SCBA IS RECOMMENDED FOR FIRE FIGHTERS. WATER SPRAY MAY BE USEFUL IN MINIMIZING VAPORS AND COOLING CONTAINERS EXPOSED TO HEAT AND FLAME. AVOID SPREADING BURNING LIQUID WITH WATER USED FOR COOLING PURPOSES.

SECTION IX - PHYSICAL DATA

APPROX. BOILING POINT	VAPOR DENSITY (AIR = 1)	VAPOR PRESSURE
148 F	1.1	96 MM HG @ 20C

EVAPORATION RATE (N-BUTYL ACETATE = 1)	% VOLATILE	% SOLUBILITY IN WATER
3.50	100%	100%

SPECIFIC GRAVITY (TEMP/TEMP)	APPEARANCE	ODOR
0.792 (60F/60F)	CLEAR, LITTLE IF ANY COLOR	CHARACTERISTIC

SECTION XI - DOCUMENTARY INFORMATION

ISSUE DATE: 7/23/86 PRODUCT CODE NO. 15030

PREV. DATE: 10/20/80 PREV. PROD. CODE NO. 5030

MSDS NO: 6267 PREV. MSDS NO: 810

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

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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.

Distributed by:
Baron-Blakeslee
2001 N. Janice Avenue
Melrose Park, IL 60160
(312) 450-3900

MATERIAL SAFETY DATA SHEET

UNOCAL

UNOCAL CHEMICALS DIVISION
PETROCHEMICALS GROUP

Product Name: METHANOL
Product Code No: 15030

Issue Date: 7/23/8

MANUFACTURER:

UNOCAL CHEMICALS DIVISION
UNION OIL COMPANY OF CALIFORNIA
1345 N. MEACHAM
SCHAUMBURG, ILLINOIS 60196

CONTACT FOR FURTHER INFORMATION:
MSDS COORDINATOR (312) 490-2500

Transportation Emergencies:
Call CHEMTREC
(800) 424-9300 Cont. U.S
(202) 483-7616 (Collect)
from Alaska & Hawaii
Health Emergencies:
CALL LOS ANGELES POISON
INFORMATION CENTER (24 hrs.
(213) 664-2121

PRODUCT IDENTIFICATION

PRODUCT NAME: METHANOL

SYNONYMS: AMSCO SOLV 5030
CARBINOL
COLONIAL SPIRIT
COLUMBIAN SPIRIT
METHYL ALCOHOL
METHYL HYDROXIDE
MONOHYDROXYMETHANE
PROXYLIC SPIRIT

GENERIC NAME: VOLATILE SOLVENT

CHEMICAL FAMILY: OXYGENATED HYDROCARBON

DOT PROPER SHIPPING NAME: METHYL ALCOHOL

ID NUMBER: UN1230

DOT HAZARD CLASSIFICATION: FLAMMABLE LIQUID

CAS NUMBER: 67-56-1

SECTION I - HAZARDOUS INGREDIENTS/EXPOSURE LIMITS	CAS NO.	TLV	UNITS	AGENCY	TYPE
METHANOL	67-56-1	200.00	PPM	ACGIH	TWA
		200.00	PPM	OSHA	TWA

SECTION II - EMERGENCY AND FIRST AID PROCEDURES

EMERGENCY
Have physician call LOS ANGELES POISON INFORMATION CENTER (24 hrs.) (213) 664-2121

EYE CONTACT:

IF IRRITATION OR REDNESS FROM EXPOSURE TO VAPORS DEVELOPS, MOVE VICTIM AWAY FROM EXPOSURE AND INTO FRESH AIR. IF IRRITATION OR REDNESS PERSISTS, SEEK MEDICAL ATTENTION. FOR DIRECT CONTACT, FLUSH THE AFFECTED EYE(S) WITH CLEAN WATER. SEEK MEDICAL ATTENTION.

MATERIAL SAFETY DATA SHEET

UNION CARBIDE

EFFECTIVE DATE: September 1, 1983

TECHNICAL PETROLEUM CO
6233 N. PULASKI ROAD
CHICAGO, ILL. 60646

Union Carbide Corporation urges the customer receiving this Material Safety Data Sheet to study it carefully to become aware of hazards, if any, of the product involved. In the interest of safety you should (1) notify your employees, agents, and contractors of the information on this sheet, (2) furnish a copy to each of your customers for the product, and (3) request your customers to inform their employees and customers as well.

I. PRODUCT IDENTIFICATION

PRODUCT NAME: METHYL CELLOSOLVE®

CHEMICAL NAME: 2-Methoxyethanol — CHEMICAL FAMILY: Glycol Ethers

FORMULA: $CH_3OC_2H_4OH$ — MOLECULAR WEIGHT: 76.09

SYNONYMS: Ethylene Glycol Monomethyl Ether

DEPARTMENT OF TRANSPORTATION	Hazard Classification	Combustible liquid
	Shipping Name	Ethylene Glycol Monomethyl Ether

CAS # 109-86-4 — CAS NAME: Ethanol, 2-methoxy-

II. PHYSICAL DATA

BOILING POINT, 760 mm Hg	124°C (256.1°F)	FREEZING POINT	-85.1°C (-121.2°F)
SPECIFIC GRAVITY (H_2O = 1)	0.9663 at 20/20°C	VAPOR PRESSURE at 20°C	6.17 mm Hg
VAPOR DENSITY (air = 1)	2.62	SOLUBILITY IN WATER, % by wt	Complete
PERCENT VOLATILES BY VOLUME	100	EVAPORATION RATE (Butyl Acetate = 1)	0.62
APPEARANCE AND ODOR	Water-white liquid, mild and characteristic odor.		

MATERIAL	%	TLV	HAZARD
2-Methoxyethanol	100	See Section V	Toxic; Combustible

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT	103°F, Tag closed cup ASTM D 56 110°F, Tag open cup ASTM D 1310			
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	2.5	UPPER	19.8

EXTINGUISHING MEDIA	Use water spray, carbon dioxide, dry chemical, alcohol-type or universal-type foams applied by manufacturer's recommended technique.
SPECIAL FIRE FIGHTING PROCEDURES	Use supplied breathing air and protective clothing.
UNUSUAL FIRE AND EXPLOSION HAZARDS	None

EMERGENCY PHONE NUMBER • 304/744-3487 • This number is available days, nights, weekends, and holidays.

[illegible]

TLV AND SOURCE

25 ppm (skin), OSHA 29 CFR para. 1910.1000, Table Z-1 and ACGIH, 1981
5 ppm (skin), ACGIH Notice of Intended Changes, 1982
UNION CARBIDE RECOMMENDATIONS
For women of childbearing potential
- o Personal exposure limit 2 ppm (8-hour time-weighted average)
- o Short-term exposure limit 5 ppm (15-minute time-weighted average excursion, no more than four times daily with a minimum separation of one hour)
- o Avoid all skin contact

For other persons
- o Personal exposure limit 10 ppm (8-hour time-weighted average)
- o Short-term exposure limit 25 ppm (15-minute time-weighted average excursion)
- o Avoid all skin contact

EFFECTS OF ACUTE OVEREXPOSURE

SWALLOWING	Headache, dizziness, drowsiness, fatigue, nausea, vomiting, tremor, difficulty with speech, confusion and unconsciousness. Damage to the kidney has been described.
SKIN ABSORPTION	Prolonged or widespread contact with skin may lead to the absorption of harmful amounts of material resulting in signs and symptoms of toxicity as described for effects of swallowing.
INHALATION	Headache, dizziness, drowsiness, fatigue, nausea, vomiting, loss of coordination, loss of appetite, tremors.
SKIN CONTACT	May cause slight irritation with prolonged contact.
EYE CONTACT	Causes irritation.

EFFECTS OF REPEATED OVEREXPOSURE

Repeated overexposure may cause injury to bone marrow and blood cells, kidney, liver, and testes.

OTHER HEALTH HAZARDS

In laboratory inhalation studies, birth defects, increased fetal lethality, and delayed fetal development have been observed in offspring of female animals exposed to concentrations in air of 50 ppm and higher.

EMERGENCY AND FIRST AID PROCEDURES

SWALLOWING	Give 2 glasses of water, induce vomiting. Call a physician.
SKIN	Remove contaminated clothing and flush skin with water.
INHALATION	Remove to fresh air. If breathing is difficult, give oxygen and call a physician.
EYES	Immediately flush with water and continue for at least 15 minutes. Call a physician if discomfort persists.

NOTES TO PHYSICIAN

There is no specific antidote and treatment should be directed at the control of symptoms and the clinical condition. Recovery from recurrent overexposure may be prolonged.

VI. REACTIVITY

STABILITY		CONDITIONS TO AVOID	None
UNSTABLE	STABLE		
--	X		

INCOMPATIBILITY (materials to avoid)	As with all organic materials containing carbon and hydrogen, contact with highly reactive chemical oxidants and/or ignition sources should be avoided.
HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS	Burning can produce carbon dioxide and/or carbon monoxide.

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID	None
May Occur	Will Not Occur		
--	X		

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Wear suitable protective equipment. Small spills should be flushed with large quantities of water. Larger spills should be collected for disposal.
WASTE DISPOSAL METHOD	Incinerate in a furnace where permitted under appropriate Federal, State, and local regulations.

VIII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	Supplied-air respirator (self-contained or air-line) in high concentrations.
VENTILATION	This product should be contained within closed equipment, in which case, general (mechanical) room ventilation is expected to be adequate.

PROTECTIVE GLOVES	Butyl rubber	EYE PROTECTION	Safety glasses
OTHER PROTECTIVE EQUIPMENT	Eye bath and safety shower		

IX. SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Do not breathe vapor. Use with adequate ventilation. Do not get in eyes, on skin, or on clothing. Accidental contact should be washed away immediately. Keep away from heat and flame. Keep container closed.

(See also Section V)

FOR INDUSTRY USE ONLY

OTHER PRECAUTIONS

None

The opinions expressed herein are those of qualified experts within Union Carbide Corporation. 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 these opinions and the conditions of use of the product are not within the control of Union Carbide Corporation, it is the user's obligation to determine the conditions of safe use of the product.

ANGUS

TECHNICAL DATA SHEET

ANGUS SERIES TDS NO. 2 (4th EDITION)

NITROMETHANE: Storage and Handling

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Introduction

Nitromethane (NM) is a versatile chemical with a wide variety of industrial applications. It is used as a stabilizer for chlorinated hydrocarbons, as a component of special fuels for internal combustion engines, as a solvent for polymers in coatings, and as an extraction solvent or solvent for chemical reactions. It is also a raw material in the synthesis of many useful chemicals such as chloropicrin and tris(hydroxymethyl)aminomethane.

Nitromethane was first prepared in 1872 by Kolbe,[1] and for many years it was considered to be a very stable compound. It was not until 1938 that McKittrick and coworkers[2] reported that nitromethane could be detonated under conditions of strong confinement.

During World War II the U.S. Army Chemical Corps[3] and the California Institute of Technology[4,5] in investigating the potential of nitromethane as a monopropellant rocket fuel discovered two conditions under which nitromethane can be detonated: **(A)** the addition of a few percent of certain compounds, particularly amines, will sensitize nitromethane so that it can be detonated by a No. 8 blasting cap; **(B)** severe and very rapid compression under adiabatic conditions can cause detonation. It also was found, during these studies, that liquid nitromethane could explode when heated under confinement to near its critical temperature.

These conditions for explosive decomposition are so extreme that nitromethane can be regarded as a safe material for industrial pur-

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poses, provided that certain of its hazardous properties are understood by persons using this material so that they can take the relatively few simple precautions required to avoid unsafe conditions. These hazards and ways to avoid them are presented in this data sheet, together with recommendations on desirable practices to follow in storing and handling nitromethane.

Shipping and Storage

Nitromethane is not an explosive by any of the tests prescribed by the U.S. Department of Transportation (DOT) to determine classification for shipping purposes. Nitromethane is shipped by truck in drums as a flammable liquid (UN 1261). Bulk shipment by tank car or tank truck is not permitted (49 CFR 173.149a). Certain mixtures of nitromethane with diluents may be shipped in bulk in special tank trailers under Exemption DOT-E 6484, as detailed subsequently.

SHIPPING CONTAINERS

Nitromethane is shipped in 55-gallon DOT 17E drums containing 500 lb net weight, or in 5-gallon drums containing 45 lb net weight. Shipments by air are in DOT 17C drums. Export shipments by water are made in DOT 17E drums when containerized, otherwise in DOT 17C drums. The 55-gallon drums usually employed contain two bungs in the head.

The head space in each drum is filled with nitrogen.

In most instances it is impractical and unnecessary to reblanket drums with nitrogen after they have been opened or to use a nitrogen blanket in process equipment. The possibility of severe compression in these operations not only is remote but can be guarded against easily.

DRUM STORAGE

Usually up to four drums of nitromethane (2000 lb) are permitted to be stored in customary plant storage areas. An acceptable storage area must be free from hazardous conditions, such as presence of high pressure equipment or processes, or nearby storage of corrosive materials, oxidizing materials, sensitizing materials, or explosives. Drums preferably are stored on end in a single layer, not stacked. For quantities in excess of four drums of nitromethane, the American Insurance Association[6] suggests the following table of minimum distances between the storage area and plant structure or other inhabited buildings.

Maximum Quantity of Nitromethane	*Maximum No. of Drums*	*Minimum Distance*
Less than 2000 lb		No restriction
2000 lb	4	100 ft
10000 lb	20	200 ft
20000 lb	40	300 ft
40000 lb	80	400 ft
80000 lb	160	500 ft

For intermediate quantities, determine proper distances by interpolation.

DRUM DISPOSAL

The addition of dry caustic soda, lye, or similar alkaline materials to nitromethane is hazardous and may result in a fire. In reconditioning nitromethane drums, therefore, never use alkaline cleaning agents. Since nitromethane is fairly soluble in water, used drums should be rinsed out several times with water or steamed for a short period. Drain and air dry with bungs removed before disposal or reuse.

BULK STORAGE

Users receiving large quantities of nitromethane may wish to transfer the contents of drums to a storage tank for processing efficiency.

Nitromethane stored in bulk must be protected from impact by high-energy projectiles. Thin-walled containers that rupture easily are safer from the effects of such impact than are

thick-walled ones. Underground storage tanks with two feet of earth on top are recommended, although a suitable barricade may be employed instead of underground construction.

Inquire for procedures on preparing a tank for nitromethane storage.

For most purposes ordinary steel is satisfactory as a material of construction for the tank as long as the nitromethane is kept dry. If the tank is not blanketed with dry gas (preferably nitrogen) to prevent moisture introduction, it may be desirable to use an aluminum or stainless steel tank to prevent a slight yellow discoloration of the nitromethane. Copper, brass, or other copper-containing alloys are not recommended. Lead or lead-lined tanks must not be used. See section on "Hazards in Handing Nitromethane."

PIPING

Ordinary steel piping may be used to transfer nitromethane. If piping passes through a hazardous processing area, it should be protected by a suitable barricade.

Arrange piping so as to eliminate the possibility of confinement of nitromethane in a line between two valves in a closed position. If the piping is ½ inch or more in diameter, a detonation trap should be installed on each end of the transfer line, i.e., at the storage tank and at the entrance to the processing equipmemt. Each detonation trap assembly may utilize a multiplicity of expansion-tube units to provide the desired pressure-drop characteristics. For high flow rates, these detonation trap assemblies can be installed in parallel.

Figure 1 shows a schematic view of a suitable detonation trap. Working drawings for construction of such traps are available upon request.

Propagation of detonation of unsensitized nitromethane in ½-inch pipe often is incomplete and can be stopped by orifices or right-angle bends, and particularly by expansion into a short section of larger (e.g., 2-inch) pipe. These characteristics have been used for the design of this detonation trap. It is preferable to use tubing rather than pipe for the construction to minimize wall thickness.

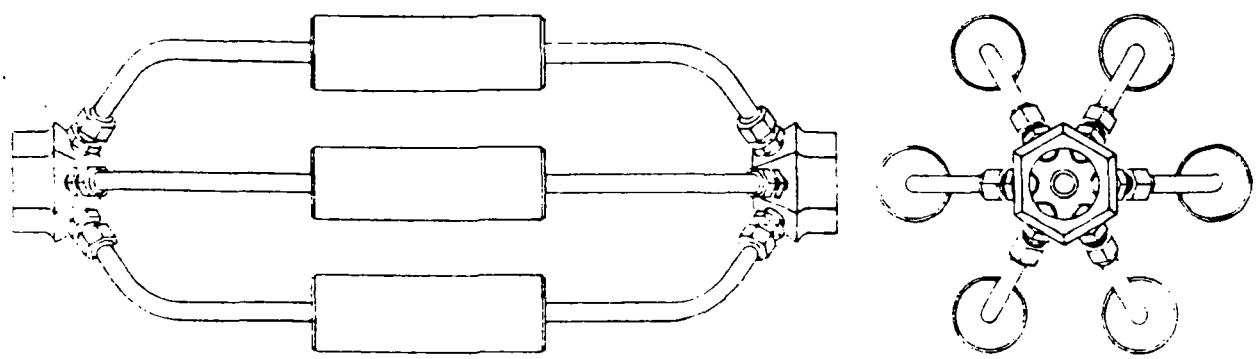
Medard[7] describes the use of tubing of polyvinyl chloride or other elastomers resistant to nitromethane to stop transmission of detonation in transfer lines.

PUMPS AND GASKETS

Nitromethane can be handled easily in centrifugal pumps equipped with carbon, Teflon, or Neoprene ring seals. Asbestos gaskets are fully satisfactory. To avoid overheating the nitromethane, *do not operate pumps against a closed discharge.* Positive displacement pumps are not recommended. Pumps capable of creating pressures in excess of 100 psig or which cause severe cavitation are not recommended.

Pumping of sensitized nitromethane can be hazardous and should be avoided.

Figure 1. Detonation trap assembly.



MATERIALS OF CONSTRUCTION

Nitromethane is not hygroscopic, but there may be some moisture pickup due to breathing of storage containers. Aluminum or stainless steel tanks are recommended for storage of wet nitromethane. In the presence of more than about 0.2% water, nitromethane is slightly corrosive to steel because of the formation of its tautomeric *aci*-form. Corrosion of mild steel can be inhibited by the addition of small proportions of phosphoric acid, monobutyl phosphate, or dibutyl phosphate.

Solutions containing nitromethane should not be exposed to copper, brass, or bronze without thorough pretesting. The presence of acidic materials may cause nitromethane to become highly corrosive to copper and its alloys after several weeks of contact.

POLYMERS

There are a number of synthetic polymeric materials that can be used with nitromethane. The actual choice depends upon the degree of exposure, the presence of fillers or plasticizers, and the importance of color.

Dayco All-Chemical 7276 hose (Dayco Corporation) and Goodall N—1689 Kem-Flex hose (Goodall Rubber Co.) are satisfactory to use with nitromethane. Teflon is satisfactory. Polyethylene, polypropylene, glass-fiber-reinforced polyesters, vinylidene chloride copolymers, and nitrile rubbers are generally satisfactory. Recommendations of the manufacturers of these products should be obtained, and tests should be run on the particular formulations suggested to be sure they are suitable for their intended use.

Our technical personnel are ready to assist in selecting materials that will be satisfactory to use in the handling and storage of nitromethane.

Hazards in Handling Nitromethane

General information on the properties of nitromethane and on its chemical reactions is given in ANGUS Technical Data Sheet No. 1, copies of which are available.

CHEMICAL HAZARDS

A primary nitroparaffin such as nitromethane can tautomerize from the nitro form to the enol (*aci*-form), called a nitronic acid:

CH_3NO_2	$CH_2 = NOOH$
nitromethane	methanenitronic acid

This nitronic acid is weakly ionized and forms salts when neutralized by a strong base. In aqueous or alcoholic solutions the salts are sufficiently stable that they may be used as intermediates to prepare a large number of derivatives of nitromethane. When dry, the salts of nitromethane can be extremely unstable and highly sensitive to shock. Avoid isolation of the salts in a dry state.

Weak bases, such as organic amines, usually do not produce identifiable crystalline salts of nitromethane. However, as mentioned earlier, the addition of amines to nitromethane can result in compositions sensitive to detonation.

Amine-sensitized nitromethane in contact with mercuric oxide reacts vigorously and may explode spontaneously, perhaps due to formation of mercury fulminate. Therefore, avoid mixtures containing nitromethane and both amines and heavy metal oxides, such as those of mercury, silver, or lead.

PIGMENTS AND DYES

Certain types of lead pigments (litharge, sublimed blue lead, and lead shavings) when mixed with nitromethane react slowly to cause pressure to develop in closed containers during storage. Other lead pigments, such as white basic lead carbonate and basic lead

sulfate, are entirely satisfactory. Always make small-scale stability tests before using mixtures of nitromethane and lead in any form, including lead pigments. Terneplate cans should not be used with nitromethane.

Bronzing pigments usually are not incorporated in coating systems but are packaged separately to be mixed immediately before use. This practice is recommended when nitromethane is used in the solvent system for such products.

Nitromethane is a good solvent for many types of dyes, but those of the nigrosine and induline class decompose nitromethane slowly to form NO_2. This reaction leads to pressure buildup when mixtures are stored over a period of time. New classes of dyes, alkaline dyes, and alkaline pigments should be tested for inertness with nitromethane before their routine use is adopted.

FLAMMABILITY

Nitromethane has a flash point of 96 °F by Tag closed cup. The DOT Flammable Liquid label is required for transportation.

The lower explosive limit for nitromethane vapor in air is 7.3% by volume, one of the highest lower limits of any organic liquid. This lower explosive limit was determined at atmospheric pressure and at 33 °C (91 °F). Such a concentration of nitromethane vapor cannot be obtained in air at lower temperatures, so explosive mixtures generally are no problem.

Nitromethane fires are readily extinguished by water. Unlike gasoline and oil fires, a nitromethane fire will not be spread by water; since nitromethane has a higher density than water at ordinary temperatures, the water usually will float on top and smother the fire. Nitromethane fires also can be extinguished easily with carbon dioxide or foam.

Dry chemical triclass extinguishers (those containing only ammonium phosphate and rated for Class ABC fires) are suitable for use on small nitromethane fires.

*Other dry chemical fire extinguishers contain sodium or potassium bicarbonate which should **not** be used on nitromethane fires. Alkaline bicarbonates appear to put out the fire when first applied, but later contribute to reignition.*

Nitromethane will burn at a considerably lower rate than most other common organic liquids. The drums in which nitromethane is shipped (DOT 17E or DOT 17C) generally will begin to leak at an internal pressure of less than 30 psig. In burning tests with drums of nitromethane the flames sometimes die out spontaneously, leaving a considerable amount of unburned nitromethane in the drum. In none of the tests has the burning become violent.

If nitromethane is ignited under conditions of confinement greater than that in DOT 17E drums, or where it conceivably could become confined during burning, then it may burn as a monopropellant with disastrous consequences. *In instances where nitromethane under such confinement is threatened by fire, immediately clear the area of all personnel! Do not attempt to fight the fire!.*

THERMAL STABILITY

Nitromethane is relatively insensitive to detonation by shock at ordinary temperatures. It becomes more sensitive as the temperature is raised, and has a 50% probability of becoming sensitive to a No. 8 blasting cap at 130-140 °F (55-60 °C).

In the absence of strong shocks, nitromethane exhibits no significant instability up to its boiling point at atmospheric pressure. Heating of nitromethane in the liquid phase under pressure can be hazardous, however, especially if the container is overfilled. Overflowing is easily possible, for there is over a threefold increase in liquid volume as nitromethane is heated from 20 °C to its critical temperature. In the region of the critical point (315 °C and 62 atm) expansion is particularly rapid, gas pockets are compressed and heated, and ignition and explosion may occur. Heating of nitro-

methane vapors, however, even to temperatures appreciably above 315 °C results only in a slow decomposition with no apparent hazard. (Nitromethane is manufactured by a vapor-phase reaction at temperatures of 400-450 °C.)

A slight color formation frequently is encountered when nitromethane is distilled at atmospheric pressure. This usually may be prevented by adding a small amount of boric acid to the distillation kettle.[9] Satisfactory distillations may be made at pressures of 100-250 mmHg without additives.

Recovery procedures for contaminated nitromethane must take into consideration any adverse effects the contaminants may exert. Steam distillation at atmospheric pressure is generally a satisfactory first step.

Most hazardous situations can easily be avoided if careful planning is employed in the storage, handling, and use of nitromethane.

Shock Sensitivity

ROUGH HANDLING OF DRUMS

Nitromethane at ambient temperature is very resistant to shock from rough handling. Drums of nitromethane have been dropped from low-flying airplanes without detonation. They have also been dropped from a height of 50 ft onto a steel plate with such force as to increase the circumference of the lower end by 9 inches; there was no apparent harm to the contents. Drums of nitromethane have been dropped from a height of 50 ft onto each other, and 100-lb objects of various shapes have been dropped on drums of nitromethane—all with no indications of nitromethane decomposition.

It is recommended that careless and rough practices be avoided in handling drums of nitromethane. However, unusual precautions are not considered necessary with these containers. Hazard associated with extreme types of shock are discussed in greater detail in the section on "*Sensitivity to Adiabatic Compression.*"

CHEMICAL SENSITIZATION OF NITROMETHANE

The addition of small proportions of certain chemicals, such as amines or acids, to nitromethane may markedly increase its sensitivity to detonation by shock. The effect of small amounts of a sensitizing chemical usually is roughly proportional to the amount added. With further increments a maximum sensitivity is reached, and beyond this concentration the sensitivity may drop rapidly. In any system containing nitromethane and a sensitizer thermal stability has been decreased; chemical activity of the system has been increased.

In the preparation of derivatives of nitromethane in chemical syntheses, use frequently is made of amines or acids as reactants or catalysts. Even though successful commercial application has been made of such reactions involving nitromethane, it is imperative that the sensitizing potential be kept constantly in mind.

CHEMICAL DESENSITIZATION OF NITROMETHANE

Nitromethane can be made less sensitive to detonation by shock by the addition of compounds such as alcohols, hydrocarbons, esters, or ketones. The effect of these desensitizers is roughly proportional to the amount added since desensitization appears to be partly a dilution phenomenon.

The Materials Transportation Bureau of the U.S. Department of Transportation has issued an exemption (DOT E 6484) which allows specified mixtures of nitromethane and diluents or desensitizers to be shipped in bulk under nitrogen blanket in special tank trucks. Under terms of this permit all the mixtures are classified as flammable. These desensitizers, with the minimum content by weight that must be present in the mixtures, are:

Cyclohexanone	25% by wt
1,4-Dioxane	35%
1,2-Butylene oxide	40%
Methanol	45%
2-Nitropropane	47%
1-Nitropropane	48%
Methyl chloroform	50%

SENSITIVITY TO ADIABATIC COMPRESSION

Adiabatic compression occurs when heat, generated by compression, does not escape to the external environment. It is actually an ideal condition, never completely realized but sometimes closely approached. Adiabatic compression usually refers to the vapor phase since liquids cannot be compressed appreciably. For this very reason, however, dangerously high pressures can be developed when a liquid-filled container (e.g., a section of pipeline between closed valves) is heated. The pressure of confined, liquid nitromethane increases 17.5 atm for every 1 °C increase of its temperature. Modest heating would suffice to rupture most completely filled containers. Any pockets of vapor or gas will slow the pressure rise, but small pockets can be compressed rapidly enough to heat the gas and even to ignite the nitromethane.

Very high temperatures can be developed by adiabatic compression; for example, when air is compressed suddenly from atmospheric pressure to 350 psi, the temperature can rise from 70 °F to 837 °F. If the air is in contact with a combustible liquid, the sudden compression may raise the temperature above the ignition point of the liquid and cause a fire.

Ignition of nitromethane under adiabatic compression is a more serious hazard than it is with many other organic compounds, because nitromethane under pressure can burn as a monopropellant. Under extreme conditions detonation of nitromethane can occur.

Nitromethane should be handled in a manner to avoid conditions favoring adiabatic compression.

Adiabatic compression can occur in a pipe containing air or other gases in which the flow of a liquid is impeded; e.g., if liquid nitromethane is pumped or pressurized into a closed-end pipe; if a valve is closed suddenly on the line through which nitromethane is being pumped rapidly; if a restriction or sufficiently small orifice is introduced into such a line (by partial closure of a valve, for instance) so that most of the kinetic energy of the moving liquid is expended in compressing a pocket of gas at the orifice.

Higher pressures without explosions can be tolerated by nitromethane in contact with nitrogen than with air or oxygen, probably because nitrogen cannot induce ignition and support combustion. This was shown in an apparatus where a quick-operating valve opened a pressure reservoir to an appended line which slanted upward and was closed at the end. The line contained nitromethane and a gas. When the gas was oxygen, explosions were reported with reservoir pressures as low as 250 psi; but when the gas was nitrogen, 850 psi was the lowest pressure at which explosions occured. Each drum of nitromethane is shipped with a blanket of nitrogen gas to keep oxygen to a minimum.

Adiabatic compression likewise can be encountered when high-energy projectiles strike a container of liquid. Under certain conditions of fill, nitromethane in containers with ¼-inch wall thickness has been exploded by the impact of .50-caliber, high-velocity bullets. In similar tests with thin-walled containers (such as DOT 17E drums) no explosions occured. It is believed that in thick-walled containers enough of the bullet's energy is consumed in compressing the gas in the head space to result in ignition and explosion. The high pressures required for ignition are not attained in thin-walled vessels. In the absence of a vapor space above the nitromethane it is difficult to achieve detonations of nitromethane even in thick-walled containers.

A much higher energy impact than that provided by a .50 caliber bullet might lead to detonation of thin-walled containers, but nevertheless a fragile container greatly reduces the possibility of accidential detonation.

Monopropellant burning of nitromethane (that is, its rapid exothermic decomposition in the absence of an oxidizer) occurs only at elevated pressures not likely to be reached in thin-walled containers. If monopropellant burning of nitromethane is initiated in a container, the reaction will continue with increased vigor as temperatures and pressures rise until either

the nitromethane is consumed completely or the container bursts. If the container is sufficiently strong, burning can proceed to detonation.

The pressures necessary for monopropellant burning substantially exceed the pressure at which thin-walled shipping containers, such as 55-gallon DOT 17E steel drums, will rupture. Such containers will normally burst in the event of a fall or a projectile impact which might otherwise lead to the explosion of nitromethane had it been contained in a thicker-walled vessel. Do not store nitromethane in thick-walled containers unless they are properly barricaded or installed underground.

There are no indications that pressure in itself causes decomposition of nitromethane. On numerous occasions, nitromethane has been used without incident at pressures of several thousand pounds per square inch. However, because of the dangers from adiabatic compression, high-pressure handling systems are not recommended for use with nitromethane. Handling systems should be so designed that pressures cannot exceed 100 psig, even with improper operation. If higher pressures are necessary, extra precautions must be taken to prevent occurence of adiabatic compression.

Toxicity

VAPOR INHALATION

The acute effects from exposure of rats to nitromethane vapor were studied by Dequidt *et al.*[10] In one experiment rats exposed to 13,000 ppm (33 g/m^3) of nitromethane in the air died after exposure for 6 hours. At 2500 ppm (6.3 g/m^3) rats survived 6-hour exposures on four successive days but died on the fifth day. No trace of methemoglobin was found in the blood of these animals, and nitromethane was not found in any organs except in the livers of animals exposed to 13,000 ppm of nitromethane.

The subchronic inhalation of nitromethane vapor was studied by Lewis *et al.*[11] Male rats and male rabbits were exposed to either 98 ppm or 745 ppm of nitromethane in the atmosphere for 7 hours/day on 5 days/week for 6 months. Animals sacrificed at 2 days, 10 days, 1 month, 3 months, and 6 months were thoroughly examined for signs of toxicity.

Rats exposed to 745 ppm of nitromethane exhibited decreased rate of body weight gain after 8 weeks of exposure. Weights of all organs evaluated were comparable to controls in rats and rabbits at all sacrifice periods except for increased thyroid weights in rabbits after 6 months at 745 ppm. Histopathologic evaluation indicated no exposure-related abnormalities in rats. Some evidence of pulmonary edema and other pulmonary abnormalities was observed in rabbits sacrificed at 1 month only.

The standard of 100 ppm for nitromethane was judged to provide a satisfactory margin of safety for workers exposed to its vapors.

CONTROL OF VAPORS

Nitromethane is similar in toxicity by inhalation to many other common organic solvents. The American Conference of Governmental Industrial Hygienists[12] has established 100 ppm (approximately 250 mg/m^3) as the threshold limit value for vapors of nitromethane in air for an 8-hour-per-day working exposure. This time-weighted average value has been adopted by the Occupational Safety and Health Administration, U.S. Department of Labor (cf. 29 CFR 1910.1000). The vapor pressure of nitromethane is low enough that this threshold limit can be met easily with the ventilation methods normally used with organic solvents.[13]

If prolonged exposure to nitromethane vapors above the threshold limit concentration is anticipated, a mask supplying fresh air or self-contained breathing apparatus should be used. Such exposure may occur inside a tank, as a result of spillage, or in fire-fighting operations.

Organic-vapor canister gas masks should never be used for protection from nitromethane vapors.

EFFECT ON THE SKIN AND EYES

In a study of the dermal toxicity of nitromethane to rabbits, no toxic effects were observed for doses as high as 2000 mg/kg. Nitromethane was noncorrosive by the DOT skin corrosion test. Nitromethane was nonirritating to both skin and eyes (scores 0.0) using the Draize technique on rabbits. Nitromethane was nonsensitizing in an intradermal sensitization test conducted on guinea pigs.[8]

Frequent exposure of the skin to nitromethane may result in a slight drying effect because of a defatting action. Prolonged or frequently repeated exposure may lead to a low-grade irritation, but no allergies or other adverse physiological effects have been reported from skin exposure. Nevertheless, in the interest of good hygienic practice in the event of accidental spillage on skin and clothing, wash well with soap and water and change to clean clothing.

ORAL INGESTION

The acute oral LD_{50} in rats for nitromethane is 1478 mg/kg.[8] The minimum acute lethal dose for rabbits by oral administration[14] is in the range of 0.75 to 1.0 g/kg. The LD_{50} of an aqueous solution of nitromethane[15] administered orally to mice is 1440 mg/kg; with dogs the LD_{50} lies between 125 and 250 mg/kg orally. Young rats which received 0.25% or 0.1% nitromethane in their drinking water for a period of 15 weeks appeared to be in moderately good health at the end of the period except for a slower rate of weight gain than control animals. Relatively mild pathological changes in the liver were found in those rats receiving the 0.25% dose, but not in those receiving the 0.1% dose.[15]

Nitromethane thus would be considered by most industrial toxicologists as only slightly toxic when taken orally. Accidental consumption is unlikely in commercial applications. Human hazard due to oral ingestion is very slight: no cases have ever been reported.

MUTAGENICITY

Nitromethane was nonmutagenic in the Ames Salmonella/mammalian microsome mutagenicity assay, with or without metabolic activation by Arochlor induced rat liver microsomes.[16]

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Environmental Considerations

AIR POLLUTION

Nitromethane is minimally photochemically reactive. As such it is classified as a solvent exempt from volume restrictions under Rule 66 of the Air Pollution Control District of Los Angeles County, Regulation 3 of the Bay Area Air Pollution Control District, and other similar air pollution legislation in the United States.

However, the continuing increased emphasis on eliminating nearly all discharges into the atmosphere makes it desirable, if not necessary, to remove solvent vapors from the air stream leaving an operation, area, or plant. For example, the exhaust air can be passed through a gas-fired incinerator to burn the solvent vapors. Economic considerations, however, may indicate the recovery and reuse of these solvents.

RECOVERY OF NITROMETHANE FROM VAPORS

Nitromethane is recovered almost quantitatively from gaseous mixtures by water in a scrubber having 15—20 theoretical plates and operated at 60—130 psi pressure; an almost saturated water solution can be obtained. At atmospheric pressure there is poorer absorption, and more water and/or a more efficient scrubber must be used.

Live-steam distillation of the scrubber effluent at atmospheric pressure strips out the nitromethane—water azeotrope (boiling point 83.6 °C) containing about 76% by weight nitromethane. This distillate separates into two layers on cooling. The upper aqueous layer contains about 10% by weight nitromethane at 20°C (~ 2—3% of the original nitromethane). This layer can be returned to the stripper, or may be discarded. The lower layer contains nitromethane with only about 2% by weight water, and can be returned directly to the process if this amount of water is not objectionable.

The wet nitromethane can be dried by fractionating it at a reduced pressure of about 200 mmHg. It is only necessary to take off the azeotrope overhead, returning it to the steam stripper. The dry nitromethane is then taken off as a side stream. About 1%, based on the product, should be continuously returned to the steam stripper from the bottom of the still to avoid a buildup of color bodies in the nitromethane.

Nitromethane also can be recovered from air at atmospheric pressure by absorption on activated carbon or silica gel. This method is probably more satisfactory than water scrubbing for low concentrations of nitromethane.

Depending on the concentration in the air, nitromethane can be absorbed at 25—30°C to the extent of 10—30% of the weight of silica gel before the breakpoint of the gel is reached. Space velocities per cubic feet of air per hour are satisfactory using silica gel of 8—14 mesh. Nitromethane is absorbed preferentially, so that satisfactory recoveries are obtained from moist air.

The absorption bed is heated with live steam to strip off the nitromethane as the water azeotrope. This eluate is treated as previously described for the product obtained from the water scrubber. After the nitromethane has been desorbed, the silica gel is reactivated by passing air through the gel to dry it.

Several manufacturers of activated carbon (among them Calgon Corporation; American Norit Company, Inc.; Union Carbide Corporation) can supply carbon suitable for this purpose. A number of firms (e. g. Ray Solv Inc. and Vic Manufacturing Company) will design and install solvent-removal or complete solvent-recovery systems to meet individual requirements.

Stainless steel or aluminum are the preferred materials of construction for nitromethane recovery equipment, but ordinary steel with a suitable plastic coating may be used.

WATER POLLUTION

Water pollution—another area of deep concern, and intensive regulation—must be carefully considered by all. Nitromethane is a biodegradable material. Numerous organisms found in soil and in activated sludge slowly decompose nitromethane to carbon dioxide, nitrogen, and water.

As with all solvents, great care should be taken to prevent leaks or spills. Not only is there the economic loss, but also the possibility of pollution. Large quantities, or slugs, of nitromethane introduced into bodies of water may temporarily inhibit the degrading organisms from properly performing their function.

WASTE DISPOSAL

Disposal of waste nitromethane may be accomplished by incineration, either directly or by adsorption on an inert material and subsequent burning. Local regulations may prevent this method of disposal. In such situations adsorption on an inert material for burial in a sanitary-landfill disposal area is a satisfactory method of disposal.

Disposal of drums and other containers used for nitromethane presents no particular problems. Such containers can be cleaned for reuse by thoroughly rinsing several times with water, or steaming for a short period, followed by drying. Strong caustic or lye solutions should never be used in reconditioning nitromethane drums.

Precautionary Labeling

Nitromethane labels bear these caution statements:

WARNING! FLAMMABLE.
FORMS SHOCK-SENSITIVE MIXTURES WITH AMINES.
COMPOUNDS FORMED WITH STRONG ALKALIS ARE EXPLOSIVE WHEN DRY.

STORE IN ORIGINAL CONTAINER. Consult manufacturer for bulk storage and handling instructions.

Avoid mixing with strong alkalis or amines.

Avoid prolonged breathing of vapor.

Use with adequate ventilation.

Keep away from heat, sparks, and flame.

Do not ship with or store near high explosives.

In case of fire, use water spray, foam, or CO_2; use only dry chemical triclass extinguishers approved for class ABC fires.

Flush spill area with water spray.

After this container has been emptied, it may contain explosive vapors; observe all warnings and precautions listed for this product. **Do not** cut, puncture, or weld on or near this container.

DO NOT CLEAN DRUM WITH LYE OR CAUSTIC.

FOR INDUSTRY USE ONLY.

Physical and Thermodynamic Properties of Pure Nitromethane

CAS Registry No. 75-52-5

Molecular weight (calcd.)	61.04
Boiling point at 760 mmHg	101.2°C (214.2°F)
Freezing point	−28.55°C (−19.4°F)
Vapor pressure at 20°C	27.3 mmHg (3.6 kPa)
at 40°C	74.8 mmHg (9.9 kPa)
at 60°C	177.8 mmHg (23.7 kPa)
Density at 0°C	1.1621 g/ml
at 20°C	1.1382 g/ml
at 30°C	1.1244 g/ml
at 50°C	1.098 g/ml
Coefficient of expansion per °C	0.00122
per °F	0.00068
Isothermal compressibility factor of liquid at 0°C	0.000060/atm
at 30°C	0.000076/atm
at 60°C	0.000088/atm
Change in pressure with temperature of confined liquid, 0–40°C	17.5 atm/°C (257 psi/°C)
Surface tension at 20°C	37.48 dynes/cm (0.37 mN/cm)
Refractive index, n_D at 25°C	1.3796
at 50°C	1.3675
Viscosity at 10°C	0.73 cp (0.73 mPa · s)
at 25°C	0.61 cp (0.61 mPa · s)
Heat of vaporization at bp	8.225 kcal/mole
Heat of formation at 25°C	−27.03 kcal/mole
Heat of combustion at 25°C, liquid	−169.3 kcal/mole
Heat capacity at 30°C, liquid	25.76 cal/(mole · °C)
Critical temperature	315°C (599°F)
Critical pressure	62 atm (915 psia) (6282 kPa)
Critical density	0.352 g/ml
Dielectric constant at 30°C	35.87
Electrical conductance at 25°C	5×10^{9} mho/cm
Dipole moment in gas phase	3.5 Debye units
Solubility of NM in water at 20°C	10.5% by wt
at 70°C	19.3% by wt
Solubility of water in NM at 20°C	1.8% by wt
at 70°C	7.6% by wt
Azeotrope with water:	
Boiling point at 1 atm	83.6°C (182.4°F)
NM in azeotrope	76.4% by wt

Typical Properties of Commercial-Grade Nitromethane

Distillation range at 1 atm (90% min.)	100–103°C
Vapor density (air=1)	2.11
Density at 15°C	1.140 g/ml
at 35°C	1.112 g/ml
Change of density with temperature, 0–50°C	0.0014 g/(ml • °C)
Weight per U.S. gallon at 68°F	9.4 lb
Flash point, Tag open cup	112°F
Tag closed cup	96°F
Abel Pensky	34°C
Lower limit of flammability at 33°C	7.3% by vol
Ignition temperature	418°C (785°F)
Evaporation rate (n-butyl acetate=100)	139 by vol
Evaporation number (diethyl ether=1)	9
Solubility parameter	12.7

Specifications for Nitromethane

Nitromethane content* (min.)	95% by wt
Total nitroparaffins* (min.)	99% by wt
Specific gravity at 25/25°C	1.124–1.129
Acidity as acetic acid (max.)	0.1% by wt
Water (max.)	0.1% by wt
Color (max.)	20 APHA

*Determined by gas chromatograph.

Summary

The following recommendations should be observed in storage, handling, and use of nitromethane:

1. Store in original drums as received in a cool place away from hazardous conditions, or transfer to an underground or barricaded storage tank

2. Protect storage and processing vessels from high-energy projectiles by a suitable barricade.

3. Ordinary steel, aluminum, or stainless steel are satisfactory materials of construction. Formulations containing nitromethane should not be exposed to brass, bronze, or copper unless tests have shown them to be inert. Lead, such as terneplate, is not satisfactory with nitromethane.

4. Nitromethane is flammable. Burning nitromethane can be extinguished with water, CO_2, foam, or dry chemical triclass extinguisher approved for class ABC fires.

5. Do not use dry chemical fire extinguishers containing sodium or potassium bicarbonates on nitromethane fires.

6. Do not expose nitromethane to dry caustic soda, lye or similar alkaline materials.

7. Do not reuse or dispose of empty nitromethane drums until they have been well rinsed with water.

8. Do not allow solutions of nitromethane and bases to become dry.

9. When mixtures of nitromethane and known sensitizers are required in a process, they should be diluted with an inert material or should be protected from severe shock.

10. Some ternary mixtures of nitromethane, amines, and heavy metal oxides can be very hazardous.

11. Like other organic compounds, nitromethane may form a sensitive explosive mixture with strong oxidizing agents such as nitrogen tetroxide.

12. Liquid nitromethane should not be processed or handled in high-pressure equipment which would permit the development of elevated pressures and temperatures.

13. Nitromethane should be protected from all possible sources of adiabatic compression.

14. Detonation traps should be installed at each end of transfer lines ½ inch or more in diameter.

Nitromethane possesses great utility as a raw material for synthesis, as a solvent in protective coatings, as a selective solvent in extraction processes, or as a solvent for chemical reactions. Industry can take advantage of its many useful properties by employing a relatively few simple precautions. Nitromethane may be used with confidence by those who have become acquainted with its hazardous properties.

The information and data contained herein are believed to be correct. However, we do not warrent either expressly or by implication the accuracy thereof. In presenting uses for this product, no attempt has been made to investigate or discuss any patent situations which may be involved.

HBW

FOR ADDITIONAL INFORMATION OTHER THAN PLACING AN ORDER, CALL THE DISTRICT OFFICE NEAREST YOU.

Atlanta Area
5000 Snapfinger Woods Drive
Building C
Decatur, GA 30035
Phone: (404) 987-4557

Cleveland-Akron Area
Phone: (216) 922-0622

Los Angeles, CA
Phone: (213) 563-0081

Northbrook, IL 60062
ANGUS Chemical Company
2211 Sanders Road
P.O. Box 3037
Phone:(312) 498-6700
To Place an Order Call Toll Free
(800) 323-6210
Illinois Call Collect
(312) 498-6700

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union

MATERIAL HEALTH AND SAFETY BULLETIN

Union Chemicals Division
Petrochemical Group

3 / 1 / 0

UCD No. 826

Product Code No. 5348

CAS# 71-23-8

UN No. 1274

MANUFACTURER'S NAME Union Chemicals Division, Union Oil Company of California	
STREET ADDRESS 1345 North Meacham Road	
CITY, STATE, AND ZIP CODE Schaumburg, Illinois 60196	Business Phone: (312) 885-5450
EMERGENCY TELEPHONE NO. Transportation Emergencies call CHEMTREC (800) 424-9300 Health Emergencies Call Los Angeles Poison Control Center (24 hours) (213) 664-2121	

PRODUCT: n-Propanol COMMON NAME: AMSCO Solv 5348 GENERIC NAME: Volatile Solvent CHEMICAL NAME: n-Propanol CHEMICAL FAMILY: Oxygenated Hydrocarbon DOT PROPER SHIPPING NAME: Alcohol NOS	WARNING STATEMENT: Warning Flammable. Induce vomiting if swallowed. For industrial use only.

Section I -- INGREDIENTS

	TLV*		TLV*
n-Propanol	200		

*Threshold Limit Value: A. [illegible] B. ACGIH [ ] C. See Section III [ ] D. Other [ ]

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Section II - - EMERGENCY AND FIRST AID PROCEDURES

EMERGENCY: Have a physician call LOS ANGELES POISON CONTROL CENTER (24 hrs.) 213/664-2121

Eye Contact	If this product comes in contact with the eyes, flush with large quantities of water for at least 15 minutes and seek immediate medical attention.
Skin Contact	If this product comes in contact with the skin, wash with large quantities of water and seek medical attention if irritation from contact persists.
Inhalation	If breathing difficulties, dizziness, or lightheadedness occur when working in areas with high vapor concentrations, victim should seek air free of vapors. If breathing stops, begin artificial respiration and seek immediate medical attention.
Ingestion	If this product is swallowed, induce vomiting if the victim is conscious. Seek immediate medical advice and/or attention.

Section III - - PHYSIOLOGICAL EFFECTS AND HEALTH INFORMATION

Eye Effects	This product may be an eye irritant.
Skin Effects	This product may cause skin irritation upon prolonged or repeated contact. Contact with this product may result in dermatitis upon prolonged or repeated contact.
Systemic Effects	Various studies have shown a possible association with exposure to this product and the following: Respiratory tract irritation Narcosis in high concentration

Section IV -- SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type)	The use of respiratory protection depends on vapor concentration above the time-weighted TLV; use a NIOSH approved cartridge respirator or gas mask.
Ventilation	General mechanical ventilation may be sufficient to keep product vapor concentrations within specified time-weighted TLV ranges. If general ventilation proves inadequate to maintain safe vapor concentrations, supplemental local exhaust may be required. Other special precautions such as respiratory masks or environmental containment devices may be required in extreme cases.

Protective Gloves	The use of impermeable gloves is advised to prevent skin irritation in sensitive individuals.	Eye Protection	Safety glasses, chemical goggles and/or face shields are recommended to safeguard against potential eye contact, irritation, or injury.

Other Protective Equipment	Impermeable aprons are advised when working with this product. The availability of eye washes and safety showers in work areas is recommended.

Section V -- REACTIVITY DATA

Stability	Unstable		Conditions to Avoid:
	Stable	X	

Incompatibility (Materials to Avoid)	This product is incompatible with strong oxidizing agents, strong acids or bases, halogens and halogen containing compounds
Hazardous Decomposition Products	Thermal decomposition in the presence of air may yield carbon monoxide and/or carbon dioxide.

Hazardous Polymerization	May Occur		Conditions to Avoid:
	Will Not Occur	X	

Section VI -- SPILL OR LEAK PROCEDURES

HIGHWAY OR RAILWAY SPILLS - CALL CHEMTREC 800/424-9300

Precautions In Case of Release or Spill	Keep sources of ignition and hot metal surfaces isolated from the spill. Flush spilled material into suitable retaining areas or containers with large quantities of water. Small amounts of spilled material may be absorbed into an appropriate absorbant.
Reportable Quantity	Notify Coast Guard National Response Center: Phone No. 800-424-8802, If Spill Is Greater Than ___ lbs (Kilograms)
Waste Disposal Method	Dispose of spilled product in accordance with applicable local, county, state and federal regulations.

Section VII -- STORAGE AND SPECIAL PRECAUTIONS

Handling and Storing Precautions	Keep product containers cool, dry, and away from sources of ignition. Use and store this product with adequate ventilation. (See Section IV.) Keep product containers closed when not in use.
Other Precautions	Personnel should avoid inhalation of vapors. (See sections I, II, III, V, VI) Personal contact with the product should be avoided. Should contact be made, remove saturated clothing and flush affected areas with water. (See sections II, IV, VI)

Section VIII -- FIRE AND EXPLOSION HAZARD DATA

DOT Flammability Classification	Flammable Liquid	Flash Point Range: ☐ Below 20° F, ☒ 20° F - 100° F, ☐ 100° F - 200° F, ☐ Over 200° F, ☐ None to boiling
Extinguishing Media	Use foam, CO_2 or dry chemical fire fighting apparatus.	
Unusual Fire and Explosion Hazards	Keep work areas free of hot metal surfaces and other sources of ignition.	
Fire Fighting Procedures	The use of self-contained breathing apparatus is recommended for fire fighters. Water may be unsuitable as an extinguishing media, but helpful in keeping adjacent containers cool. Avoid spreading burning liquid with water used for cooling purposes.	

Section IX -- PHYSICAL DATA

Approximate Boiling Range, ° F	207°F	Vapor Density: ☒ Heavier ☐ Lighter Than Air	
Evaporation Rate: ☐ Faster ☒ Slower Than Ether		Percent Volatile: 100%	Solubility in Water: 100%
Specific Gravity: ☒ Lighter ☐ Heavier Than Water		Weight per Gallon: 6.70	
Appearance and Odor:	This product is clear, has little if any color and has a characteristic odor.		

Section X -- DOCUMENTARY INFORMATION

Product Code No.	5348	Issue Date Revised 9/25/84 10/22/80	Prepared By Paul Pfeifer
Replaces: UCD No.		Product Code No.	Issued
Reviewed By:	[illegible]	Manager, Loss Prevention	
Reviewed By:	[illegible]	Director of Occupational Health & Toxicology	
Reviewed By:	[illegible]	Manager, Science and Technology Division	

The above information is believed to be correct as of the date hereof. However, no warranty of merchantability, fitness for any use, or any other warranty is expressed or is to be implied regarding the accuracy of these data, the results to be obtained from the use of the material, or the hazards connected with such use. Since the information contained herein 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 responsibility for the results of its use. This information is furnished on the condition that the person receiving it shall make his own determination as to the suitability of the material for his particular purpose and on the condition that he assume the risk of his use thereof.

Product Bulletin

Union Chemicals Division

Union 76

n-PROPANOL

CAS #71-23-8

RESALE SPECIFICATION

PROPERTY	LIMITATION
Gravity, specific - 20°C	0.804 - 0.807
Color, Pt - Co	5 max.
Distillation Range, °C	2 max. to incl. 97.2
Alkalinity, as NH_3, % wt.	0.003
Acidity, as acetic, % wt.	0.003
Water, % by wt.	0.2
Non-volatiles, gms/100 ml	0.001
Solubility in water	Complete

TYPICAL

PROPERTY	DETERMINATION
Gravity, specific - 20°C	0.805
Pounds per gallon - 20°C	6.7
Boiling Point, °F	204 - 208
Flash Point, TOC, °F	81
Vapor Pressure @ 20°C, mm Hg	15

The information, data and suggestions for the use of the materials given here are based on our best experience and knowledge, but we do not guarantee the results to be obtained in customer's processes. The products discussed are sold without any warranty regarding merchantability or fitness for a particular purpose or any other warranty expressed or implied. Nothing contained herein shall be construed to constitute inducement or recommendation to practice any invention covered by any patent without authority from the owner of the patent.

Union Chemicals Division
Union Oil Company of California

1 Region II Technical Dept.
September 1977 5348

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DUPONT

MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION

NUMBER : 5891PP
NAME : "VYDAX" AR, FLUOROTELOMER DISPERSION

CHEMICAL FAMILY : FLUOROTELOMER MIXTURE

DUPONT REGISTRY NUMBER : 22-57-5
MANUFACTURER/DISTRIBUTOR : E.I. du Pont de Nemours & Co., Inc.
1007 Market Street
Wilmington, DE
19898

PRODUCT INFORMATION PHONE : 1-(800)441-7515
TRANSPORTATION EMERGENCY PHONE (CHEMTREC) : 1-(800)424-9300
MEDICAL EMERGENCY PHONE : 1-(800)441-3637

****

HAZARDOUS COMPONENTS

Material	CAS Number	%
TRICHLOROTRIFLUOROETHANE ("FREON" TF)		80
TRADE SECRET		

****

PHYSICAL DATA

Boiling Point : 48 deg C at 760 mm Hg.
Melting Point : 300 deg C
Specific Gravity : 1.65
Vapor Pressure : 334 mm Hg at 25 deg C.
Vapor Density : 6.4
Solubility in Water : 0 WT %
% Volatiles : 80 WT %
PH : 4.0
Odor : Ethereal
Form : Liquid
Color : White to Near White
Appearance: Opaque, Translucent

E 78812

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.

HAZARDOUS REACTIVITY

Instability : Stable.
Incompatibility : Incompatible with reactive metals, especially when powdered.
Decomposition :
At 300 degrees C. forms potentially toxic compounds.
Polymerization : Polymerization will not occur.

****

FIRE AND EXPLOSION DATA

Method : PMCC

Does not ignite.

FIRE AND EXPLOSION HAZARDS

Non-flammable. Generates air-borne solid particles above 216 degrees C.

EXTINGUISHING MEDIA

"Alcohol" Foam. Dry Powder (Sand or Met-L-X). Dry Chemical. CO2.
Water may be ineffective. Cooldrums with water spray.

SPECIAL FIRE FIGHTING INSTRUCTIONS

Evacuate personnel to a safe area.
Decomposition at flame temperatures forms potentially toxic compounds.
Avoid breathing demcomposition products.

****

HEALTH HAZARD INFORMATION

Principal Health Hazards

SIGNIFICANT ROUTES AND EFFECTS OF EXOSURE

Inhalation 2 hr. LC50: 11,000 ppm in rats
Skin absorption ALD: > 11,000 mg/kg in rabbits
Oral LD50: 43,000 mg/kg in rats

Very low toxicity by inhalation (4 hr. LC50 > 5,000; > 40 mg/l).
Very low toxicity by contact (LD50 10,000 mg/kg).
Very low toxicity by ingestion (oral LD50 > 5,000 mg/kg).

The product is a mild skin irritant, is a mild eye irritant, and is not a skin sensitizer in animals. Toxic effects described in animals from short exposures by inhalation, ingestion, or skin contact include nonspecific effects such as weighy loss and irritation. Toxic effects in animals attributable to "Freon" TF and occurring only with

(HEALTH HAZARD INFORMATION - CONTINUED)

inhalation exposures are anaesthetic effects, liver effects, and cardiac effects. Animal testing indicates that "Freon" TF does not have mutagenic, or embryotoxic effects.

Other Health Hazards

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Human health effects of overexposure may initially include: temporary nervous system depression with anaesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness. Higher exposures may lead to these effects: temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation; abnormal liver function as detected by laboratory tests; of fatality from gross overexposure.

Carcinogenicity
None of the components in this chemical is listed by IARC, NTP, or OSHA as a carcinogen.

Exposure Limits

TLV * (ACGIH) : None Established
PEL (OSHA) : None Established

* TLV is a registered trademark.

FOR "FREON" TF:
TLV (ACGIH): 1000 ppm, 7600 mg/m3
STEL: 1250 ppm, 9500 mg/m3
PEL (OSHA): 1000 ppm, 7600 mg/m3

Safety Precautions

Avoid breathing vapors or mist. Avoid contact with eyes. Avoid contact with skin. Avoid contact with clothing. Wash thoroughly after handling.

****

FIRST AID

FIRST AID & INSTRUCTIONS TO PHYSICIANS
INHALATION - If large amounts are inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen, and call a physician.
SKIN CONTACT - The compound is not likely to be hazardous by skin contact, but cleansing the skin after use is advisable.
EYE CONTACT - In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a

(FIRST AID - CONTINUED)

physician.
INGESTION - No specific intervention is indicated as the compound is not likely to be hazardous by ingestion. However, consult a physician if necessary.

NOTE: Because of a possible increased risk of eliciting cardiac dysrrythmias catacholamine drugs, such as epinephrine, should be used with special caution in situations of emergency life support.

****

PROTECTION INFORMATION

Generally Applicable Control Measures and Procedures

Keep container tightly closed. Do not consume food, drink or tobacco in the areas where they may become contaminated with this material. Use adequate ventilation, especially in enclosed spaces and when welding coated metals. Avoid breathing mist when applying as a spray.

Personal Protective Equipment

Eye/Face : Goggles or glasses with side shields.

Additional : Clothing sufficient to minimize physical contact.
Protective Gloves : Impermeable.

****

DISPOSAL INFORMATION

Aquatic Toxicity : SEE INFORMATION AND REFERENCES

Spill, Leak, or Release

NOTE: Review FIRE AND EXPLOSION HAZARDS and SAFETY PRECAUTIONS before proceeding with clean up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up.
Soak up with sawdust, sand, oil dry or other absorbent material. Flush spill area with water. Do not burn.

Waste Disposal

Treatment, storage, transportation and disposal must be in accordance with Federal, State, and Local regulations.
Empty containers retain product residue. Do not burn or use a cutting torch on the empty drum.

SHIPPING INFORMATION

Domestic - Other than Air (DOT)
Name : Not regulated.

Additional Information
Shipping Containers
Steel Drums : 1,5 & 30gal plastic-lined DOT
17E steels cans, pails & drums

****

STORAGE CONDITIONS

Keep container tightly closed. Do not store or consume food, drink or tobacco in area where they may become contaminated with this material. Contents may be under pressure. Open carefully.

****

ADDITIONAL INFORMATION AND REFERENCES

AQUATIC TOXICITY
The compound has low toxicity (96 hr. LD50 500-5,000 mg/l).
96 hr. LC50, fathead minnows: 1250 ppm.

****

Date of latest Revision : 85/10/09
Person Responsible for MSDS : R. M. KNEE
CHEMICALS & PIGMENTS
WILMINGTON, DE 19898
800-441-9442

Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: September, 1987
EDITION: 3rd (M004160)
CHEMICAL NAME AND SYNONYMS:
Methylene Chloride; (Dichloromethane)
CAS NO. 75-09-2
TRADE NAME AND SYNONYMS:
Blaco MC
CHEMICAL FAMILY: Halogenated Hydrocarbons
FORMULA: CH_2Cl_2
DOT SHIPPING NAME: Methylene Chloride
DOT HAZARD CLASS: ORM-A
UN 1593

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 104°F (39.8°C)	**VAPOR DENSITY(AIR=1):** at 20°C=2.93	**SPEC. GRAV.** 1.32	**pH OF SOLUTIONS:** Not Applicable
FREEZING/MELTING POINT: -142.1°F(-96.7°C)	**SOLUBILITY (WEIGHT % IN WATER):** 1.3	**BULK DENSITY:** at 20°C 11 lbs/gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: at 20°C=349 mm Hg	**EVAPORATION RATE:** (BuAC) = 1 - 0.7	**HEAT OF SOLUTION:** Not applicable	

APPEARANCE AND ODOR: Clear, colorless liquid with an ether-like odor at concentrations over 100 ppm

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
Methylene Chloride - CAS #75-09-2	100	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED) None (TCC)	**FLAMMABLE LIMITS IN AIR (% BY VOLUME)** Upper 25 Lower 14	**EXTINGUISH. MEDIA:** Carbon Dioxide; Dry Chemicals; or Water Spray

SPECIAL FIRE FIGHTING PROCEDURES:
Pressure-demand, self-contained respiratory protection should be provided for fire fighters in buildings or confined areas where this product is stored. Storage containers exposed to fire should be kept cool with a water spray, in order to prevent pressure build-up.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is nonflammable and nonexplosive under normal conditions of use. At high temperatures, Methylene Chloride decomposes to give off hydrochloric acid as gas plus other toxic and irritating vapors such as phosgene. If storage containers are exposed to excessive heat, over-pressurization of the containers can result.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

TOXICITY DATA: Methylene Chloride	CLASSIFICATION (POISON, IRRITANT, ETC.)
LC 50 INHALATION = 24445 ppm (RAT)	INHALATION: Toxic
LD 20 DERMAL = 2700 mg/kg (RABBIT)	SKIN/EYE: Liquid irritating to skin; eye irritant
LD-50-INGESTION = 2000-4000 mg/kg (RAT)	INGESTION:Slightly Toxic
FISH,LC-50 (LETHAL CONCENTRATION)Not Available	AQUATIC:Not Available

HUMAN EXPOSURE INFORMATION/DATA: Contains Methylene Chloride. Possible cancer hazard based on tests with Laboratory animals. Overexposure may create cancer risk (See Section 5)

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limits (29 CFR 1910.1000) are 500 ppm (8-hour TWA); 500-1,000 ppm periodic excursions are allowed providing TWA is at or below 500 ppm; 1,000-2,000 ppm excursions allowed only for maximum of five minutes in any 2-hour period--2,000 maximum allowable concentration (must not be exceeded).

Current ACGIH 8-hour TWA is 100 ppm with 15 minute excursion every 1-hour of 500 ppm.
NIOSH recommends that the TWA exposure limit for methylene chloride is 75 ppm. This product is listed in the TSCA Inventory. Not listed as carcinogenic by IARC, NTP, OSHA, ACGIH;
A 1985 NTP, 2 yr. animal inhalation study report states that there is "clear evidence of carcinogenicity" in mice and female rats.
Experience in industry has shown no increased incidences of cancer of any type in the worker population.
IARC lists this product as having inadequate evidence in humans and animals to evaluate carcinogenicity, (Group 3).
MEDICAL LIMITATIONS: Persons with angina or heart disease should not be exposed to this product.

ROUTES OF EXPOSURE

INHALATION: Excessive inhalation may produce symptoms of central nervous system depression, ranging from light-headedness, nausea and vomiting to unconsciousness and death.

SKIN CONTACT: Mildly irritating to skin. Skin contact may produce a burning sensation. Prolonged or repeated contact may cause skin to become reddened, rough, and dry due to the removal of natural oils and may result in dermatitis.

SKIN ADSORPTION: This product may be absorbed through the skin, although not expected to produce toxicity by this route.

EYE CONTACT: An irritant to the eyes, causing pain, lacrimation, and general inflammation.

INGESTION: May cause irritation of the gastrointestinal tract with vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through the gastrointestinal tract may produce symptoms of central nervous system depression ranging from light-headedness to unconsciousness.

EFFECTS OF OVEREXPOSURE

ACUTE: Excessive inhalation or ingestion may produce symptoms of central nervous system depression ranging from light-headedness, to unconsciousness and death. Exposure of the eyes and skin may produce irritation.

CHRONIC: Can cause headache, mental confusion, depression, fatigue loss of appetite, nausea, vomiting, cough, loss of sense of balance, and visual disturbances. Prolonged or repeated skin contact may cause dermatitis.

MONITORING

BIOLOGICAL: Reports indicate that 33 ppm Methylene Chloride in breath during exposure is equivalent to an exposure of about 100 ppm in air. Blood analyzed for carboxyhemoglobin (COHb) may show 7 to 10% saturation following exposure to 250 and 500 ppm respectively. Amount of exertion, duration of exposure, and time sampled effect these rations.

PERSONAL/AREA: The NIOSH Analytical Method Number 1005 is applicable.

EMERGENCY AND FIRST AID PROCEDURES

EYES: OBJECT IS TO FLUSH MATERIAL OUT THEN SEEK MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire eye surface. See medical attention immediately.

SKIN: Wash contaminated areas with plenty of soap and water. A soothing ointment may be applied to irritated skin after thorough cleansing. Remove contaminated clothing and footwear and wash clothing before reuse. Discard footwear which cannot be decontaminated. Seek medical attention.

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. Have conscious patient drink several glasses of water then induce vomiting by having patient tickle back of throat with finger. Keep airway clear. See medical attention immediately.

NOTES TO PHYSICIAN: OVEREXPOSURE TO THIS PRODUCT CAN PRODUCE ELEVATED CARBOXYHEMOGLOBIN LEVELS.

SECTION 6 - REACTIVITY DATA

STABILITY: Under normal conditions, this material is stable.

CONDITIONS TO AVOID: Avoid open flames, hot glowing surfaces, electric arcs, welding operations.

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: None

INCOMPATIBILITY(MATERIALS TO AVOID): Avoid contacting this product with pure oxygen, oxidizing materials, alkali metals, caustic soda, caustic potash. Shock sensitive explosives may be formed.

HAZARDOUS DECOMPOSITION PRODUCTS: At high temperatures this product decomposes to give off hydrogen chloride gases and small quantities of other toxic irritating vapors such as phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY: Respiration protection is not required under normal use. However, use a NIOSH/MSHA approved respirator, following manufacturer's recommendations where vapor, mist, or spray may be generated. Use supplied air respirator in positive pressure mode following ANSI Z117.1-1977 for tank, confined space entry, and emergency situations.

VENTILATION (TYPE): Where engineering controls are not feasible use adequate local exhaust ventilation. Local exhaust ventilation should be used where mist, spray or vapor may be generated.

EYE PROTECTION: Chemical Splash Goggles

GLOVES: Polyfluorinated or polyethylene

OTHER CLOTHING AND EQUIPMENT: Standard work clothing. Standard work shoes; discard if shoes cannot be decontaminated. Store contaminated clothing in well ventilated cabinets or closed containers. Wash contaminated clothing and dry before reuse.

SECTION 9 - SPECIAL PRECAUTIONS

SIGNAL WORDS: DANGER! VOLATILE SOLVENT!
STATEMENT OF HAZARDS: Volatile Solvent
Persons with angina or heart disease should not be exposed.
Overexposure to vapor can cause loss of consciousness and may result in death.
Causes irritation of the eyes, skin and respiratory tract.
May be fatal if swallowed!

PRECAUTIONARY STATEMENTS:
DO NOT take internally.
DO NOT get in eyes, on skin, on clothing.
Use only with adequate ventilation to maintain exposure level below TLV.
When handling, wear chemical splash goggles, protective clothing, and solvent-resistant gloves.
Washing thoroughly after handling or contact.
*NEVER enter a pit or tank without observing safety procedures:
*Never alone, always with a life line, and always with positive supply of fresh air.
*Employ respiratory protection when exposure to vapors is possible.
*Avoid contact with flames, pilot lights, hot glowing surfaces, or alkali metals to prevent decomposition resulting in toxic and irritating vapors.
*Keep container tightly closed.
*Store in cool, ventilate place.
*DO NOT use in poorly ventilated or confined spaces.
*Methylene chloride vapors are heavier than air and will collect in low areas.
*DO NOT store in open, unlabeled or mislabeled containers.
AVOID CONTAMINATION OF WATER SUPPLIES: Handling storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently sever, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances.
2. Industrial Hygiene and Toxicology, Volume 11.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax.
4. Industrial Toxicology, Hamilton and Hardy.
5. Toxicity and Metabolisms of Industrial Solvents, Browning.
6. Toxicology, the Basic Science of Poisons, Casarett and Doull.
7. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
8. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: November, 1987
EDITION: 3rd (M004120)
CHEMICAL NAME AND SYNONYMS:
Perchloroethylene; tetrachloroethylene
CAS. NO. 127-18-4
TRADE NAME AND SYNONYMS:
Blaco-Perc
CHEMICAL FAMILY: Halogenated Hydrocarbons
FORMULA: $CCl_2=CCl_2$

DOT SHIPPING NAME: Tetrachloroethylene
DOT HAZARD CLASS: ORM-A-UN1897
REPORTABLE QUANTITY: 1 lb.

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 250°F 121°C

VAPOR DENSITY (AIR=1): 5.83

SPEC. GRAV. (20°/20°C) 1.6

pH OF SOLUTIONS: 6.8 to 8.4

FREEZING/MELTING POINT: -8.2°F -22.3°C

SOLUBILITY (WEIGHT % IN WATER): @25°C 0.015%

BULK DENSITY: 13.6 lbs./gal. @ 20°C

VOLUME % VOLATILE: 100

VAPOR PRESSURE: at 20°C=14.2 mm Hg

EVAPORATION RATE: (Ethyl Ether=1) 0.09

HEAT OF SOLUTION: Not applicable

APPEARANCE AND ODOR: Clear, colorless liquid with an ether-like odor

SECTION 2 - HAZARDOUS INGREDIENTS

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
Perchlorethylene (Stabilized)	100	See Below

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)
None when tested in accordance with DOT requirements.

FLAMMABLE LIMITS IN AIR (% BY VOLUME)
None

EXTINGUISH. MEDIA:
For fires involving perchor, use water, dry chemical or carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES: Fire fighters should wear NIOSH/MSHA pressure-demand self-contained breathing apparatus for possible exposure to hydrogen chloride and possible traces of phosgene.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Perchlor involved in fires can decompose to hydrogen chloride and possible traces of phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA: (1)
LC LO INHALATION: (rat) 4,000 ppm (4 Hours)
LD 50 DERMAL: Not determined
LD 50 INGESTION: (rabbit - 5,000 mg/kg
FISH, LC 50 (LETHAL CONCENTRATION) 96 hr. TLM 100-10 ppm

CLASSIFICATION (POISON, IRRITANT, ETC.)
INHALATION: Moderately Toxic
SKIN/EYE: Liquid mildly irritating to skin; eye irritant
INGESTION: Slightly Toxic
AQUATIC:

HUMAN EXPOSURE INFORMATION/DATA: Perchloroethylene is listed in the TSCA Inventory. It is not listed as a carcinogen by OSHA, IARC, or NTP.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

PERMISSIBLE EXPOSURE LIMITS

OSHA: 100 ppm - 8-hour time weighted average
200 ppm - acceptable ceiling concentration
300 ppm - acceptable maximum peak above the ceiling concentration for an 8-hour shift. The maximum duration for this exposure is 5 minutes in any 3 hours. (29CFR 1910.1000, Table Z-2).

ACGIH: 50 ppm, 8-hour TLV-TWA (Threshold Limit Value-Time-Weighted Average); 200 ppm, STEL (short-term exposure limit).

ACUTE:

INHALATION: Perchloroethylene is primarily a central nervous system depressant and can cause possible central nervous system damage with overexposure. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Fatalities following severe acute exposure to various chlorinated solvents have been attributed to ventricular fibrillation.

EYE/SKIN: Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes, and skin absorption can occur.

INGESTION: Swallowing of this material may result in irritation of the mouth and GI tract along with other effects as listed above for Inhalation. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a potentially fatal condition.

CHRONIC:

Prolonged exposure above the OSHA permissible exposure limits may result in liver and kidney damage. Perchloroethylene has been extensively studied for its cancer potential. A recent NTP study has determined that there is clear evidence of carcinogenicity (liver) in both male and female mice, clear evidence of leukemia in male and female rats and some evidence of animal carcinogenicity (kidney tumors) in male rats. The NTP study exposed rats to 200 and 400 ppm and mice to 100 and 200 ppm in a lifetime study. At the present time, IARC lists Perchlor in Group 3, but there are indications that they are recommending Group 2b. Until more information regarding this NTP study is available, prudent handling practice should minimize human exposure.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Prolonged exposure above the OSHA permissible exposure limit may complicate existing liver and kidney diseases.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

EYE OR SKIN CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

INGESTION: If conscious, drink a quart of water. **DO NOT** induce vomiting. Take immediately to a hospital or physician. If unconscious, or in convulsions, take immediately to a hospital. **DO NOT** give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN (INCLUDING ANTIDOTES): **NEVER** administer adrenalin following perchlorethylene overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to perchlorethylene.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable **CONDITIONS TO AVOID:** Avoid open flames, hot glowing surfaces or electric arcs.

HAZARDOUS POLYMERIZATION: Will not occur **CONDITIONS TO AVOID:** None

INCOMPATIBILITY(MATERIALS TO AVOID): None

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen Chloride and possible traces of phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much as contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use a half or full facepiece organic vapor chemical cartridge or canister respirator when concentrations exceed permissible limits. Use self-contained breathing apparatus (SCBA) or full facepiece airline respirator with auxiliary SCBA operated in the pressure-demand mode for emergencies and for all work performed in storage vessels, poorly ventilated rooms, and other confined areas. Respirators must be approved by NIOSH or MSHA. The respirator use limitations made by NIOSH/MSHA and by the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

VENTILATION (TYPE): Use local exhaust or dilution ventilation as appropriate to control exposures to below permissible limits.

EYE PROTECTION: Splashproof goggles **GLOVES:** Viton, Silver Shield, Polyvinyl Alcohol*. For limited service only: Nitrile. *(degrades in water)

OTHER PROTECTIVE EQUIPMENT: Boots, aprons, or chemical suits should be used when necessary to prevent skin contact. Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **CANCER INFORMATION:** Has caused cancer in certain laboratory animals, of questionable relevance to humans.
* **DO NOT** use in poorly ventilated or confined spaces.
* Perchloroethylene vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.
* A chlorinated solvent used as a flashpoint suppressant must be added in sufficient quantity or the resultant mixture may have a flashpoint lower than the flammable component.
* **DO NOT** use cutting or welding torches on drums that contained perchloroethylene unless properly purged and cleaned.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney damage.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to Perchloroethylene below OSHA permissible exposure limits. Observance of lower limits (outlined in Section 5) is advisable.
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**

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Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: November, 1987
EDITION: 3rd (M004130)
CHEMICAL NAME AND SYNONYMS:
1,1,1-Trichloroethane; methylchloroform
CAS. NO. 71-55-6
TRADE NAME AND SYNONYMS:
Blaco-Thane
CHEMICAL FAMILY: Halogenated Hydrocarbons
FORMULA: CH_3CCl_3

DOT SHIPPING NAME: RQ 1,1,1-trichloroethane Mixture, (contains 1,4-diethylene dioxide)
DOT HAZARD CLASS: ORM-A
I.D. NUMBER: UN 2831

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 165.4°F	**VAPOR DENSITY(AIR=1):** 4.54	**SPEC. GRAV.** 1.300-1.320 @ 25°/25°C	**pH OF SOLUTIONS:** 6.0 to 7.5
FREEZING/MELTING POINT: -49°F -45°C	**SOLUBILITY (WEIGHT % IN WATER):** Negligible	**BULK DENSITY:** 10.80-10.97 lbs/gal. @ 25°C	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: at 25°C=135mm Hg	**EVAPORATION RATE:** (Ethyl Ether=1) 0.35	**HEAT OF SOLUTION:** Not applicable	**APPEARANCE AND ODOR:** Clear, colorless liquid with an ether-like odor

SECTION 2 - HAZARDOUS INGREDIENTS

	APPROX. %	HAZARD DATA
1,1,1-trichloroethane (Stabilized)	96	See Section 5
1,4-diethylene dioxide (CAS NO. 123-91-1)	)	
Glycol methylene ether (CAS NO. 646-06-0)	) Balance	
Sec butanol (CAS NO. 78-92-2)	)	

NOTE: Tested Mixture

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)	EXTINGUISH. MEDIA:
None when tested in accordance with DOT requirements	LEL: 7% UEL: 15% See Below	Water, dry chemical or carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES: Fire fighters should wear a NIOSH/MSHA-approved pressure-demand, self-contained breathing apparatus for possible exposure to hydrogen chloride and possibly traces of phosgene.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors concentrated in a confined or poorly ventilated area can be ignited upon contact with a spark, flame, or high intensity source of heat. This can occur at concentrations ranging between 7-15% by volume. Decomposition or burning can produce hydrogen chloride or possibly traces of phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA:	CLASSIFICATION (POISON, IRRITANT, ETC.)
LC LO INHALATION: (rat) 14,250 ppm (7 hours)	INHALATION: Toxic
LD 50 DERMAL: rabbit 15g/kg	SKIN/EYE: Liquid mildly irritating to skin; eye irritant
SKIN/EYE IRRITATION: See Section 5	
LD 50 INGESTION: rat 10-12g/kg (See Section 5)	INGESTION: Not Significantly toxic
FISH,LC 50 (LETHAL CONCENTRATION) Not Determined	AQUATIC: Unknown

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

PERMISSIBLE EXPOSURE LIMITS

OSHA: 350 ppm, 8-hour TWA (time-weighted average); 29 CFR 1910.1000

ACGIH: 350 ppm 8-hour TLV-TWA (Threshold Limit Value - Time-Weighted Average); 450 ppm, STEL, (15-minute short-term exposure limit)

ACUTE:

INHALATION: 1,1,1-trichloroethane is primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory system, dizziness, nausea, lightheadedness, headache, loss of coordination and equilibrium, unconsciousness, possible central nervous system damage and even death in confined or poorly ventilated areas. Fatalities following severe acute exposure to various chlorinated solvents have been attributed to ventricular fibrillation.

Aerosol - Preliminary results from studies in rats indicate that the acute inhalation toxicity of "aerosolized" 1,1,1-trichloroethane is higher than expected based on the reported acute inhalation toxicity of 1,1,1-trichloroethane vapor. The significance of these findings to human health in product use situations is not clearly understood.

EYE/SKIN: Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes, and skin absorption can occur.

INGESTION: Swallowing of this material may result in irritation of the mouth and GI tract with other effects as listed above for Inhalation. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a potentially fatal condition.

CHRONIC:

1,1,1-trichloroethane has been extensively studied for cancer potential. There is no documented evidence to suggest the 1,1,1-trichloroethane causes an increased cancer incidence in humans or animals. The EPA's Science Advisory Board concluded that there is no evidence to suggest carcinogenic activity for 1,1,1-trichloroethane.

REPRODUCTIVE:

In developmental toxicity studies, there was no evidence for birth defects in rats or rabbits after inhalation exposure to pregnant animals. No adverse findings relative to reproduction or developmental toxicity were observed following daily six-hour exposures at or below 3,000 ppm in rats or rabbits.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None known

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, preferable mouth-to-mouth. If breathing is difficult, give oxygen if a qualified operator is available. Call a physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

INGESTION: If conscious, drink a quart of water. **DO NOT** induce vomiting. Take immediately to a hospital or physician. **DO NOT** give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN (Including Antidotes):
NEVER administer adrenalin following Blaco-Thane overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to Blaco-Thane.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable **CONDITIONS TO AVOID:** Avoid open flames, hot glowing surfaces or electric arcs.
HAZARDOUS POLYMERIZATION: Will not occur **CONDITIONS TO AVOID:** None
INCOMPATIBILITY(MATERIALS TO AVOID): Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive explosives may be formed.
HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen Chloride and possible traces of phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use a half or full facepiece organic vapor chemical cartridge or canister respiratory when concentrations exceed permissible limits. Use self-contained breathing apparatus (SCBA) or full facepiece airline respiratory with auxiliary SCBA operated in the pressure-demand mode for emergencies and for all work performed in storage vessels, poorly ventilated rooms, and other confined areas. Respirators must be approved by NIOSH or MSHA. The respirator use limitations made by NIOSH/MSHA and by the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

VENTILATION (TYPE): Use local exhaust or dilution ventilation as appropriate to control exposures to below permissible limits.

EYE PROTECTION: Splashproof Goggles

GLOVES: Viton, Silver Shield.
For limited service only:
Polyvinyl alcohol*.
*(degrades in water)

OTHER PROTECTIVE EQUIPMENT: Boots, aprons, or chemical suits should be used when necessary to prevent skin contact. Safety shower and eye wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29CFR 1910.133 and 29CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Blaco-Thane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* Liquid oxygen or other strong oxidants may form explosive mixtures with Blaco-Thane.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.
* A chlorinated solvent used as a flashpoint suppressant must be added in sufficient quantity or the resultant mixture may have a flashpoint lower than the flammable component.
* Caution should be taken not to use in pressurized or totally enclosed system of aluminum construction. Example, paint or adhesive spray system.
* **DO NOT** store or stack aluminum in contact with Blaco-Thane to prevent possible solvent decomposition (stacking corrosion).
* **DO NOT** use cutting or welding torches on empty drums that contained Blaco-Thane unless properly purged and cleaned.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause possible central nervous system damage.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to Blaco-Thane below OSHA permissible exposure limits.
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT** eat, drink, or smoke in work areas.

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MSDS: BLACO TRI

Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: October, 1987
EDITION: 3rd (M004100)
CHEMICAL NAME AND SYNONYMS: Trichlorethylene; trichloroethene
TRADE NAME AND SYNONYMS: Blaco-Tri
CAS. NO. 79-01-6
CHEMICAL FAMILY: Halogenated Hydrocarbons
FORMULA: $CHCl=CCl_2$

DOT SHIPPING NAME: Trichloroethylene
DOT HAZARD CLASS: ORM-A
UN1710-(RQ 1000#/454kg)

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 188°F	VAPOR DENSITY(AIR=1): 4.54	SPEC. GRAV. (20°/20°C) 1.465	pH OF SOLUTIONS: 6.7 to 7.5
FREEZING/MELTING POINT: -123.5°F (-86.4°C)	SOLUBILITY (WEIGHT % IN WATER): 0.11	BULK DENSITY: @20°C 12.2 lbs./gal.	VOLUME % VOLATILE: 100
VAPOR PRESSURE: at 20°C=57.8mmHg	EVAPORATION RATE: (Ethyl Ether=1) 0.28	HEAT OF SOLUTION: Not applicable	APPEARANCE AND ODOR: Clear, colorless liquid with an ether-like odor

SECTION 2 - HAZARDOUS INGREDIENTS

	APPROX. %	HAZARD DATA
Trichloroethylene (Stabilized)	100	SEE BELOW

NOTE: HAZARD INFORMATION IS BASED ON TEST MIX AND NOT INDIVIDUAL INGREDIENTS.

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)	EXTINGUISH. MEDIA:
None when tested in accordance with DOT requirements (See Below)	at 100°C LEL: 7.8 UEL: 52% at 25°C LEL: 8.0 UEL: 10.5%	Water, dry chemical or carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES: Fire fighters should wear a NIOSH/MSHA-approved pressure-demand, self-contained breathing apparatus for possible exposure to hydrogen chloride and possibly traces of phosgene.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors concentrated in a confined or poorly ventilated area can be ignited upon contact with a spark, flame, or high intensity source of heat. This can occur at concentrations ranging between 7.8-52% by volume. Decomposition or burning can produce hydrogen chloride or possibly traces of phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA: See References 1,2,8

LC LO INHALATION: (rat) 8,000 ppm/4 hour

LD 50 DERMAL: Not determined

LD 50 INGESTION: rat 4,900-7,000 mg/kg

FISH, LC 50 (LETHAL CONCENTRATION)
See Section 5

CLASSIFICATION (POISON, IRRITANT, ETC.)

INHAL.: Slightly toxic

SKIN: Not determined

EYE: Eye irritant

INGESTION: Slightly to moderately toxic

AQUATIC: See Section 5

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

PERMISSIBLE EXPOSURE LIMITS(TLV)

PERMISSIBLE EXPOSURE LIMITS (TLV)

OSHA: 100 PPM - 8-hour (time-weighted average)
200 PPM - Acceptable ceiling concentration
300 PPM - Acceptable maximum peak above the ceiling concentration for an 8-hour shift. The maximum duration for this exposure is 5 minutes, in any 2 hours (29 CFR 1910.1000, Table Z.2).

ACGIH: 50 PPM - 8-hour TWA (time-weighted average)
200 PPM - STEL (short-term exposure limit)

EFFECTS OF OVEREXPOSURE

ACUTE

INHALATION: Trichloroethylene is a central nervous system depressant which can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, possible central nervous system damage, unconsciousness and death in confined or poorly ventilated area. Fatalities following severe acute exposure have been attributed to ventricular fibrillation resulting in cardiac failures.

EYE/SKIN: Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes, and skin adsorption can occur.

INGESTION: Swallowing of this material may result in irritation of the mouth and gastro-intestinal tract along with other effects as listed above for inhalation. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a potentially fatal condition.

CHRONIC

Prolonged exposure above the OSHA permissible exposure limits may result in liver and kidney damage. Trichloroethylene has been extensively studied for chronic effects in animals. While there are studies in which tumors were induced in mice, there is no evidence that trichloroethylene poses a carcinogenic risk to humans.

TOXICITY DATA

AQUATIC DATA:

Sheepshead Minnows	- 96-hour LC50 - 52 MG/L	Slightly Toxic
Mysid Shrimp	- 96-hour LC50 - 14 MG/L	Slightly Toxic
Marine Alga	- 96-hour EC50 - 95 MG/L	Slightly Toxic

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None Known

CHEMICAL LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN:

NTP: No
IARC: No
OSHA: No

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, preferable mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

EYE OR SKIN CONTACT: Flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, consult a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

INGESTION: If conscious, drink a quart of water. DO NOT induce vomiting. Take immediately to a hospital or physician. If unconscious, or in convulsions, take immediately to a hospital. DO NOT give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN (Including Antidotes):
NEVER administer adrenalin following trichloroethylene overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to trichloroethylene.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: Avoid open flames, hot glowing surfaces or electric arcs.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: None

INCOMPATIBILITY(MATERIALS TO AVOID): Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive explosives may be formed.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen Chloride and possible traces of phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces including ignitable vapors have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much as contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use a half or full facepiece organic vapor chemical cartridge or canister respirator when concentrations exceed the permissible limits. Use self-contained breathing apparatus (SCBA) or full facepiece airline respirator with auxiliary SCBA operated in the pressure-demand mode for emergencies and for all work performed in storage vessels, poorly ventilated rooms, and other confined areas. Respirators must be approved by NIOSH/MSHA. The respirator use limitations made by NIOSH/MSHA and by the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

VENTILATION (TYPE): Dilution (General) or Local Exhaust - Sufficient to maintain workplace concentration below permissible exposure limits.

EYE PROTECTION: Splashproof Goggles

GLOVES: Viton, silvershield or Polyvinyl Alcohol* (*degrade in water)

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Boots, aprons or chemical suit should be used when necessary to prevent skin contact. Personnel protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichloroethylene vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* Liquid oxygen or other strong oxidants may form explosive mixtures with trichloroethylene.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.
* A Chlorinated solvent used as a flashpoint suppressant must be added in sufficient quantity or the resultant mixture may have a flashpoint lower than the flammable component.
* **DO NOT** use cutting or welding torches on drums that contained Trichloroethylene unless properly purged and cleaned.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney injury and possible central nervous system damage.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to Trichloroethylene below permissible exposure limits. Observance of lower limits (outlined in Section 5) is advisable. Eye irritation, dizziness, and/or drunkenness are signs of overexposure.
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK, OR SMOKE IN WORK AREAS.**

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances.
2. Industrial Hygiene and Toxicology, Volume 11, F.A. Patty.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax.
4. Industrial Toxicology, Hamilton and Hardy.
5. Toxicity and Metabolisms of Industria Solvents, Browning.
6. Toxicology, the Basic Science of Poisons, Casarett and Doull.
7. Federal Regulations, 40 CFR Hazardous Waste Management Section 260-265, Identification and Listing of Hazardous Wastes.
8. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September.

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Material Safety Data Sheet

Baron Blakeslee, Inc., – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450 3900

DATE: October, 1987
EDITION: 3rd (M006404)
CHEMICAL NAME AND SYNONYMS:
1,1,1-Trichloroethane;(methylchloroform)
CAS. NO.71-55-6 & N-Propanol CAS NO.71-23-8
TRADE NAME AND SYNONYMS:
Blaco-Solv 404
CHEMICAL FAMILY: Halogenated Hydrocarbons and Alcohols
FORMULA: CH_3CCl_3/C_3H_7OH
DOT SHIPPING NAME: RQ,1,1,1-trichloroethane mixture (contains 1,4-diethylene dioxide)
DOT HAZARD CLASS: ORM-A
I.D. NUMBER: UN 2831

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 165.4°F	VAPOR DENSITY(AIR=1): 4.54	SPEC. GRAV. 1.28-1.30 @ 25°/25°C	pH OF SOLUTIONS: 6.0 to 7.5
FREEZING/MELTING POINT: Not Available	SOLUBILITY (WEIGHT % IN WATER): Approximately 4%	BULK DENSITY: Approx. 10.75 lbs. per gallons @ 25°C	VOLUME % VOLATILE: 100
VAPOR PRESSURE: at 25°C=30mm Hg	EVAPORATION RATE: (Ethyl Ether=1) 1	HEAT OF SOLUTION: Not applicable	APPEARANCE AND ODOR: Clear, colorless liquid with an ether-like odor

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
1,1,1-trichloroethane (Stabilized)	93-95	See Section 4,5
N-Propanol	3-5	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME) (Trichloroethane)	EXTINGUISH. MEDIA:
None when tested in accordance with DOT requirements	LEL: 7% UEL: 15% See Below	Water, dry chemical or carbon dioxide

SPECIAL FIRE FIGHTING PROCEDURES: Fire fighters should wear a NIOSH/-MSHA-approved pressure-demand, self-contained breathing apparatus for possible exposure to hydrogen chloride and possibly traces of phosgene.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors concentrated in a confined or poorly ventilated area can be ignited upon contact with a spark, flame, or high intensity source of heat. This can occur at concentrations ranging between 7-15% by volume. Decomposition or burning can produce Hydrogen chloride or possibly traces of phosgene.

SECTION 4 - HEALTH HAZARD DATA

(For 1,1,1-Trichloroethane)

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

AQUATIC: Not Determined

LC LO INHALATION: (rat) 14,250 ppm (7 hours)

LD 50 DERMAL: rabbit 15g/kg

SKIN/EYE IRRITATION: See Section 5

LD 50 INGESTION: rat 10-12g/kg (See Section 5)

FISH,LC 50(LETHAL CONCENTRATION) Not Determined

INGESTION: Not Significantly toxic

CLASSIFICATION (POISON, IRRITANT, ETC.)

INHALATION: Toxic

SKIN/EYE: Liquid mildly irritating to skin; eye irritant

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

PERMISSIBLE EXPOSURE LIMITS

A. 1,1,1-TRICHLOROETHANE - CAS NO. 71-55-6

PERMISSIBLE EXPOSURE LIMITS

OSHA: 350 ppm, 8-hour TWA (Time-Weighted Average); 29 CFR 1910.1000
ACGIH: 350 ppm, 8-hour TLV-TWA (Threshold Limit Value - Time-Weighted Average); 450 ppm, STEL, (15-minute short-term exposure limit).

The 1,1,1-trichloroethane used in this mixture also contains as stabilizers 1,4-diethylene dioxide (CAS no. 123-91-1), Glycol Methylene Ether (CAS No. 646-06-0), and Sec Butanol (CAS No. 78-92-2). Note that the listed health effects are based on tests conducted on the stabili: 1,1,1-trichloroethane mixture.

ACUTE

INHALATION: 1,1,1-Trichloroethane is primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory system, dizziness, nausea, light-headedness, headache, loss of coordination and equilibrium, unconsciousness, possible central nervous system damage and even death in confined or poorly ventilated areas. Fatalities following severe acute exposure to various chlorinated solvents have been attributed to ventricular fibrillation.

AEROSOL: Preliminary results from studies in rats indicate that the acute inhalation toxicity of "aerosolized" 1,1,1-trichloroethane is higher than expected based on the reported acute inhalation toxicity of 1,1,1-trichloroethane vapor. The significance of these findings to human health in product use situations is not clearly understood.

EYE/SKIN: Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes, and skin absorption can occur.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Solv 404 is as follows:

A) Using OSHA TWA values - 330 ppm

B) Using ACGIH TLV values - 330 ppm

All of the components of Blaco-Solv 404 are listed in the TSCA Inventory. None of the components are listed as a carcinogen by OSHA, NTP, or IARC.

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, preferable mouth-to-mouth. If breathing is difficult, give oxygen if a qualified operator is available. Call a physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

INGESTION: If conscious, drink large quantities of water. **DO NOT** induce vomiting. Take immediately to a hospital or physician. If unconscious or in convulsions, take immediately to a hospital. **DO NOT** give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN (Including Antidotes):

NEVER administer adrenalin following 1,1,1-Trichloroethane overexposure. Increased sensitivity of the heart to adrenalin may be caused by overexposure to 1,1,1-Trichloroethane.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: Avoid open flames, hot glowing surfaces or electric arcs.
HAZARDOUS POLYMERIZATION: Will not occur **CONDITIONS TO AVOID:** None
INCOMPATIBILITY(MATERIALS TO AVOID): Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive explosives may be formed.
HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen Chloride and possible traces of phosgene.

INGESTION: Swallowing of this material may result in irritation of the mouth and gastro-intestinal tract along with other effects as liste above for Inhalation. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a potentially fatal condition.

CHRONIC

1,1,1-Trichloroethane has been extensively studied for cancer potential. There is no documented evidence to suggest that 1,1,1-Trichloroethane causes an increased cancer incidence in humans or animals. The EPA's Science Advisory Board concluded that there is no evidence to suggest carcinogenic activity for 1,1,1-Trichloroethane.

REPRODUCTIVE:

In developmental toxicity studies, there was no evidence for birth defects in rats or rabbits after inhalation exposure to pregnant animals. No adverse finding relative to reproduction or developmental toxicity were observed following daily six-hour exposures at or below 3,000 ppm in rats or rabbits.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None Known

B. N-PROPANOL - CAS No. 71-23-8

PERMISSIBLE EXPOSURE LIMITS (TLV)

OSHA: 200 ppm (skin) (8-hour TWA) (Time-Weighted Average); 29 CFR 1910.1000
ACGIH: 200 ppm (skin) (8-hour TLV-TWA) (Threshold Limit Value-Time-Weighted Average); 450 ppm (STEL) (15 minute short term exposur limit)

ROUTES/EFFECTS OF EXPOSURE

EYES: Can cause severe irritation, redness, tearing blurred vision; may cause burns.

SKIN: Prolonged or repeated contact can cause moderate irritation, defatting, dermatitis.

INHALATION: Excessive inhalation of vapors can cause nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, headache, possible unconsciousness.

INGESTION: High irritation effects in women, (LD_{LO} women = 5,700 mg/kg.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* 1,1,1-Trichloroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* Liquid oxygen or other strong oxidants may form explosive mixtures with 1,1,1-Trichloroethane.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.
* A chlorinated solvent used as a flashpoint suppressant must be added in sufficient quantity or the resultant mixture may have a flashpoint lower than the flammable component.
* Caution should be taken not to use in pressurized or totally enclosed system of aluminum construction. Example, paint or adhesive spray system.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney injury.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits.
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.

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SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much as contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use a half or full facepiece organic vapor chemical cartridge or canister respirator when concentrations exceed permissible limits. Use self-contained breathing apparatus (SCBA) or full facepiece airline respirator with auxiliary SCBA operated in the pressure-demand mode for emergencies and for all work performed in storage vessels, poorly ventilated rooms, and other confined areas. Respirators must be approved by NIOSH or MSHA. The respiratory use limitations made by NIOSH/MSHA 9,10 and by the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

VENTILATION (TYPE): Dilution (General) or Local Exhaust - Sufficient to maintain workplace concentration below permissible exposure limits.
EYE PROTECTION: Splashproof Goggles
GLOVES: Viton; Silvershield; for limited service only: Polyvinyl Alcohol (degrades in water).
OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Boots, aprons, or chemical suits should be used when necessary to prevent skin contact. Personnel protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

Material Safety Data Sheet

Baron Blakeslee, Inc., – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450 3900

DATE: November, 1987
EDITION: 3rd (M006413)
CHEMICAL NAME AND SYNONYMS: Blend of 1,1,1-Trichloroethane, Trichlorotrifluoroethane, Methyl Alcohol, and ethyl alcohol
TRADE NAME AND SYNONYMS: Blaco-Solv 413
CHEMICAL FAMILY: Halogenated Solvents and Alcohols
FORMULA: CH_3CCl_3; $CCl_2FCCClF_2$; CH_3OH; C_2H_5OH
DOT SHIPPING NAME: RQ,1,1,1-trichloroethane Mixture (contains 1,4-Diethylene Dioxide)
DOT HAZARD CLASS: ORM-A
I.D. NUMBER: UN 2831

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 122°F 50°C	**VAPOR DENSITY(AIR=1):** 3.7	**SPEC. GRAV.** 1.242 at 60°F	**pH OF SOLUTIONS:** neutral
FREEZING/MELTING POINT: Less than -49°F (-45°C)	**SOLUBILITY (WEIGHT % IN WATER):** 2.1	**BULK DENSITY:** at 77°F lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: 139 mm Hg (calculated) @ 20°C	**EVAPORATION RATE:** (Ethyl Ether=1) 2	**HEAT OF SOLUTION:** Not applicable	**APPEARANCE AND ODOR:** Clear, colorless liquid with an ether-like odor

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
1,1,1-trichloroethane (Stabilized)	58	See Section 5
Trichlorotrifluoroethane	25	See Section 5
Methyl Alcohol	8.5	See Section 5
Ethyl Alcohol	8.5	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)	EXTINGUISH. MEDIA:
None when tested in accordance with DOT	Not Available	Water, dry chemical CO_2 requirements

SPECIAL FIRE FIGHTING PROCEDURES: Fire fighters should wear a NIOSH/MSHA-approved positive pressure, self-contained breathing apparatus for possible exposure to hydrogen chloride, hydrogen fluoride, and possibly traces of phosgene.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors concentrated in a confined or poorly ventilated area can be ignited upon contact with a spark, flame, or high intensity source of heat. This can occur at concentrations ranging between 7-15% by volume. Decomposition or burning can produce Hydrogen chloride, hydrogen fluoride or possibly traces of phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

(For 1,1,1-Trichloroethane)

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA: rat 8,000 ppm/7 hours

LC LO INHALATION: (rat) 4,000 ppm (4 hours)

LD 50 DERMAL: rabbit 15g/kg

LD 50 INGESTION: rat 10-12g/kg (See Section 5)

SKIN/EYE IRRITATION: See Section 5

FISH, LC 50 (LETHAL CONCENTRATION)
Not determined

CLASSIFICATION (POISON, IRRITANT, ETC.) Mixture

INHALATION: Toxic

SKIN/EYE: Liquid mildly

INGESTION: Not significantly toxic

AQUATIC: Not determined

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

PERMISSIBLE EXPOSURE LIMITS(TLV)

A. 1,1,1-TRICHLOROETHANE - CAS NO. 71-55-6

PERMISSIBLE EXPOSURE LIMITS (TLV)

OSHA: 350 ppm, 8-hour TWA (Time-Weighted Average); 29 CFR 1910.1000

ACGIH: 350 ppm, 8-hour TLV; 450 ppm, STEL, (15-minute short-term exposure limit)

ACUTE

INHALATION: 1,1,1-Trichloroethane is primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory system, dizziness, nausea, light-headedness, headache, loss of coordination and equilibrium, unconsciousness, possible central nervous system damage and even death in confined or poorly ventilated areas. Fatalities following severe acute exposure to various chlorinated solvents have been attributed to ventricular fibrillation.

EYE/SKIN: Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes, and skin absorption can occur.

INGESTION: Swallowing of this material may result in irritation of the mouth and gastro-intestinal tract along with other effects as listed above for Inhalation. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a potentially fatal condition.

CHRONIC

1,1,1-Trichloroethane has been extensively studied for cancer potential. There is no documented evidence to suggest that 1,1,1-Trichloroethane causes an increased cancer incidence in humans or animals. The EPA's Science Advisory Board concluded that there is no evidence to suggest carcinogenic activity for 1,1,1-Trichloroethane. 1,1,1-Trichloroethane is not listed by IARC, NTP or OSHA as a carcinogen.

B. TRICHLOROTRIFLUOROETHANE - CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA).

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV).

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced with high exposure levels: intoxication, cardiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.

EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.

INGESTION: Similar symptoms as for Inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE:

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headaches, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION:

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

This material is low in toxicity. It is an anesthetic and inhalation of high concentrations can produce asphyxiation. At levels of about 2,500 ppm in air there begins to be interference with psychological and psychomotor functions, expressed as excitement and incoordination.

(High-level and cardiac):

Animal studies in various species have indicated cardiac arrhythmia at the following concentrations:

Species	(5-Minute Exposure) Lowest Concentration Causing Arrhythmia (ppm)
Monkey	25,000-50,000
Mouse	100,000

Also, in the dog, myocardial depression was seen at 50,000 ppm.

(Inhalation Subacute) - rats @ 2,520 ppm/7 hours daily, 5 days/wk, 30 days: no apparent effects @ 5,000 ppm and same exposure time: mild liver effects, prevention of weight gain.

C. ETHYL ALCOHOL - CAS NO. 64-17-5

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1000 ppm 8-hour TWA).

ACGIH has adopted a permissible exposure limit of 1000 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE:

INGESTION: Large doses can cause alcohol poisoning. A central nervous system depressant.

INHALATION: Exposure to concentrations of over 1,000 ppm can cause headache, irritation of nose and throat, and if long continued drowsiness and lassitude, loss of appetite and inability to concentrate.

EYES: Irritant to eyes in concentrations greater than 1,000 ppm.

D. METHYL ALCOHOL - CAS NO. 67-56-1

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA permissible exposure limit (20 CFR 1910.1000) is 200 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 200 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE:

INGESTION: The main toxic effect is exerted on the nervous system particularly the optic nerves and possibly the retina.

Severe exposures may cause dizziness, unconsciousness, sighing respiration, cardiac depression and eventually death. Where exposure is less severe, the first symptoms may be blurring of vision, photophobia, and conjunctivitis followed by the development of definite eye lesions. There may be headache, gastro intestinal disturbances, dizziness and a feeling of intoxication. The visual symptoms may clear temporarily, only to recur later and progress to actual blindness.

Death from ingestion of less than 30 ml. has been reported. Usual fatal dose is 100-250 ml.

INHALATION: Inhalation of fumes can lead to similar symptoms to those listed for ingestion.

EYE/SKIN: Skin may become dry and cracked due to solvent action of methyl alcohol. Mild irritant to eyes.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Solv 413 is as follows:

A) Using OSHA TWA values - 350 ppm

B) Using ACGIH TLV values - 350 ppm

All of the components of Blaco-Solv 413 are listed in the EPA TSCA Inventory. None of the components are listed as a carcinogen by OSHA, NTP, or IARC.

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, preferable mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

EYE OR SKIN CONTACT: Flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, consult a physician.

INGESTION: If conscious, drink a quantities of water. **DO NOT** induce vomiting. Take immediately to a hospital or physician. If unconscious or in convulsions, take immediately to a hospital. **DO NOT** give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN (Including Antidotes):

NEVER administer adrenalin following Blaco-Solv 413 overexposure Increased sensitivity of the heart to adrenalin may be caused by over exposure to 1,1,1-Trichloroethane and Trichlorotrifluoroethane.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable **CONDITIONS TO AVOID:** Avoid open flames, hot glowing surfaces or electric arcs.
HAZARDOUS POLYMERIZATION: Will not occur **CONDITIONS TO AVOID:** None
INCOMPATIBILITY(MATERIALS TO AVOID): Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive explosives may be formed.
HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen Chloride, Hydrogen Fluoride and possible traces of phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much as contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below.) Blaco-Solv 413 has a CERCLA Reportable Quantity (RQ) of 170 lbs. due to the presence of 1,4-diethylene dioxide (in stabilized 1,1,1-trichloroethane).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: For emergencies or working in contained areas, wear self-contained breathing apparatus or supplied air respiratory protection. In other circumstances involving potential overexposure, use NIOSH/MSHA-approved organic vapor respirator. (Observe limitations directed by manufacturer). Respiratory protection program must be in accordance with 29 CFR 1910.134.
VENTILATION (TYPE): Dilution (General) or Local Exhaust - Sufficient to maintain workplace concentration below permissible exposure limits.
EYE PROTECTION: Splashproof Goggles **GLOVES:** Polyethylene, neoprene or polyvinyl alcohol

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personnel protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* 1,1,1-Trichloroethane and trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* Liquid oxygen or other strong oxidants may form explosive mixtures with Blaco-Solv 413.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas, hydrogen fluoride gas and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.
* A chlorinated solvent used as a flashpoint suppressant must be added in sufficient quantity or the resultant mixture may have a flashpoint lower than the flammable component.
* Caution should be taken not to use in pressurized or totally enclosed system of aluminum construction. Example, paint or adhesive spray system.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney injury.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits.
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F. Patty, 1963.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Industrial Toxicology, Hamilton and Hardy, 1974.
5. Toxicity and Metabolisms of Industria Solvents, Browning, 1965.
6. Toxicology, the Basic Science of Poisons, Casarett and Doull, 1980.
7. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September 1980.
8. Encyclopedia of Chemical Technology, Volume 5, Third Edition, Kirk-Othmer, 1979.
9. NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards, DHHS (NIOSH) Publication No. 81-123, January, 1981.
10. NIOSH/OSHA Pocket Guide to Chemical Hazards, DHEW (NIOSH) Publication No. 78-210, September, 1978.

THIS MATERIAL SAFETY DATA SHEET IS OFFERED SOLELY FOR YOUR INFORMATION, CONSIDERATION, AND INVESTIGATION.

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Material Safety Data Sheet

Baron Blakeslee, Inc., - 2001 N. Janice Ave., - Melrose Park, IL 60160 (312)450 3900

DATE: February, 1988
EDITION: 3rd (M005139)
CHEMICAL NAME AND SYNONYMS: Methylene Chloride and Methyl Alcohol
TRADE NAME AND SYNONYMS: Blaco-Strip 139
CHEMICAL FAMILY: Halogenated Hydrocarbons
FORMULA: CH_2Cl_2,CH_3OH
DOT SHIPPING NAME: Methylene chloride mixture
DOT HAZARD CLASS: ORM-A
I.D. NUMBER: UN 1593

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 99.5°F	**VAPOR DENSITY(AIR=1):** 2.8	**SPEC. GRAV.** 1.27	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: N/A	**SOLUBILITY (WEIGHT % IN WATER):** Approx. 0.2%	**BULK DENSITY:** 10.5#/Gal. @ 77°F	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: mm Hg at 20°C 380	**EVAPORATION RATE:** (CCl_4=1) 1.4	**HEAT OF SOLUTION:** Not applicable	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
Methylene Chloride - CAS No. 75-09-2	92-93	See Section 4 & 5
Methyl Alcohol - CAS No. 67-56-1	7-8	See Section 4 & 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT°F (METHOD USED) None to boiling point (Closed Cup)
FLAMMABLE LIMITS IN AIR (% BY VOLUME) N/A

EXTINGUISHING MEDIA: For fires involving Blaco-Strip 139 use water, dry chemicals, CO_2

SPECIAL FIRE FIGHTING PROCEDURES: Pressure-demand, self-contained respiratory protection should be provided for fire fighters in buildings or confined areas where this product is stored. Storage containers exposed to fire should be kept cool with a water spray, in order to prevent pressure build-up.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is non-flammable and non-explosive under normal conditions of use. At high temperatures, Methylene Chloride decomposes to give off hydrochloric acid as gas plus other toxic and irritating vapors such as phosgene. If storage containers are exposed to excessive heat, over-pressurization of the containers can result.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA: (Methylene Chloride
LC 50 INHALATION = 24,445 ppm (RAT)
LD 20 DERMAL = 2,700 mg/kg (RABBIT)
LD 50 INGESTION = 2,000-4,000 mg/kg (RAT)
FISH,LC-50 (LETHAL CONCENTRATION) Not Available

CLASSIFICATION (POISON, IRRITANT, ETC.)
INHALATION: Toxic
SKIN/EYE: Liquid mildly irritating to skin; eye irritant
INGESTION: Toxic
AQUATIC: Not Available

HUMAN EXPOSURE INFORMATION/DATA: Contains Methylene Chloride. Possible cancer hazard based on tests with laboratory animals. Overexposure may create cancer risk (See Section 5).

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. METHYLENE CHLORIDE - CAS NO. 75-09-2

PERMISSIBLE EXPOSURE LIMITS(TLV)

Current Federal OSHA permissible exposure limits (29 CFR 1910.1000) are 500 ppm (8-hour TWA); 500-1,000 ppm periodic excursions are allowed providing TWA is at or below 500 ppm; 1,000-2,000 ppm excursions allowed only for maximum of five minutes in any 2-hour period - 2,000 maximum allowable concentration (must not be exceeded).

Current ACGIH 8-hour TWA is 100 ppm with 15-minute excursion every 1-hour of 500 ppm.

NIOSH recommends that the TWA exposure limit for methylene chloride is 75 ppm. This chemical is listed in the TSCA Inventory. Not listed as carcinogenic by IARC, NTP, OSHA, ACGIH; a 1985 NTP, 2 year animal inhalation study report states that there is "clear evidence of carcinogenicity" in mice and female rats. Experience in industry has shown no increased incidences of cancer of any type in the worker population. IARC lists this product as having inadequate evidence in humans and animals to evaluate carcinogenicity, (Group 3).
MEDICAL LIMITATIONS: Persons with angina or heart disease should not be exposed to this product.

ROUTES OF EXPOSURE

INHALATION: Excessive inhalation may produce symptoms of central nervous system depression, ranging from light-headedness, nausea and vomiting to unconsciousness and death.

SKIN CONTACT: Mildly irritating to skin. Skin contact may produce a burning sensation. Prolonged or repeated contact may cause skin to become reddened, rough, and dry due to the removal of natural oils and may result in dermatitis.

SKIN ADSORPTION: This product may be absorbed through the skin, although not expected to produce toxicity by this route.

EYE CONTACT: An irritant to the eyes, causing pain, lacrimation, and general inflammation.

INGESTION: May cause irritation of the gastrointestinal tract with vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through the gastrointestinal tract may produce symptoms of central nervous system depression ranging from light-headedness to unconsciousness.

EFFECTS OF OVEREXPOSURE

ACUTE: Excessive inhalation or ingestion may produce symptoms of central nervous system depression ranging from light-headedness, to unconsciousness and death. Exposure of the eyes and skin may produce irritation.

CHRONIC: Can cause headache, mental confusion, depression, fatigue loss of appetite, nausea, vomiting, cough, loss of sense of balance, and visual disturbances. Prolonged or repeated skin contact may cause dermatitis.

MONITORING

BIOLOGICAL: Reports indicate that 33 ppm methylene chloride in breath during exposure is equivalent to an exposure of about 100 ppm in air. Blood analyzed for carboxyhemoglobin (COHb) may show 7 to 10% saturation following exposure to 250 and 500 ppm respectively. Amount of exertion, duration of exposure, and time sampled effect these rations.

PERSONAL/AREA: The NIOSH Analytical Method Number 1005 is applicable.

B. METHYL ALCOHOL - CAS NO. 67-56-1

Current Federal OSHA permissible exposure limit is 200 ppm (8-hour TWA) (20 CFR 1910.1000).

Current ACGIH permissible exposure is 200 ppm (8-hour TLV).

This chemical is listed in the TSCA Inventory. It is **not** listed as a carcinogen by IARC, NTP, OSHA, ACGIH.

ROUTES OF EXPOSURE/EFFECTS OF OVEREXPOSURE

INGESTION: The main toxic effect is exerted on the nervous system particularly the optic nerves and possibly the retina.

Severe exposures may cause dizziness, unconsciousness, sighing respiration, cardiac depression and eventually death. Where exposure is less severe, the first symptoms may be blurring of vision, photophobia, and conjunctivitis followed by the development of definite eye lesions. There may be headache, gastro intestinal disturbances, dizziness and a feeling of intoxication. The visual symptoms may clear temporarily, only to recur later and progress to actual blindness.

Death from ingestion of less than 30 ml. has been reported. Usual fatal dose is 100-250 ml.

INHALATION: Inhalation of fumes can lead to similar symptoms to those listed for ingestion.

EYE/SKIN: Skin may become dry and cracked due to solvent action of methyl alcohol. Mild irritant to eyes.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Strip 139 is as follows:

A) Using OSHA TWA values - 400 ppm
B) Using ACGIH TLV values - 110 ppm

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

INGESTION: NEVER give anything by mouth to an unconscious person. Have conscious patient drink several glasses of water then induce vomiting by having patient tickle back of throat with finger. Keep airway clear. Seek medical attention immediately.

EYES: **OBJECT IS TO FLUSH MATERIAL OUT THEN SEEK MEDICAL ATTENTION.** Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire eye surface. See medical attention immediately.

SKIN: Wash contaminated areas with plenty of soap and water. A soothing ointment may be applied to irritated skin after thorough cleansing. Remove contaminated clothing and footwear and wash clothing before reuse. Discard footwear which cannot be decontaminated. See medical attention.

NOTES TO PHYSICIAN: Overexposure to this product can produce elevated carboxyhemoglobin levels.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable **CONDITIONS TO AVOID:** Avoid open flames, hot glowing surfaces or electric arcs, welding operations

HAZARDOUS POLYMERIZATION: Will not occur. **CONDITIONS TO AVOID:** None

INCOMPATIBILITY(MATERIALS TO AVOID): Avoid contamination with pure oxygen, caustic soda, caustic potash, alkali metals or oxidizing materials. Shock sensitive explosives may be formed.

HAZARDOUS DECOMPOSITION PRODUCTS: At high temperatures this product decomposes to give off hydrogen chloride gases and small quantities of other toxic irritating vapors such as phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Respiration protection is not required under normal use. However, use a NIOSH/MSHA approved respirator, following manufacturer's recommendations where vapor, mist, or spray may be generated. Use supplied air respirator in positive pressure mode following ANSI Z117.1-1977 for tank, confined space entry, and emergency situations.

VENTILATION (TYPE): Where engineering controls are not feasible use adequate local exhaust ventilation. Local exhaust ventilation should be used where mist, spray or vapor may be generated.

EYE PROTECTION: Splashproof Goggles

GLOVES: Polyethylene, neoprene or polyvinyl alcohol

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personnel protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

SIGNAL WORDS: DANGER! VOLATILE SOLVENT!

STATEMENT OF HAZARDS: Volatile Solvent - Persons with angina or heart disease should not be exposed. Overexposure to vapor can cause loss of consciousness and may result in death. Causes irritation of the eyes, skin and respiratory tract. May be fatal if swallowed!

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Blaco-Strip 139 vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* Liquid oxygen or other strong oxidants may form explosive mixtures with Blaco-Strip 139.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
* **NEVER** enter a pit or tank without observing safety procedures: **NEVER** alone, always with a life line, and always with positive supply of fresh air.
  Employ respiratory protection when exposure to vapors is possible.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney injury. Persons with angina or heart disease should <u>not</u> be exposed.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits.
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1963.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Industrial Toxicology, Hamilton and Hardy, 1974.
5. Toxicity and Metabolisms of Industrial Solvents, Browning, 1965.
6. Toxicology, the Basic Science of Poisons, Casarett and Doull, 1980.
7. Federal Registry, 45 CFR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
8. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September 1980.

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Material Safety Data Sheet

Baron Blakeslee, Inc., – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450 3900

DATE: February, 1988
EDITION: 3rd (M005140)
CHEMICAL NAME AND SYNONYMS: Methylene Chloride, Methyl Alcohol and Isopropylamine
TRADE NAME AND SYNONYMS: Blaco-Strip 139A
CHEMICAL FAMILY: Halogenated Hydrocarbons Alcohols, Amines
FORMULA: CH_2Cl_2, CH_3OH, $(CH_3)_2$, $CHNH_2$
DOT SHIPPING NAME: Methylene Chloride Mixture
DOT HAZARD CLASS: ORM-A
I.D. NUMBER: UN 1593

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 99.5°F	**VAPOR DENSITY(AIR=1):** 2.8	**SPEC. GRAV.** 1.27	**pH OF SOLUTIONS:** 10
FREEZING/MELTING POINT: Not Available	**SOLUBILITY (WEIGHT % IN WATER):** Approx. 0.2%	**BULK DENSITY:** Approx. 10.6 lbs/gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: mm Hg at 20°C 380	**EVAPORATION RATE:** (CCl_4=1) 1.5	**HEAT OF SOLUTION:** Not applicable	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor

SECTION 2 - HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
Methylene Chloride - CAS No. 75-09-2	92-93	See Section 4 & 5
Methyl Alcohol - CAS No. 67-56-1	7	See Section 4 & 5
Isopropylamine - CAS No. 75-31-0	0.1	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT°F (METHOD USED)
None to Boiling Point

FLAMMABLE LIMITS IN AIR (% BY VOLUME) (Methylene Chloride) LEL:12% UEL:19%

EXTINGUISHING MEDIA: For fires involving Blaco-Strip 139A use water, dry chemicals, CO_2

SPECIAL FIRE FIGHTING PROCEDURES: Pressure-demand, self-contained respiratory protection should be provided for fire fighters in buildings or confined areas where this product is stored. Storage containers exposed to fire should be kept cool with a water spray, in order to prevent pressure build-up.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is non-flammable unde normal conditions of use. At high temperatures, Methylene Chloride decomposes to give off hydrochloric acid as gas plus other toxic a irritating vapors such as phosgene. If storage containers are exposed to excessive heat, over-pressurization of the containers can result.

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA: (Methylene Chloride
LC 50 INHALATION = 24,445 ppm (RAT)
LD 20 DERMAL = 2,700 mg/kg (RABBIT)
LD 50 INGESTION = 2,000-4,000 mg/kg (RAT)
FISH,LC-50 (LETHAL CONCENTRATION) Not Available

CLASSIFICATION (POISON, IRRITANT, ETC.)
INHALATION: Toxic
SKIN/EYE: Liquid mildly irritating to skin; eye irritant
INGESTION: Toxic
AQUATIC: Not Available

HUMAN EXPOSURE INFORMATION/DATA: Contains Methylene Chloride. Possible cancer hazard based on tests with laboratory animals. Overexposure may create cancer risk (See Section 5).

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. METHYLENE CHLORIDE - CAS NO. 75-09-2

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limits (29 CFR 1910.1000) are 500 ppm (8-hour TWA); 500-1,000 ppm periodic excursions are allowed providing TWA is at or below 500 ppm; 1,000-2,000 ppm excursions allowed only for maximum of five minutes in any 2-hour period - 2,000 maximum allowable concentration (must not be exceeded).

Current ACGIH 8-hour TWA is 100 ppm with 15-minute excursion every 1-hour of 500 ppm.

NIOSH recommends that the TWA exposure limit for methylene chloride is 75 ppm. This chemical is listed in the TSCA Inventory. Not listed as carcinogenic by IARC, NTP, OSHA, ACGIH; a 1985 NTP, 2 year animal inhalation study report states that there is "clear evidence of carcinogenicity" in mice and female rats. Experience in industry has shown no increased incidences of cancer of any type in the worker population. IARC lists this product as having inadequate evidence in humans and animals to evaluate carcinogenicity, (Group 3).
MEDICAL LIMITATIONS: Persons with angina or heart disease should not be exposed to this product.

ROUTES OF EXPOSURE

INHALATION: Excessive inhalation may produce symptoms of central nervous system depression, ranging from light-headedness, nausea and vomiting to unconsciousness and death.

SKIN CONTACT: Mildly irritating to skin. Skin contact may produce a burning sensation. Prolonged or repeated contact may cause skin to become reddened, rough, and dry due to the removal of natural oils and may result in dermatitis.

SKIN ADSORPTION: This product may be absorbed through the skin, although not expected to produce toxicity by this route.

EYE CONTACT: An irritant to the eyes, causing pain, lacrimation, and general inflammation.

INGESTION: May cause irritation of the gastrointestinal tract with vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through the gastrointestinal tract may produce symptoms of central nervous system depression ranging from light-headedness to unconsciousness.

EFFECTS OF OVEREXPOSURE

ACUTE: Excessive inhalation or ingestion may produce symptoms of central nervous system depression ranging from light-headedness, to unconsciousness and death. Exposure of the eyes and skin may produce irritation.

CHRONIC: Can cause headache, mental confusion, depression, fatigue loss of appetite, nausea, vomiting, cough, loss of sense of balance, and visual disturbances. Prolonged or repeated skin contact may cause dermatitis.

MONITORING

BIOLOGICAL: Reports indicate that 33 ppm methylene chloride in breath during exposure is equivalent to an exposure of about 100 ppm in air. Blood analyzed for carboxyhemoglobin (COHb) may show 7 to 10% saturation following exposure to 250 and 500 ppm respectively. Amount of exertion, duration of exposure, and time sampled effect these rations.

PERSONAL/AREA: The NIOSH Analytical Method Number 1005 is applicable.

B. METHYL ALCOHOL - CAS NO. 67-56-1

PERMISSIBLE EXPOSURE LIMITS(TLV)

Current Federal OSHA permissible exposure limit is 200 ppm (8-hour TWA) (20 CFR 1910.1000).

Current ACGIH permissible exposure is 200 ppm (8-hour TLV).

This chemical is listed in the TSCA Inventory. It is **not** listed as a carcinogen by IARC, NTP, OSHA, ACGIH.

ROUTES OF EXPOSURE/EFFECTS OF OVEREXPOSURE

INGESTION: The main toxic effect is exerted on the nervous system particularly the optic nerves and possibly the retina.

Severe exposures may cause dizziness, unconsciousness, sighing respiration, cardiac depression and eventually death. Where exposure is less severe, the first symptoms may be blurring of vision, photophobia, and conjunctivitis followed by the development of definite eye lesions. There may be headache, gastro intestinal disturbances, dizziness and a feeling of intoxication. The visual symptoms may clear temporarily, only to recur later and progress to actual blindness.

Death from ingestion of less than 30 ml. has been reported. Usual fatal dose is 100-250 ml.

INHALATION: Inhalation of fumes can lead to similar symptoms to tho listed for ingestion.

EYE/SKIN: Skin may become dry and cracked due to solvent action of methyl alcohol. Mild irritant to eyes.

C. ISOPROPYLAMINE - CAS No. 75-31-0

Current Federal OSHA permissible exposure limit is 5 ppm (8-hour TWA).

Current ACGIH permissible exposure limit is 5 ppm (8-hour TLV).

This chemical is listed in the TSCA Inventory. It is not listed as a carcinogen by IARC, NTP, or OSHA.

ROUTES OF EXPOSURE/EFFECTS OF OVEREXPOSURE

Harmful if swallowed, inhaled, or absorbed through skin:

Chemical is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

INHALATION: May be fatal as a result of spasm, inflammation, and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema.

SKIN/EYE CONTACT: Severe irritation and burns.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Strip 139A is as follows:

A) Using OSHA TWA values - 459 ppm
B) Using ACGIH TLV values - 194 ppm

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if qualified operator is available. Seek medical attention immediately.

INGESTION: **NEVER** give anything by mouth to an unconscious person. Have conscious patient drink several glasses of water then induce vomiting by having patient tickle back of throat with finger. Keep airway clear. Seek medical attention immediately.

EYES: **OBJECT IS TO FLUSH MATERIAL OUT THEN SEEK MEDICAL ATTENTION.** Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire eye surface. See medical attention immediately.

SKIN: Wash contaminated areas with plenty of soap and water. A soothing ointment may be applied to irritated skin after thorough cleansing. Remove contaminated clothing and footwear and wash clothing before reuse. Discard footwear which cannot be decontaminated. See medical attention.

NOTES TO PHYSICIAN: Overexposure to this product can produce elevated carboxyhemoglobin levels.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: Avoid open flames, hot glowing surfaces or electric arcs.

HAZARDOUS POLYMERIZATION: Will not occur. **CONDITIONS TO AVOID:** None

INCOMPATIBILITY(MATERIALS TO AVOID): Avoid contamination with pure oxygen, caustic soda, caustic potash, alkali metals or oxidizing materials. Shock sensitive explosives may be formed.

HAZARDOUS DECOMPOSITION PRODUCTS: At high temperatures this product decomposes to give off hydrogen chloride gases and small quantities of other toxic irritating vapors such as phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Respiration protection is not required under normal use. However, use a NIOSH/MSHA approved respirator, following manufacturer's recommendations where vapor, mist, or spray may be generated. Use supplied air respirator in positive pressure mode following ANSI Z117.1-1977 for tank, confined space entry, and emergency situations.

VENTILATION (TYPE): Where engineering controls are not feasible use adequate local exhaust ventilation. Local exhaust ventilation should be used where mist, spray or vapor may be generated.

EYE PROTECTION: Splashproof Goggles

GLOVES: Polyethylene or Polyfluorinated

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personnel protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

SIGNAL WORDS: DANGER! VOLATILE SOLVENT!

STATEMENT OF HAZARDS: Volatile Solvent - Persons with angina or heart disease should not be exposed. Overexposure to vapor can cause loss of consciousness and may result in death. Causes irritation of the eyes, skin and respiratory tract. May be fatal if swallowed!

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Blaco-Strip 139A vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* Liquid oxygen or other strong oxidants may form explosive mixtures with Blaco-Solv 139A.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and traces of phosgene.
* **NEVER** enter a pit or tank without observing safety procedures: **NEVER** alone, always with a life line, and always with positive supply of fresh air.
  Employ respiratory protection when exposure to vapors is possible.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death. Long-term overexposure may cause liver/kidney injury. Persons with angina or heart disease should <u>not</u> be exposed.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits.
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A Patty, 1963.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Industrial Toxicology, Hamilton and Hardy, 1974.
5. Toxicity and Metabolisms of Industrial Solvents, Browning, 1965.
6. Toxicology, the Basic Science of Poisons, Casarett and Doull, 1980.
7. Federal Registry, 45 CFR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
8. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September 1980.

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Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450 3900

DATE: September, 1987
EDITION: 2nd (M002579)
CHEMICAL NAME AND SYNONYMS: Blend of Trichlorotrifluoroethane, and Acetone
TRADE NAME AND SYNONYMS: Blaco-Tron TA
CHEMICAL FAMILY: Halogenated Hydrocarbons/ Ketones
FORMULA: $C_2Cl_3F_3/CH_3COCH_3$

DOT SHIPPING NAME: Not regulated by DOT
DOT HAZARD CLASS: None

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 110.5°F	**VAPOR DENSITY(AIR=1):** Approx. 6.0	**SPEC. GRAV.** 1.44 (Liquid)	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: G.T. -35°C	**SOLUBILITY (WEIGHT % IN WATER):** 0.25	**BULK DENSITY:** Approx. 11.7 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: Approx 385 mm Hg (at 21.1°C)	**EVAPORATION RATE:** Approx. 1.3 (Butyl Acetate=1)	**HEAT OF SOLUTION:** Not Available	**APPEARANCE AND ODOR:** Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS

	Approx. %	HAZARD DATA
Trichlorotrifluoroethane - CAS No. 76-13-1	90	See Section 5
Acetone - CAS No. 67-64-1	10	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)	EXTINGUISH. MEDIA:
Non-Flammable (Closed Cup)	Not Available	Carbon Dioxide; Dry Chemical; or Water

SPECIAL FIRE FIGHTING PROCEDURES:
Wear self-contained breathing apparatus approved by NIOSH. Use water spray to keep containers cool. Keep any spillage away from fire and heat.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA: Trichlorotrifluoroethane

LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects

SKIN - RABBIT: 500 mg-open

LD_{50} RAT: 43 gm/kg

HUMAN EXPOSURE INFORMATION/DATA:

CLASSIFICATION (POISON, IRRITANT, ETC.)

INHALATION: Low Toxic

SKIN/EYE: Mild irritant

INGESTION: Mildly Toxic

None of the components of Blaco-Tron TA are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: intoxication, candiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.
EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.
INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

B. ACETONE - CAS NO. 67-64-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA).

ACGIH has adopted a permissible exposure limit of 750 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE

SWALLOWING: Causes nausea, vomiting, headache, dizziness, and stupor.

SKIN ABSORPTION: No evidence of adverse effects from available information.

INHALATION: Causes headache, dizziness, nausea, and vomiting. Vapors may irritate eyes, nose, and throat.

SKIN CONTACT: No immediate irritation. Repeated contact causes defatting and skin chapping.

EYE CONTACT: Causes irritation.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Tron TA is as follows:

A) Using OSHA TWA values - 1000 ppm
B) Using ACGIH TLV values - 920 ppm

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. **NEVER** give anything by mouth to an unconscious person. Take immediately to hospital or physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

NOTES TO PHYSICIAN: Aspirated acetone may cause severe lung damage and present a significant hazard. Stomach contents should be evacuated quickly in a manner which avoids aspiration. Otherwise, treatment is directed at the control of symptoms and the clinical condition. No specific antidote is known.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.

HAZARDOUS POLYMERIZATION: Will not occur. **CONDITIONS TO AVOID:** None

INCOMPATIBILITY(MATERIALS TO AVOID): Strong acids and alkalis reactive metals e.g. powdered aluminum, magnesium, zinc, molten aluminum, barium and lithium shavings.

HAZARDOUS DECOMPOSITION PRODUCTS: Halogens, hydrochloric and hydrofluoric acids, possibly carbonyl halides, CO and CO_2.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, State or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.

EYE PROTECTION: Splashproof Goggles
GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.

* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety procedures:
* **NEVER** alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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Material Safety Data Sheet

Baron Blakeslee, Inc., – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450 3900

DATE: August, 1987

EDITION: 3rd (M002578)

CHEMICAL NAME AND SYNONYMS:
Blend of Trichlorotrifluoroethane, Acetone and Comsol NM 55 (55 Nitromethane)

TRADE NAME AND SYNONYMS:
Blaco-Tron TAS

CHEMICAL FAMILY: Halogenated Hydrocarbons

FORMULA: $C_2CL_3F_3/CH_3COCH_3/CH_3NO_2$

DOT SHIPPING NAME: Not regulated

DOT HAZARD CLASS: None

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 110.5°F	**VAPOR DENSITY(AIR=1):** Approx. 6.0	**SPEC. GRAV.** 1.44 (Liquid)	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: G.T. -35°C	**SOLUBILITY (WEIGHT % IN WATER):** 0.25	**BULK DENSITY:** Approx. 12 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: Approx 385 (at 21.1°C)	**EVAPORATION RATE:** Approx. 1.3	**HEAT OF SOLUTION:** Not available	**APPEARANCE AND ODOR:** Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS	Approx. %	HAZARD DATA
Trichlorotrifluoroethane - CAS No. 76-13-1	89.5	See Section 5
Acetone - CAS No. 67-64-1	10.0	See Section 5
Nitromethane - CAS No. 75-52-5	0.5	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED) Non-Flammable	**FLAMMABLE LIMITS IN AIR (% BY VOLUME)** Not Available	**EXTINGUISH. MEDIA:** Carbon Dioxide; Dry Chemical; or Water

SPECIAL FIRE FIGHTING PROCEDURES:
Wear self-contained breathing apparatus approved by NIOSH. Use water spray to keep containers cool. Keep any spillage away from fire and heat.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA: Trichlorotrifluoroethane

LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects

SKIN - RABBIT: 500 mg-open

LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)

INHALATION: Low Toxic

SKIN/EYE: Mild irritant

INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA:
None of the components of Blaco-Tron TAS are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)
Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)
ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low concentrations, headache drowsiness, loss of concentration, at high levels: Intoxication, CNS depression and respiratory depression (possibly fatal). Can displace air resulting in asphyxiation hazard.
EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.
INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

B. ACETONE - CAS NO. 67-64-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA).

ACGIH has adopted a permissible exposure limit of 750 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE

SWALLOWING: Causes nausea, vomiting, headache, dizziness, and stupor.

SKIN ABSORPTION: No evidence of adverse effects from available information.

INHALATION: Causes headache, dizziness, nausea, and vomiting. Vapors may irritate eyes, nose, and throat.

SKIN CONTACT: No immediate irritation. Repeated contact causes defatting and skin chapping.

EYE CONTACT: Causes irritation.

C. NITROMETHANE - CAS NO. 75-52-5

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA Permissible Exposure Limit (29 CFR 1910.1000) is 100 ppm (8-hour TWA)

ACGIH has adopted a Permissible Exposure Limit of 100 ppm (8-hour TLV)

ROUTES/EFFECTS OF OVEREXPOSURE

INHALATION: May cause anorexia, nausea, vomiting and diarrhea, als kidney and liver damage.

INGESTION: Similar effects as inhalation.

EYES/SKIN: Non-irritating to skin/eyes using draize technique on rabbits. Frequent exposures to skin may cause slight drying due to defatting action.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Tron TAS is as follows:

A) Using OSHA TWA values - 900 ppm
B) Using ACGIH TLV values - 835 ppm

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. **NEVER** give anything by mouth to an unconscious person. Take immediately to hospital or physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water.

NOTES TO PHYSICIAN: Aspirated acetone may cause severe lung damage and present a significant hazard. Stomach contents should be evacuated quickly in a manner which avoids aspiration. Otherwise, treatment is directed at the control of symptoms and the clinical condition. No specific antidote is known.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.

HAZARDOUS POLYMERIZATION: Will not occur. **CONDITIONS TO AVOID:** None

INCOMPATIBILITY(MATERIALS TO AVOID): Strong acids and alkalis reactive metals e.g. powdered aluminum, magnesium, zinc, molten aluminum, barium and lithium shavings.

HAZARDOUS DECOMPOSITION PRODUCTS: Halogens, hydrochloric and hydrofluoric acids, possibly carbonyl halides, CO and CO_2.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. DO NOT flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, State or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.

EYE PROTECTION: Splashproof Goggles **GLOVES:** Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety procedures:
* Never alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: September, 1987

EDITION: 3rd (M002592)

CHEMICAL NAME AND SYNONYMS:
Blend of Methylene Chloride Trichlorotrifluoroethane and Cyclopentane

TRADE NAME AND SYNONYMS:
Blaco-Tron TCM

CHEMICAL FAMILY:
Halogenated Hydrocarbons

FORMULA: $CH_2Cl_2/C_2Cl_3F_3/C_5H_{10}$

DOT SHIPPING NAME: Methylene chloride Mixture

DOT HAZARD CLASS: ORM-A UN 1593

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 97.3°F	**VAPOR DENSITY(AIR=1):** 4.3	**SPEC. GRAV.** 1.29	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: Not available	**SOLUBILITY (WEIGHT % IN WATER):** Approx. .10	**BULK DENSITY:** Approx. 10.75 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: 424 mm Hg at 20°C	**EVAPORATION RATE:** (Carbon Tetrachloride=100) 200	**HEAT OF SOLUTION:** Not available	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
Methylene Chloride - CAS No. 75-09-2	52	See Section 5
Trichlorotrifluoroethane - CAS No. 76-13-1	39	See Section 5
Cyclopentane, technical - CAS No. 287-92-3	9	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)	EXTINGUISH. MEDIA:
None (Closed Cup)	Not Determined	Carbon Dioxide, Dry Chemical, or Water Spray

SPECIAL FIRE FIGHTING PROCEDURES:
Fire fighters should wear NIOSH pressure demand self-contained breathing apparatus for possible exposure to hydrochloric and hydrofluoric acids and phosgene. Use water spray to keep containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene. If storage containers are exposed to excessive heat, over-pressurization of the containers can result.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

TOXICITY DATA: Trichlorotrifluoroethane
LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects
SKIN - RABBIT: 500 mg-open
LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)
INHALATION: Low Toxic
SKIN/EYE: Mild irritant
INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA:
None of the components of Blaco-Tron TCM are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory. Contains methylene chloride. Possible cancer hazard based on tests with laboratory animals. Overexposure may create cancer risk (see Section 5).

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: intoxication, candiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.
EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.
INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

B. METHYLENE CHLORIDE - CAS NO. 75-09-2

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limits (29 CFR 1910.1000) are 500 ppm (8-hour TWA); 500-1,000 ppm periodic excursions are allowed providing TWA is at or below 500 ppm; 1,000-2,000 ppm excursions allowed only for maximum of five minutes in any 2-hour period-2,000 maximum allowable concentration (must not be exceeded).

Current ACGIH 8-hour TWA is 100 ppm with 15-minute excursion every 1-hour of 500 ppm.

NIOSH recommends that the TWA exposure limit for methylene chloride is 75 ppm. A 1985 NTP, 2 year animal inhalation study report states that there is "clear evidence of carcinogenicity" in mice and female rats. Experience in industry has shown no increased incidences of cancer of any type in the worker population. IARC lists this product as having inadequate evidence in humans and animals to evaluate carcinogenicity, (Group 3).

MEDICAL LIMITATIONS: Persons with angina or heart disease should not be exposed to this product.

ROUTES OF EXPOSURE:

INHALATION: Excessive inhalation may produce symptoms of central nervous system depression, ranging from light-headedness, nausea and vomiting to unconsciousness and death.

SKIN CONTACT: Mildly irritating to skin. Skin contact may produce a burning sensation. Prolonged or repeated contact may cause skin to become reddened, rough, and dry due to the removal of natural oils and may result in dermatitis.

SKIN ADSORPTION: This product may be absorbed through the skin, although not expected to produce toxicity by this route.

EYE CONTACT: An irritant to the eyes, causing pain, lacrimation, and general inflammation.

INGESTION: May cause irritation of the gastrointestinal tract with vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through the gastrointestinal tract may produce symptoms of central nervous system depression ranging from light-headedness to unconsciousness.

EFFECTS OF OVEREXPOSURE:

ACUTE: Excessive inhalation or ingestion may produce symptoms of central nervous system depression ranging from light-headedness, to unconsciousness and death. Exposure of the eyes and skin may produce irritation.

CHRONIC: Can cause headache, mental confusion, depression, fatigue loss of appetite, nausea, vomiting, cough, loss of sense of balance, and visual disturbances. Prolonged or repeated skin contact may cause dermatitis.

MONITORING

BIOLOGICAL: Reports indicate that 33 ppm methylene chloride in breath during exposure is equivalent to an exposure of about 100 ppm in air. Blood analyzed for carboxyhemoglobin (COHb) may show 7 to 10% saturation following exposure to 250 and 500 ppm respectively. Amount of exertion, duration of exposure, and time sampled effect these rations.

PERSONAL/AREA: The NIOSH Analytical Method Number 1005 is applicable.

C. CYCLOPENTANE - CAS NO. 287-92-3

Permissible Exposure Limits (TLV)

This is no current Federal OSHA permissible exposure limit (29 CFR 1910.1000) for this chemical.

ACGIH has adopted a permissible exposure limit of 600 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE:

INHALATION: Exposure at concentrations over the TLV results in central nervous system depression. Symptoms of acute exposure, in high concentrations, are excitement, loss of equilibrium, stupor, coma, and rarely, respiratory failure.

Narcosis has been found in animals at 90,000 to 120,000 ppm with exposure times of 5 to 60 minutes. 130,000 ppm has been reported as fatal in animals. The possibility of a serious chronic effect, polyneuropathy has been discussed.

EYES: May produce mild irritation.

The information supplied here and elsewhere on cyclopentane applies to the pure material. The raw material for this product is actually technical grade. It contains isomers of cyclopentane.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Tron TCM is as follows:

A) Using OSHA TWA values - 580 ppm

B) Using ACGIH TLV values - 150 ppm

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. **NEVER** give anything by mouth to an unconscious person. Take immediately to a hospital or physician.

EYE CONTACT: Flush with large amounts of water, lifting eyelids occasionally for at least 15 minutes. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and footwear. If irritant occurs, see a physician. Thoroughly clean contaminated clothing and footwear before reuse or discard.

NOTE TO PHYSICIAN: OVEREXPOSURE TO THIS PRODUCT CAN PRODUCE ELEVATED CARBOXYHEMOGLOBIN LEVELS.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: None

INCOMPATIBILITY(MATERIALS TO AVOID): Strong acids and alkalis reactive metals e.g. powdered aluminum, magnesium, zinc, molten aluminum, barium and lithium shavings. Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrochloric and hydrofluoric acids, phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below.)

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air positive pressure mode respirators for emergencies and in situations where air may be displaced by vapors.
VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.
EYE PROTECTION: Splashproof Goggles
GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.
OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane methylene chloride vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.

* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety procedures and:
* **NEVER** alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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Material Safety Data Sheet

Baron Blakeslee, Inc., – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450 3900

DATE: August, 1987

EDITION: 2nd (M008030)

CHEMICAL NAME AND SYNONYMS:
Blend of Trichlorotrifluoroethane, ethyl alcohol, and methyl alcohol

TRADE NAME AND SYNONYMS:
Blaco-Tron TE-35

CHEMICAL FAMILY:
Halogenated Hydrocarbons/Alcohols

FORMULA: $C_2CL_3F_3/C_2H_2H_5OH/CH_3OH$

DOT SHIPPING NAME: Combustible Liquid, NOS

DOT HAZARD CLASS: NA 1993

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 119°F	**VAPOR DENSITY(AIR=1):** 3.0	**SPEC. GRAV.** 1.17 (liquid)	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: Below -76°C	**SOLUBILITY (WEIGHT % IN WATER):** 0.028	**BULK DENSITY:** Approx. 9.75 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: 360 at 70°F	**EVAPORATION RATE:** (Ether = 1) (time to evaporate):15	**HEAT OF SOLUTION:** Not available	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
Trichlorotrifluoroethane - CAS No.76-13-1	65	See Section 5
Ethyl alcohol,denatured grade - CAS No.64-17-5	31	See Section 5
Methyl alcohol - CAS No. 67-56-1	3	See Section 5

May also contain other minor ingredients such as Methyl Isobutyl Ketone in concentrations less than 0.5% that are used to denature the ethyl alcohol component.

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT°F (METHOD USED) 140-145°F (Closed Cup)	**FLAMMABLE LIMITS IN AIR (% BY VOLUME)** Not Available	**EXTINGUISH. MEDIA:** Carbon dioxide; dry chemical or water spray

SPECIAL FIRE FIGHTING PROCEDURES:
Fire fighters should wear NIOSH pressure demand self-contained breathing apparatus for possible exposure to hydrochloric and hydrofluoric acids and phosgene. Use water spray to keep containers cool.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

UNUSUAL FIRE AND EXPLOSION HAZARDS: Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene.

Blaco-Tron TE-35 is <u>not</u> for use in a heated vapor degreaser. **DO <u>NOT</u>** heat solvent.

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV):

TOXICITY DATA: Trichlorotrifluoroethane

LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects

SKIN - RABBIT: 500 mg-open

LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)

INHALATION: Low Toxic

SKIN/EYE: Mild irritant

INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA:

None of the components of Blaco-Tron TE-35 are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

<u>ROUTES/EFFECTS OF EXPOSURE</u>:

INHALATION: At low concentrations, headache drowsiness, loss of concentration, at high levels: Intoxication, CNS depression and respiratory depression (possibly fatal). Can displace air resulting in asphyxiation hazard.

EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.

INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

B. Ethyl Alcohol - CAS NO. 64-17-5

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1000 ppm 8-hour TWA).

ACGIH has adopted a permissible exposure limit of 1000 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE:

INGESTION: Large doses can cause alcohol poisoning. A central nervous system depressant.

INHALATION: Exposure to concentrations of over 1,000 ppm can cause headache, irritation of nose and throat, and if long continued drowsiness and lassitude, loss of appetite and inability to concentrate.

EYES: Irritant to eyes in concentrations greater than 1,000 ppm.

C. METHYL ALCOHOL - CAS NO. 67-56-1

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA permissible exposure limit (20 CFR 1910.1000) is 200 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 200 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE

INGESTION: The main toxic effect is exerted on the nervous system particularly the optic nerves and possible the retina.

Severe exposures may cause dizziness, unconsciousness, sighing respiration, cardiac depression and eventually death. Where exposure is less severe, the first symptoms may be blurring of vision, photophobia, and conjunctivitis followed by the development of definite eye lesions. There may be headache, gastro intestinal disturbances, dizziness and a feeling of intoxication. The visual symptoms may clear temporarily, only to recur later and progress to actual blindness.

Death from ingestion of less than 30 ml. has been reported. Usual fatal dose is 100-250 ml.

INHALATION: Inhalation of fumes can lead to similar symptoms to those listed for ingestion.

EYE/SKIN: Skin may become dry and cracked due to solvent action of methyl alcohol. Mild irritant to eyes.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Tron TE-35 is as follows:

A) Using OSHA TWA values - 725 ppm

B) Using ACGIH TLV values - 710 ppm

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. DO NOT give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. NEVER give anything by mouth to an unconscious person. Take immediately to hospital or physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.
HAZARDOUS POLYMERIZATION: Will not occur. **CONDITIONS TO AVOID:** None
INCOMPATIBILITY(MATERIALS TO AVOID): Strong acids and alkalis reactive metals e.g. powdered aluminum, magnesium, zinc, molten aluminum, barium and lithium shavings. Strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS: Hydrochloric and hydrofluoric acids, phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. (Remove all sources of heat or flame. Use spark proof tools.) Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below.)

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.
EYE PROTECTION: Splashproof Goggles
GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **DO NOT** use Blaco-Tron TE-35 in a heated vapor degreaser. **DO NOT** heat solvent.
* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety procedures:
* Never alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

THIS MATERIAL SAFETY DATA SHEET IS OFFERED SOLELY FOR YOUR INFORMATION CONSIDERATION AND INVESTIGATION.

BARON-BLAKESLEE PROVIDES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE DATA CONTAINED HEREIN.

Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: September, 1987

EDITION: 2nd (M008040)

CHEMICAL NAME AND SYNONYMS:
Blend of Trichlorotrifluoroethane and ethyl alcohol containing a small amount of methyl alcohol

TRADE NAME AND SYNONYMS:
Blaco-Tron TE

CHEMICAL FAMILY:
Halogenated Hydrocarbons/Alcohols

FORMULA: $C_2Cl_3F_3/C_2H_5OH/CH_3OH$

DOT SHIPPING NAME: Not regulated

DOT HAZARD CLASS: Not Applicable

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 112°F	**VAPOR DENSITY(AIR=1):** 6.0	**SPEC. GRAV.** 1.527 (liquid)	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: Below -35°C	**SOLUBILITY (WEIGHT % IN WATER):** 0.028	**BULK DENSITY:** Approx. 12.7 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: 365 mm Hg at 20°C	**EVAPORATION RATE:** (Ether = 1) (time to evaporate): 2.0	**HEAT OF SOLUTION:** Not available	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS

	APPROX. %	HAZARD DATA
Trichlorotrifluoroethane-CAS No.76-13-1	96.0	See Section 5
Ethyl alcohol,denatured grade(SDA-30)-CAS No.64-17-5	4.0	See Section 5
Methyl alcohol (minor ingredient SDA-30) CAS No. 67-56-1	0.4	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED) Non-Flammable	**FLAMMABLE LIMITS IN AIR (% BY VOLUME)** Not Available	**EXTINGUISH. MEDIA:** Carbon dioxide; dry chemical or water spray

SPECIAL FIRE FIGHTING PROCEDURES:
Fire fighters should wear NIOSH pressure demand self-contained breathing apparatus for possible exposure to hydrochloric and hydrofluoric acids and phosgene. Use water spray to keep containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV):

TOXICITY DATA: Trichlorotrifluoroethane

LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects

SKIN - RABBIT: 500 mg-open

LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)

INHALATION: Low Toxic

SKIN/EYE: Mild irritant

INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA:

None of the components of Blaco-Tron TE are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: intoxication, candiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.
EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.
INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

B. **Ethyl Alcohol - CAS NO. 64-17-5**

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1000 ppm 8-hour TWA).

ACGIH has adopted a permissible exposure limit of 1000 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE:

INGESTION: Large doses can cause alcohol poisoning. A central nervous system depressant.

INHALATION: Exposure to concentrations of over 1,000 ppm can cause headache, irritation of nose and throat, and if long continued drowsiness and lassitude, loss of appetite and inability to concentrate.

EYES: Irritant to eyes in concentrations greater than 1,000 ppm.

C. **METHYL ALCOHOL - CAS NO. 67-56-1**

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA permissible exposure limit (20 CFR 1910.1000) is 200 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 200 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE

INGESTION: The main toxic effect is exerted on the nervous system particularly the optic nerves and possible the retina.

Severe exposures may cause dizziness, unconsciousness, sighing respiration, cardiac depression and eventually death. Where exposure is less severe, the first symptoms may be blurring of vision, photophobia, and conjunctivitis followed by the development of definite eye lesions. There may be headache, gastro intestinal disturbances, dizziness and a feeling of intoxication. The visual symptoms may clear temporarily, only to recur later and progress to actual blindness.

Death from ingestion of less than 30 ml. has been reported. Usual fatal dose is 100-250 ml.

INHALATION: Inhalation of fumes can lead to similar symptoms to those listed for ingestion.

EYE/SKIN: Skin may become dry and cracked due to solvent action of methyl alcohol. Mild irritant to eyes.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Tron TE is as follows:

A) Using OSHA TWA values - 900 ppm

B) Using ACGIH TLV values - 900 ppm

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. **NEVER** give anything by mouth to an unconscious person. Take immediately to hospital or physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: None

INCOMPATIBILITY(MATERIALS TO AVOID): Strong acids and alkalis reactive metals e.g. powdered aluminum, magnesium, zinc, molten aluminum, barium and lithium shavings. Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrochloric and hydrofluoric acids, phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below.)

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.

EYE PROTECTION: Splashproof Goggles

GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety procedures:
* Never alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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Material Safety Data Sheet

Baron Blakeslee, Inc., 2001 N. Janice Ave., Melrose Park, IL 60160 (312)450 3900

DATE: September, 1987
EDITION: 2nd (M002610)

CHEMICAL NAME AND SYNONYMS:
Blend of Trichlorotrifluoroethane and Ethyl Alcohol containing a small amount of methyl alcohol

TRADE NAME AND SYNONYMS:
Blaco-Tron TE Plus

CHEMICAL FAMILY:
Halogenated hydrocarbons/Alcohols

FORMULA: $C_2CL_3F_3/C_2H_5OH/CH_3OH$

DOT SHIPPING NAME: Not regulated

DOT HAZARD CLASS: N/A

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 113°F	**VAPOR DENSITY(AIR=1):** 5.9	**SPEC. GRAV.** 1.43 (liquid)	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: Below -35°C	**SOLUBILITY (WEIGHT % IN WATER):** Approx. 0.028	**BULK DENSITY:** Approx. 11.9 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: 220	**EVAPORATION RATE:** (Acetone = 1) (time to evaporate): 1.8	**HEAT OF SOLUTION:** Not available	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS	Approx. %	HAZARD DATA
Trichlorotrifluoroethane	90.0	See Section 5
Ethyl alcohol, denatured grade (SDA-30)	9.0	See Section 5
Methyl alcohol (minor ingredient SDA-30, above)	1.0	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)	EXTINGUISH. MEDIA:
Non-Flammable	Not Available	Carbon Dioxide; Dry Chemical;Water Spray

SPECIAL FIRE FIGHTING PROCEDURES:
Fire fighters should wear NIOSH pressure demand self-contained breathing apparatus for possible exposure to hydrochloric and hydrofluoric acids and phosgene. Use water spray to keep containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV): See Section 5

TOXICITY DATA: Trichlorotrifluoroethane

LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects

SKIN - RABBIT: 500 mg-open

LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)

INHALATION: Low Toxic

SKIN/EYE: Mild irritant

INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA:

None of the components of Blaco-Tron TE Plus are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: intoxication, candiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.

EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.
INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

B. Ethyl Alcohol - CAS NO. 64-17-5

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1000 ppm 8-hour TWA).

ACGIH has adopted a permissible exposure limit of 1000 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE:

INGESTION: Large doses can cause alcohol poisoning. A central nervous system depressant.

INHALATION: Exposure to concentrations of over 1,000 ppm can cause headache, irritation of nose and throat, and if long continued drowsiness and lassitude, loss of appetite and inability to concentrate.

EYES: Irritant to eyes in concentrations greater than 1,000 ppm.

C. METHYL ALCOHOL - CAS NO. 67-56-1

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA permissible exposure limit (20 CFR 1910.1000) is 200 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 200 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE

INGESTION: The main toxic effect is exerted on the nervous system particularly the optic nerves and possible the retina.

Severe exposures may cause dizziness, unconsciousness, sighing respiration, cardiac depression and eventually death. Where exposure is less severe, the first symptoms may be blurring of vision, photophobia, and conjunctivitis followed by the development of definite eye lesions. There may be headache, gastro intestinal disturbances, dizziness and a feeling of intoxication. The visual symptoms may clear temporarily, only to recur later and progress to actual blindness.

Death from ingestion of less than 30 ml. has been reported. Usual fatal dose is 100-250 ml.

INHALATION: Inhalation of fumes can lead to similar symptoms to those listed for ingestion.

EYE/SKIN: Skin may become dry and cracked due to solvent action of methyl alcohol. Mild irritant to eyes.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Tron TE Plus is as follows:

A) Using OSHA TWA values - 850 ppm

B) Using ACGIH TLV values - 850 ppm

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. **NEVER** give anything by mouth to an unconscious person. Take immediately to hospital or physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.
HAZARDOUS POLYMERIZATION: Will not occur. **CONDITIONS TO AVOID:** None
INCOMPATIBILITY(MATERIALS TO AVOID): Strong acids and alkalis reactive metals e.g. powdered aluminum, magnesium, zinc, molten aluminum, barium and lithium shavings. Strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS: Hydrochloric and hydrofluoric acids, phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below.)

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.
EYE PROTECTION: Splashproof Goggles
GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritatic or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety procedures:
* Never alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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BARON-BLAKESLEE PROVIDES NO WARRENTIES, EITHER EXPRESS OR IMPLIED, AND ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE DATA CONTAINED HEREIN.

Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: November, 1987

EDITION: 2nd (M002620)

CHEMICAL NAME AND SYNONYMS:
Blend of Trichlorotrifluoroethane, ethyl alcohol containing a small amount of methyl alcohol and nitromethane

TRADE NAME AND SYNONYMS:
Blaco-Tron TES

CHEMICAL FAMILY:
Halogenated Hydrocarbons/Alcohols

FORMULA: $C_2CL_3F_3/C_2H_2H_5OH/CH_3OH/CH_3NO_2$

DOT SHIPPING NAME: Not regulated by DOT

DOT HAZARD CLASS: Not Applicable

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 112°F	**VAPOR DENSITY(AIR=1):** 6.0	**SPEC. GRAV.** 1.52 (liquid)	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: Below -35°C	**SOLUBILITY (WEIGHT % IN WATER):** 0.02%	**BULK DENSITY:** Approx. 12.7 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: 465 mm Hg @ 20°C	**EVAPORATION RATE:** (Ether = 1) (time to evaporate): 2.0	**HEAT OF SOLUTION:** Not available	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS

	APPROX. %	HAZARD DATA
Trichlorotrifluoroethane - CAS No.76-13-1	95	See Section 5
Ethyl alcohol,denatured grade - CAS No.64-17-5	3.6	See Section 5
Methyl alcohol - CAS No. 67-56-1	0.8	See Section 5
Nitromethane - CAS No. 75-52-5	0.5	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED) Non-Flammable	**FLAMMABLE LIMITS IN AIR (% BY VOLUME)** Not Available	**EXTINGUISH. MEDIA:** Carbon dioxide; dry chemical or water spray

SPECIAL FIRE FIGHTING PROCEDURES:
Fire fighters should wear NIOSH positive pressure self-contained breathing apparatus for possible exposure to hydrochloric and hydrofluoric acids and phosgene. Use water spray to keep containers cool.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

NUSUAL FIRE AND EXPLOSION HAZARDS:
Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene.

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV):

TOXICITY DATA: Trichlorotrifluoroethane
LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects
SKIN - RABBIT: 500 mg-open
LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)
INHALATION: Low Toxic
SKIN/EYE: Mild irritant
INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA:
None of the components of Blaco-Tron TES are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: intoxication, cardiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.

EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.

INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

This material is low in toxicity. It is an anesthetic and inhalation of high concentrations can produce asphyxiation. At levels of about 2,500 ppm in air there begins to be interference with psychological and psychomotor functions, expressed as excitement and incoordination.

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

B. Ethyl Alcohol - CAS NO. 64-17-5

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1000 ppm 8-hour TWA).

ACGIH has adopted a permissible exposure limit of 1000 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE:

INGESTION: Large doses can cause alcohol poisoning. A central nervous system depressant.
INHALATION: Exposure to concentrations of over 1,000 ppm can cause headache, irritation of nose and throat, and if long continued drowsiness and lassitude, loss of appetite and inability to concentrate.
EYES: Irritant to eyes in concentrations greater than 1,000 ppm.

C. **METHYL ALCOHOL - CAS NO. 67-56-1**

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA permissible exposure limit (20 CFR 1910.1000) is 200 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 200 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE

INGESTION: The main toxic effect is exerted on the nervous system particularly the optic nerves and possibly the retina.

Severe exposures may cause dizziness, unconsciousness, sighing respiration, cardiac depression and eventually death. Where exposure is less severe, the first symptoms may be blurring of vision, photophobia, and conjunctivitis followed by the development of definite eye lesions. There may be headache, gastro intestinal disturbances, dizziness and a feeling of intoxication. The visual symptoms may clear temporarily, only to recur later and progress to actual blindness.

Death from ingestion of less than 30 ml. has been reported. Usual fatal dose is 100-250 ml.
INHALATION: Inhalation of fumes can lead to similar symptoms to those listed for ingestion.
EYE/SKIN: Skin may become dry and cracked due to solvent action of methyl alcohol. Mild irritant to eyes.

D. **NITROMETHANE - CAS NO. 75-52-5**

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA Permissible Exposure Limit (29 CFR 1910.1000) is 100 ppm (8-hour TWA)

ACGIH has adopted a Permissible Exposure Limit of 100 ppm (8-hour TLV)

ROUTES/EFFECTS OF OVEREXPOSURE

INHALATION: May cause anorexia, nausea, vomiting and diarrhea, also, kidney and liver damage.

INGESTION: Similar effects as inhalation.

EYES/SKIN: Non-irritating to skin/eyes using draize technique on rabbits. Frequent exposures to skin may cause slight drying due to defatting action.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below.)

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved pressure-demand self-contained or supplied-air respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.

EYE PROTECTION: Splashproof Goggles

GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety procedures:
* Never alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: October, 1987
EDITION: 2nd (M007940)
CHEMICAL NAME AND SYNONYMS:
Trichlorotrifluoroethane
TRADE NAME AND SYNONYMS:
Blaco-Tron TF
CHEMICAL FAMILY:
Halogenated Hydrocarbons
FORMULA: $C_2Cl_3F_3$
DOT SHIPPING NAME: Not regulated
DOT HAZARD CLASS: Not Applicable

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 117.5°F	**VAPOR DENSITY(AIR=1):** 6.5	**SPEC. GRAV.** 1.57 (liquid)	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: Below -35°C	**SOLUBILITY (WEIGHT % IN WATER):** 0.1	**BULK DENSITY:** Approx. 13.1 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: at 70°F 5.5 PSIA	**EVAPORATION RATE:** (Ether = 1) (time to evaporate): 2.0	**HEAT OF SOLUTION:** Not available	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS	%	HAZARD DATA
Trichlorotrifluoroethane-CAS No.76-13-1	100	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)	EXTINGUISH. MEDIA:
Non-Flammable (Closed Cup)	Not Available	Carbon dioxide; dry chemical or water spray

SPECIAL FIRE FIGHTING PROCEDURES:
Fire fighters should wear NIOSH pressure demand self-contained breathing apparatus for possible exposure to hydrochloric and hydrofluoric acids and phosgene. Use water spray to keep containers cool.
UNUSUAL FIRE AND EXPLOSION HAZARDS:
Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV):

TOXICITY DATA: Trichlorotrifluoroethane

LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects

SKIN - RABBIT: 500 mg-open

LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)

INHALATION: Low Toxic

SKIN/EYE: Mild irritant

INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA:

Blaco-Tron TF (trichlorotrifluoroethane) is not listed as a carcinogen by OSHA, IARC, or NTP. Trichlorotrifluoroethane is listed in the TSCA Inventory.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: intoxication, cardiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.

EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.

INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. **NEVER** give anything by mouth to an unconscious person. Take immediately to hospital or physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and shoes. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable **CONDITIONS TO AVOID:** Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.
HAZARDOUS POLYMERIZATION: Will not occur. **CONDITIONS TO AVOID:** None
INCOMPATIBILITY(MATERIALS TO AVOID): Strong acids and alkalis reactive metals e.g. powdered aluminum, magnesium, zinc, molten aluminum, barium and lithium shavings. Strong oxidizing agents.
HAZARDOUS DECOMPOSITION PRODUCTS: Hydrochloric and hydrofluoric acids, phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below.)

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.
EYE PROTECTION: Splashproof Goggles
GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.

* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety procedures:
* Never alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: September, 1987
EDITION: 3rd (M002511)
CHEMICAL NAME AND SYNONYMS:
Blend of Trichlorotrifluoroethane and Methylene Chloride
TRADE NAME AND SYNONYMS:
Blaco-Tron TMC
CHEMICAL FAMILY:
Halogenated Hydrocarbons
FORMULA: $C_2Cl_3F_3/CH_2Cl_2$

DOT SHIPPING NAME: Methylene chloride Mixture
DOT HAZARD CLASS: ORM-A UN 1593

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 97.7°F	**VAPOR DENSITY(AIR=1):** 4.7	**SPEC. GRAV.** 1.42	**pH OF SOLUTIONS:** Neutral
FREEZING/MELTING POINT: Not available	**SOLUBILITY (WEIGHT % IN WATER):** Approx. .10	**BULK DENSITY:** Approx. 11.8 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: 500 mm Hg at 20°C	**EVAPORATION RATE:** Carbon Tetrachloride 100 160	**HEAT OF SOLUTION:** Not available	

APPEARANCE AND ODOR: Colorless liquid with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
Trichlorotrifluoroethane - CAS No. 76-13-1	50.5	See Section 5
Methylene Chloride - CAS No. 75-09-2	49.5	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)	EXTINGUISH. MEDIA:
None (Closed Cup)	Not Determined	Carbon dioxide; dry chemical or water spray

SPECIAL FIRE FIGHTING PROCEDURES:
Fire fighters should wear NIOSH pressure demand self-contained breathing apparatus for possible exposure to hydrochloric and hydrofluoric acids and phosgene. Use water spray to keep containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Will decompose at temperatures above 250°F. Decomposition products can include hydrochloric and hydrofluoric acid and phosgene. If storage containers are exposed to excessive heat, over-pressurization of the containers can result.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

SECTION 4 - HEALTH HAZARD DATA

TOXICITY DATA: Trichlorotrifluoroethane
LC LO INHALATION: Human: 4,500 ppm Central Nervous System Effects
SKIN - RABBIT: 500 mg-open
LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)
INHALATION: Low Toxic
SKIN/EYE: Mild irritant
INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA:
None of the components of Blaco-Tron TMC are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory. Contains methylene chloride. Possible cancer hazard based on tests with laboratory animals. Overexposure may create cancer risk (see Section 5).

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: intoxication, candiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.
EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.
INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

Animal studies in various species have observed cardiac arrythmia at the following concentrations:

Monkey - 25,000 - 50,000 ppm
Mouse - 100,000 ppm

Myocardial depression was observed in the dog at 50,000 ppm.

Subacute data: Rats exposed at 2,520 ppm, 7 hours/day, 5 days/wk, 30 days - no apparent effects.
At 5,000 ppm and same time exposure, mild liver effects, prevention of weight gain.

B. METHYLENE CHLORIDE - CAS NO. 75-09-2

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limits (29 CFR 1910.1000) are 500 ppm (8-hour TWA); 500-1,000 ppm periodic excursions are allowed providing TWA is at or below 500 ppm; 1,000-2,000 ppm excursions allowed only for maximum of five minutes in any 2-hour period-2,000 maximum allowable concentration (must not be exceeded).

Current ACGIH 8-hour TWA is 100 ppm with 15-minute excursion every 1-hour of 500 ppm.

NIOSH recommends that the TWA exposure limit for methylene chloride is 75 ppm. A 1985 NTP, 2 year animal inhalation study report states that there is "clear evidence of carcinogenicity" in mice and female rats. Experience in industry has shown no increased incidences of cancer of any type in the worker population. IARC lists this product as having inadequate evidence in humans and animals to evaluate carcinogenicity, (Group 3).

MEDICAL LIMITATIONS: Persons with angina or heart disease should not be exposed to this product.

ROUTES OF EXPOSURE:

INHALATION: Excessive inhalation may produce symptoms of central nervous system depression, ranging from light-headedness, nausea and vomiting to unconsciousness and death.

SKIN CONTACT: Mildly irritating to skin. Skin contact may produce a burning sensation. Prolonged or repeated contact may cause skin to become reddened, rough, and dry due to the removal of natural oils and may result in dermatitis.

SKIN ADSORPTION: This product may be absorbed through the skin, although not expected to produce toxicity by this route.

EYE CONTACT: An irritant to the eyes, causing pain, lacrimation, and general inflammation.

INGESTION: May cause irritation of the gastrointestinal tract with vomiting. If vomiting results in aspiration, chemical pneumonia could follow. Absorption through the gastrointestinal tract may produce symptoms of central nervous system depression ranging from light-headedness to unconsciousness.

EFFECTS OF OVEREXPOSURE:

ACUTE: Excessive inhalation or ingestion may produce symptoms of central nervous system depression ranging from light-headedness, to unconsciousness and death. Exposure of the eyes and skin may produce irritation.

CHRONIC: Can cause headache, mental confusion, depression, fatigue loss of appetite, nausea, vomiting, cough, loss of sense of balance, and visual disturbances. Prolonged or repeated skin contact may cause dermatitis.

MONITORING

BIOLOGICAL: Reports indicate that 33 ppm methylene chloride in breath during exposure is equivalent to an exposure of about 100 ppm in air. Blood analyzed for carboxyhemoglobin (COHb) may show 7 to 10% saturation following exposure to 250 and 500 ppm respectively. Amount of exertion, duration of exposure, and time sampled effect these rations.

PERSONAL/AREA: The NIOSH Analytical Method Number 1005 is applicable.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Tron TMC is as follows:

A) Using OSHA TWA values - 600 ppm

B) Using ACGIH TLV values - 140 ppm

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. **NEVER** give anything by mouth to an unconscious person. Take immediately to a hospital or physician.

EYE CONTACT: Flush with large amounts of water, lifting eyelids occasionally for at least 15 minutes. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and footwear. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and footwear before reuse or discard.

NOTE TO PHYSICIAN: OVEREXPOSURE TO THIS PRODUCT CAN PRODUCE ELEVATED CARBOXYHEMOGLOBIN LEVELS.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: None

INCOMPATIBILITY(MATERIALS TO AVOID): Strong acids and alkalis reactive metals e.g. powdered aluminum, magnesium, zinc, molten aluminum, barium and lithium shavings. Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrochloric and hydrofluoric acids, phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See Below.)

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, state or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air positive pressure mode respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.

EYE PROTECTION: Splashproof Goggles

GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane/methylene chloride vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.
* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* ***DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.***
* <u>NEVER</u> enter a pit or tank without observing safety procedures and:
* <u>NEVER</u> alone, always with a life line, and always with positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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Material Safety Data Sheet

Baron Blakeslee, – 2001 N. Janice Ave., – Melrose Park, IL 60160 (312)450-3900

DATE: September, 1987

EDITION: 3rd (M002630)

CHEMICAL NAME AND SYNONYMS: Blend of Trichlorotrifluoroethane, Ethyl Alcohol, Methyl Alcohol, and Nitromethane

TRADE NAME AND SYNONYMS: Blaco-Tron TMS Plus

CHEMICAL FAMILY: Halogenated Hydrocarbons, Alcohols

FORMULA: $C_2Cl_3F_3/C_2H_5OH/CH_3OH/CH_3NO_2$

DOT SHIPPING NAME: Not regulated by DOT

DOT HAZARD CLASS: N/A

SECTION 1 - PHYSICAL DATA

BOILING POINT @ 760 MM Hg: 103°F	**VAPOR DENSITY(AIR=1):** 5.0	**SPEC. GRAV.** 1.46 (Liquid)	**pH OF SOLUTIONS:** Unknown
FREEZING/MELTING POINT: < -35°C	**SOLUBILITY (WEIGHT % IN WATER):** 8.%	**BULK DENSITY:** Approx. 12.2 lbs./gal.	**VOLUME % VOLATILE:** 100
VAPOR PRESSURE: 370 mm Hg at 20°C	**EVAPORATION RATE:** 10 (Ether = 1)	**HEAT OF SOLUTION:** Not available	

APPEARANCE AND ODOR: Colorless with ethereal and faint sweetish odor.

SECTION 2 - HAZARDOUS INGREDIENTS	APPROX. %	HAZARD DATA
Trichlorotrifluoroethane - CAS No. 76-13-1	91-92	See Section 5
Ethyl Alcohol - CAS No. 64-17-5	4	See Section 5
Methyl Alcohol - CAS No. 67-56-1	4	See Section 5
Nitromethane - CAS No. 75-52-5	0.5	See Section 5

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT F (METHOD USED)	FLAMMABLE LIMITS IN AIR (% BY VOLUME)
None to boiling point (Closed Cup)	Not Available

EXTINGUISHING MEDIA: For fires involving Blaco-Tron TMS Plus use water, dry chemical, CO_2.

SPECIAL FIRE FIGHTING PROCEDURES: Fire fighters should wear NIOSH pressure demand self-contained breathing apparatus for possible exposure to hydrochloric and hydrofluoric acids and phosgene. Use water spray to keep containers cool.

24-HOUR EMERGENCY ASSISTANCE: 201/455-2000

UNUSUAL FIRE AND EXPLOSION HAZARDS: See Hazardous Decomposition Products, Section 6. **NOTE:** If 80% of solvent evaporates, the remaining mixture exhibits a flash point at about 50°C. Also, if solvent is heated under pressure to 61-64°C a flash point can be observed due to enriched concentration of alcohol in vapor.

SECTION 4 - HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMITS (TLV):

TOXICITY DATA: Trichlorotrifluoroethane
LC LO INHALATION: Human: 4,500 ppm Central Nervous system effects
SKIN - RABBIT: 500 mg-open
LD_{50} RAT: 43 gm/kg

CLASSIFICATION (POISON, IRRITANT, ETC.)
INHALATION: Low Toxic
SKIN/EYE: Mild irritant
INGESTION: Mildly Toxic

HUMAN EXPOSURE INFORMATION/DATA: None of the components of Blaco-Tron TMS Plus are listed as a carcinogen by OSHA, IARC, or NTP. All of the components are listed in the TSCA Inventory.

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure information in the order of the most hazardous and the most likely route of overexposure.

A. Trichlorotrifluoroethane, CAS NO. 76-13-1

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1,000 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 1,000 ppm (8-hour TLV)

ROUTES/EFFECTS OF EXPOSURE:

INHALATION: At low level of concentration (human: 2,500 ppm fluorocarbon component, 0.5-1.0 hour exposure) headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: intoxication, candiac effects, and CNS depression (loss of concentration or even death) may occur. Vapors can displace air, resulting in an asphyxiation hazard.
EYE OR SKIN CONTACT: Irritant to skin and eyes: excessive contact may cause defatting.
INGESTION: Similar symptoms as for inhalation. In large doses, respiratory failure can occur.

EFFECTS OF OVEREXPOSURE

ACUTE: Primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated area. Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption can occur.

ADDITIONAL INFORMATION

EXPOSURE TO TRICHLOROTRIFLUOROETHANE:

This material is low in toxicity. It is an anesthetic and inhalation of high concentrations can product asphyxiation. At levels of about 2,500 ppm in air there begins to be interference with psychological and psychomotor functions, expressed as excitement and incoordination.

(High-level and cardiac):

Animal studies in various species have indicated cardiac arrhythmia at the following concentrations:

Species	(5-minute exposure) Lowest Concentration Causing Arrhythmia (ppm)
Monkey	25,000-50,000
Mouse	100,000

Also, in the dog, myocardial depression was seen at 50,000 ppm.

(Inhalation Subacute) - rats @ 2,520 ppm/7 hours daily, 5 days/wk, 30 days: no apparent effects. @ 5,000 ppm and same exposure time: mild liver effects, prevention of weight gain.

B. Ethyl Alcohol - CAS NO. 64-17-5

PERMISSIBLE EXPOSURE LIMITS (TLV)

Current Federal OSHA permissible exposure limit (29 CFR 1910.1000) is 1000 ppm 8-hour TWA).

ACGIH has adopted a permissible exposure limit of 1000 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE:

INGESTION: Large doses can cause alcohol poisoning. A central nervous system depressant.

INHALATION: Exposure to concentrations of over 1,000 ppm can cause headache, irritation of nose and throat, and if long continued drowsiness and lassitude, loss of appetite and inability to concentrate.

EYES: Irritant to eyes in concentrations greater than 1,000 ppm.

C. METHYL ALCOHOL - CAS NO. 67-56-1

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA permissible exposure limit (20 CFR 1910.1000) is 200 ppm (8-hour TWA)

ACGIH has adopted a permissible exposure limit of 200 ppm (8-hour TLV).

ROUTES/EFFECTS OF OVEREXPOSURE

INGESTION: The main toxic effect is exerted on the nervous system particularly the optic nerves and possibly the retina.

Severe exposures may cause dizziness, unconsciousness, sighing respiration, cardiac depression and eventually death. Where exposure is less severe, the first symptoms may be blurring of vision, photophobia, and conjunctivitis followed by the development of definite eye lesions. There may be headache, gastro intestinal disturbances, dizziness and a feeling of intoxication. The visual symptoms may clear temporarily, only to recur later and progress to actual blindness.

Death from ingestion of less than 30 ml. has been reported. Usual fatal dose is 100-250 ml.

INHALATION: Inhalation of fumes can lead to similar symptoms to those listed for ingestion.

EYE/SKIN: Skin may become dry and cracked due to solvent action of methyl alcohol. Mild irritant to eyes.

D. NITROMETHANE - CAS NO. 75-52-5

PERMISSIBLE EXPOSURE LIMITS -

Current Federal OSHA Permissible Exposure Limit (29 CFR 1910.1000) is 100 ppm (8-hour TWA)

ACGIH has adopted a Permissible Exposure Limit of 100 ppm (8-hour TLV)

ROUTES/EFFECTS OF OVEREXPOSURE

INHALATION: May cause anorexia, nausea, vomiting and diarrhea, also, kidney and liver damage. A respiratory tract irritant.

INGESTION: Similar effects as inhalation.

EYES/SKIN: Non-irritating to skin/eyes using draize technique on rabbits. Frequent exposures to skin may cause slight drying due to defatting action.

Based on the ACGIH methodology for the calculation of a TLV value for a mixture (Appendix C, ACGIH TLV Handbook, 1986), the TLV value for Blaco-Tron TMS Plus is as follows:

A) Using OSHA TWA values - 555 ppm
B) Using ACGIH TLV values - 555 ppm

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove patient to fresh air. Give mouth to mouth resuscitation if breathing has stopped. Give oxygen as necessary if a qualified operator is available. **DO NOT** give adrenalin (epinephrine). Call a physician.

INGESTION: If conscious, induce vomiting immediately by giving 2 to 4 glasses of water and touching finger to back of throat. Call a physician. **NEVER** give anything by mouth to an unconscious person. Take immediately to hospital or physician.

EYE CONTACT: Flush with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If eye symptoms persist, consult physician.

SKIN CONTACT: Wash promptly with soap and water for at least 15 minutes while removing contaminated clothing and hoes. If irritation occurs, see a physician. Thoroughly clean contaminated clothing and shoes before reuse or discard.

SECTION 6 - REACTIVITY DATA

STABILITY: Stable
CONDITIONS TO AVOID: Will decompose at temperatures above 250°F. Avoid sparks, hot spots, welding, flames and cigarettes.
HAZARDOUS POLYMERIZATION: Will not occur. **CONDITIONS TO AVOID:** None
INCOMPATIBILITY(MATERIALS TO AVOID): Strong oxidants including oleum; hot reactive metals, e.g. powdered aluminum, magnesium, zinc, molten aluminum; barium and lithium shavings.
HAZARDOUS DECOMPOSITION PRODUCTS: Hydrochloric and hydrofluoric acids, phosgene.

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS SPILLED OR RELEASED: Immediately evacuate the area and provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal. After all visible traces have been removed, thoroughly wet vacuum the area. **DO NOT** flush to sewer. If area of spill is porous, remove as much contaminated earth and gravel, etc. as necessary and place in closed containers for disposal. (See below).

WASTE DISPOSAL METHOD: Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act as well as any other relevant federal, State or local laws/regulations regarding disposal.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: None required for adequately vented work situations. Use NIOSH approved self-contained or supplied-air positive pressure respirators for emergencies and in situations where air may be displaced by vapors.

VENTILATION (TYPE): Local exhaust: At filling zones and where leakage is probable. Mechanical (General): Adequate for storage areas.

EYE PROTECTION: Splashproof Goggles

GLOVES: Protective gloves and full protective clothing if there is prolonged or repeated contact of liquid with skin.

OTHER PROTECTIVE EQUIPMENT: Safety shower and eye-wash fountain in immediate area. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORING:

* **DO NOT** use in poorly ventilated or confined spaces.
* Trichlorotrifluoroethane vapors are heavier than air and will collect in low areas.
* Keep container closed when not in use.
* **DO NOT** store in open, unlabeled or mislabeled containers.
* This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas hydrofluoric acid and traces of phosgene.

* **AVOID CONTAMINATION OF WATER SUPPLIES:** Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected.

OTHER PRECAUTIONS:

* **AVOID PROLONGED OR REPEATED BREATHING OF VAPORS.** High vapor concentrations can cause dizziness, unconsciousness or death.
* **USE ONLY WITH ADEQUATE VENTILATION.** Ventilation must be sufficient to limit employee exposure to product below OSHA permissible exposure limits (8-hour TWA).
* **AVOID CONTACT WITH EYES.** Will cause irritation and pain.
* **AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.** May cause irritation or dermatitis.
* **DO NOT TAKE INTERNALLY.** Swallowing may cause injury or death.
* **DO NOT EAT, DRINK OR SMOKE IN WORK AREAS.**
* **NEVER** enter a pit or tank without observing safety precautions.
* **NEVER** alone, always with a life line, and always with a positive supply of fresh air.
* Employ respiratory protection when exposure to vapors is possible.

REFERENCES:

1. NIOSH Registry of Toxic Effects of Chemical Substances, 1978.
2. Industrial Hygiene and Toxicology, Volume 11, Second Edition, F.A. Patty, 1986.
3. Dangerous Properties of Industrial Materials, Sixth Edition, N.I. Sax, 1984.
4. Federal Register, 45FR Hazardous Waste Management Systems Part III, Identification and Listing of Hazardous Wastes, Page 33084, May 19, 1980.
5. EPA Science Advisory Board, Subcommittee on Airborne Carcinogens, September, 1980.

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ALLIED

PRODUCT SAFETY DATA SHEET

GENESOLV® A Solvent

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ CAS NO ☐ ALLIED PRODUCT CODE #
GENESOLV® A Solvent	75-69-4

CHEMICAL NAME AND/OR SYNONYM	
Trichlorofluoromethane	Allied Product Code: 196-007850. Synonyms: Fluorocarbon 11; Refrigerant 11; Propellant 11; Fluorotrichloromethane.

FORMULA	MOLECULAR WEIGHT
CCl_3F	137.4

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

ALLIED-SIGNAL INC.
Engineered Materials Sector
P.O. Box 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Product Safety Department	(201) 455-4157	August, 1985	January, 1987

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(201) 455-2000

Inhalation: Immediately remove patient to fresh air. If breathing has stopped, give mouth-to-mouth resuscitation. Give oxygen, as necessary, provided a qualified operator is available. Call a physician. Do not give adrenaline (epinephrine).

Eyes: Promptly flush with large amounts of water, lifting eyelids occasionally, and continue flushing for 15 minutes. If irritation symptoms persist, consult a physician.

Skin: Promptly wash with soap and water, then flush with water until all chemical is removed. Remove contaminated clothing and wash before reuse.

Ingestion: If conscious, immediately give 2 to 4 glasses of water and induce vomiting by touching finger to back of throat. Call a physician.

C. HAZARDS INFORMATION

HEALTH

INHALATION

Vapors, when inhaled, are slightly irritating to lungs. Breathing concentrations approaching 10% in air can cause dizziness, difficult breathing, drowsiness and possibly narcosis. See Section K for a more detailed discussion.

INGESTION

This will upset and irritate the gastrointestinal tract. Estimated to have moderate toxicity (see Section K), it is likely to show most of the same symptoms as those for inhalation.

SKIN

Excessive contact may cause irritation (due to defatting action) and possible frostbite (due to refrigeration effect of evaporation).

EYES

Liquid contact will irritate. Rabbit test data are available – Reference (a).
Vapors are estimated to be mildly irritating.

PERMISSIBLE CONCENTRATION, AIR (SEE SECTION J)

OSHA/TWA: 1000 ppm.

ACGIH/TLV: 1000 ppm (ceiling).

BIOLOGICAL

Action Level:
None established.

UNUSUAL CHRONIC TOXICITY

A NCI-sponsored bioassay on carcinogenicity (rats) showed no carcinogenicity. Subacute data are available – Reference (a).

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
N.A. °C Not flammable ☐ OPEN CUP ☐ CLOSED CUP	°C Not applicable	LOWER – Not applicable UPPER – Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS

Though not combustible itself, contact with certain metals (see Section G) produces rapid exothermic reactions or potentially explosive combinations. See, also, Hazardous Decomposition Products, Section G.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

Any standard agent. Select the one most suitable for type of fire. Material itself is not flammable.

FIRE EXTINGUISHING AGENTS TO **AVOID**

Not pertinent.

SPECIAL FIRE FIGHTING PRECAUTIONS

Although not flammable, when this material is in a fire, firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against suffocation and possible toxic decomposition products. Use water spray to keep fire-exposed containers cool, and to keep any spillage away from fire and heat, and to knock down vapors.

VENTILATION

Ventilation should be adequate to meet TLV requirements and to minimize exposure to vapors.
Local Exhaust: At filling zones and where leakage is probable.
Mechanical (General): Adequate for storage areas.

NORMAL HANDLING

Avoid breathing vapor, liquid contact with eye, skin or clothing. Tank-cleaning personnel should use only a formal tank entry procedure based on recognized safety principles; e.g., see Reference (3). Follow precautions on label.

STORAGE

Storage areas should be clean, well-ventilated, away from heat or direct sunlight, and of low fire-risk. Protect containers from physical damage and keep closed. Special attention should be given to ventilation of low-lying areas or small enclosures where this material is stored or used to avoid possible hazards of asphyxiation.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT – SECTION E)

Evacuate unprotected personnel from area. Protected personnel, using a self-contained air supply (see Section E), should remove any flames, shut off leak, and provide ventilation. They should then absorb liquid with commercial absorbent and shovel into metal drums and close. Store as above. Large spills: Dike up with inert material or commercial absorbent and pump into drums, making sure pump does not overheat. Attempt to keep out of sewer. Any release to the environment of this product may be subject to Federal and/or state reporting requirements. Check with appropriate agencies.

SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS **SIGNAL WORD** – WARNING!

This product can cause death from asphyxiation if misused or if not handled properly. Tanks probably cannot be effectively flushed of vapor if sumps contain liquid. "Empty" cylinders may contain hazardous residues. See directions on label. Workers with cardiovascular or pulmonary problems should have medical evaluation before exposure.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

None required for normally-vented work situations. For accidental or non-ventilated situations, where concentration of vapors may be high, use a self-contained breathing apparatus or supplied-air respirator, NIOSH-approved.

EYES AND FACE

Wear chemical safety goggles if there is any possibility of contact with liquid. Do not wear contact lenses. Add a face shield if there is danger of liquid splashing while handling.

HANDS, ARMS, AND BODY

Wear protective, impervious gloves and clothing (preferably made of PVA or neoprene) if there is repeated or prolonged contact with liquid.

OTHER CLOTHING AND EQUIPMENT

Provide eyewash stations and quick-drench shower facilities. For tank cleaning, see Reference (3).

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Colorless liquid with a faint ether-like odor.	
BOILING POINT 23.8°C MELTING POINT −111°C	SPECIFIC GRAVITY (H_2O = 1) @ 21.1°C (liquid) 1.49	VAPOR DENSITY (AIR = 1) @ 30°C and 1 atm. 5.06
SOLUBILITY IN WATER (% by Weight) Approximately 0.11 (@ 25°C, 1 atmosphere)	pH N.D.	VAPOR PRESSURE (mm Hg at 20°C) ☐ (PSIG) ☐ 13.4 psia @ 70°F 690 mm Hg @ 70°F
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☒ (time to evaporate): 0.4	% VOLATILES BY VOLUME (At 20°C) 100	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Flames, lighted cigarettes, hot spots, welding. (Decomposes, liberating hazardous gases.)

INCOMPATIBILITY (MATERIALS TO AVOID)

Aluminum in the form of freshly abraded surface (strong exothermic reaction); aluminum powder mixed with this material will flash or spark on heavy impact – Reference (d). Granular barium mixed with this material is susceptible to detonation – Ref. (e). Lithium shavings mixed with this material: impact-sensitive and can detonate – Ref. (d). The following are also incompatible: Chemically-active metals, such as sodium, potassium, and calcium, and powdered magnesium and zinc – Ref. (f).

HAZARDOUS DECOMPOSITION PRODUCTS

Halogens, halogen acids, and possibly carbonyl halides, such as phosgene.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	None known.

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT/C.A.S. #	WT.%	HAZARD DATA (SEE SECT. J)
Not Applicable.		

* = PROPRIETARY – TRADE SECRET

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY

Degradability: None

Aquatic Toxicity: None

OCTANOL/WATER PARTITION COEFFICIENT
Unknown

EPA HAZARDOUS SUBSTANCE? (CLEAN WATER ACT SECT 311) ☐ YES ☒ NO IF SO REPORTABLE QUANTITY. — — #

40 CFR 116 117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Disposal of GENESOLV® A which has been used as a solvent may be subject to Federal, state and local regulations (EPA spent halogenated solvent – F001 & F002). Users should review their operations in terms of applicable Federal, state and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED
EPA "hazardous waste", if discarded unused.

HAZARDOUS WASTE NUMBER. (IF APPLICABLE)
U121

40 CFR 261

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

(1) TWA: OSHA Standard, 29 CFR 1910 (1982), "Z List". Entry : Fluorotrichloromethane.
(2) TLV: ACGIH 1984-85 List, "Threshold Limit Values for Chemical Substances. . .".

REGULATORY STANDARDS

DOT CLASSIFICATION N.A.

49 CFR 173

Not regulated by the D.O.T.

(3) OSHA tank entry regulations: 29 CFR 1910.94 (8 through 11).

(4) FDA regulations are applicable to the Food Grade type.

GENERAL (a) AIHA Hygienic Guide, "Trichlorofluoromethane", 1968, American Industrial Hygiene Association.
(b) NIOSH Registry (RTECS), 1981-82, Accession No. PB6125000.
(c) Aviado, D.M., Toxicology, 1975, 3: 321-332.
(d) NFPA Manual 491 M (1975), "Manual of Hazardous Chemical Reactions", 8th ed., 1984.
(e) Bretherick, L., "Handbook of Reactive Chemical Hazards", 2nd ed., 1979, Butterworths, Boston.
(f) NIOSH/OSHA: "Pocket Guide to Chemical Hazards", 1978, 8/80 printing.
(g) Trochimowicz, H.J., Reinhardt, C.F., et al., J. Occ. Med., 1976, 18:26.

K. ADDITIONAL INFORMATION

C. HAZARDS INFORMATION – Health – Inhalation – Ingestion (continued)

The estimate of moderate toxicity is based on the moderate toxicity reported for the intraperitoneal route, LD_{50} (mouse): 1743 mg/kg – Reference (b).

This material is low in toxicity: Its predominant hazard is simple asphyxia. However, it must not be considered inert! High concentrations in air (in the order of 20 times the TLV) have been shown to reduce ventilatory capacity of the lungs temporarily and to produce minor cardiac effects.* Material is less toxic than carbon dioxide, but it may have narcotic effects at high concentrations.

Also, published animal studies report that cardiac arrhythmia, which in humans is possibly fatal, is produced by the vapor if inhaled five minutes at airborne concentrations of 25,000 ppm (monkey and rat) or 100,000 ppm (mouse).* – Reference (c).

*The probability of incurring cardiac arrhythmia is greatly increased by the presence of a second agent, epinephrine (adrenaline): Inhalation of vapor at levels as low as 5000 ppm can produce cardiac sensitization to epinephrine in dogs, resulting in cardiac arrhythmias that can be fatal. – Reference (g).

[The ACGIH recommended ceiling value of 1000 ppm should provide a substantial margin of safety to prevent organic injury as well as cardiac sensitization.] – Reference ACGIH: Documentation of TLVs – 4th edition.

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ALLIED

PRODUCT SAFETY DATA SHEET

GENESOLV® D SOLVENT

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ CAS NO ☐ ALLIED PRODUCT CODE #
GENESOLV® D Solvent (various grades)	76-13-1

CHEMICAL NAME AND/OR SYNONYM

Trichlorotrifluoroethane Synonyms: Fluorocarbon 113, Refrigerant 113, Propellant 113.

FORMULA	MOLECULAR WEIGHT
$C_2Cl_3F_3$	187.4

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

ALLIED-SIGNAL INC.
Engineered Materials Sector
P.O. Box 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Product Safety Department	(201) 455-4157	October, 1985	January, 1987

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(201) 455-2000

Inhalation: Remove patient promptly to fresh air. If breathing has stopped, give artificial respiration, preferably mouth-to-mouth. Give oxygen as necessary, provided a qualified operator is available. Call a physician. Do not give adrenaline (epinephrine).

Eyes: Immediately flush eyes with large amounts of water for at least 15 minutes, lifting eyelids occasionally. If symptoms persist, consult a physician.

Skin: Flush skin with water until all chemical is removed. Remove contaminated clothing and wash before reuse.

Ingestion: If conscious, induce vomiting immediately by giving two glasses of water and touching finger to back of throat. Call a physician.

C. HAZARDS INFORMATION

HEALTH

INHALATION

At low levels (human, @ 2500 ppm, 0.5-1.0 hours), drowsiness, loss of concentration, "heaviness" in the head have been experienced. Also, at high levels, cardiac effects are reported – Reference (a). For further toxicity data, see page 5.

INGESTION

May cause discomfort (see vapor pressure, Section F). May also give some of the same symptoms and toxicity as those for inhalation above. LD_{50} (rat): 43 g/kg – Reference (b).

SKIN

Irritant: excessive contact may cause defatting.
Rabbit irritation data (mild) are reported in reference (b).

EYES

Vapor may act as mild irritant. Liquid will irritate eyes and may cause conjunctivitis.

PERMISSIBLE CONCENTRATION, AIR (SEE SECTION J) OSHA/TWA: 1000 ppm

ACGIH/TLV: the same with a Short-Term Exposure Limit (STEL) of 1250 ppm.

BIOLOGICAL Action Level: None established.

UNUSUAL CHRONIC TOXICITY

See Section K for subacute (inhalation) data and further discussion.

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
N.A. °C Non-flammable ☐ OPEN CUP ☐ CLOSED CUP	680 °C (very weak combustion)	LOWER – Not applicable UPPER – Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS

See exothermic reactions with some metals, Section G.
See hazardous decomposition products, Section G.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

Material is non-flammable; use an extinguishing agent suitable for surrounding fire.

FIRE EXTINGUISHING AGENTS TO **AVOID**

None known.

SPECIAL FIRE FIGHTING PRECAUTIONS

When material is involved in a fire, firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against vapors and toxic and corrosive decomposition products. Use water spray to keep fire-exposed containers cool, and to keep spillage away from fire and heat, and to knock down vapors.

VENTILATION

Provide local exhaust at filling zones and other operating spaces where leakage is probable.
Mechanical (General) ventilation is adequate for other operating and storage areas. See Special Precautions, below, in this Section.

NORMAL HANDLING

Avoid breathing vapor, liquid contact with eyes, skin or clothing. Tank-cleaning personnel should use only a formal tank entry procedure based on recognized safety principles [see reference (3), Section J, and follow precautions on label].

STORAGE

Store in a clean, cool, dry and well-ventilated area of low fire risk. Protect containers from physical damage and keep closed. Do not enter storage areas unless adequately ventilated. See precautions on label.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT – SECTION E)

Evacuate unprotected personnel. Protected personnel, per Section E, should remove any flames and shut off leak, if without risk. Absorb liquid spill with commercial absorbent, shovel into metal drums, close and store as above. Dike up large spills with commercial absorbent and pump into drums, making sure pump does not overheat.

SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS **SIGNAL WORD** – WARNING!

Tanks cannot be effectively flushed of vapor if sumps contain liquid. Empty container may contain product residues (vapor or liquid); observe all labeled hazard precautions. Closures should be removed carefully to relieve possible internal pressure and, when empty, to avoid accidental exposure to any entrapped vapors. Room air-conditioning systems and space heaters should be routinely inspected for corrosion if in areas exposed to halocarbon vapors.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

None required for adequately vented work situations. For accidental or non-ventilated situations, use a self-contained breathing apparatus or supplied-air respirator, approved by NIOSH.

EYES AND FACE

Wear chemical safety goggles if there is any possibility of contact with liquid. Do not wear contact lenses. Add a face shield if there is danger of liquid splashing while handling.

HANDS, ARMS, AND BODY

Wear protective, impervious gloves and clothing (preferably made of PVA or neoprene) if there is repeated or prolonged contact with liquid. Remove and wash clothing promptly upon contamination.

OTHER CLOTHING AND EQUIPMENT

High dose-level warning signs are recommended for areas of principal exposure. Provide eyewash stations and quick-drench shower facilities. For tank cleaning, see OSHA regulations, Reference (3), Section J.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Colorless liquid with faint ethereal odor.	
BOILING POINT 47.6 °C MELTING POINT (freezing) −35 °C	SPECIFIC GRAVITY (H_2O = 1) @ 21.1°C (liquid): 1.57	VAPOR DENSITY (AIR = 1) 6.5
SOLUBILITY IN WATER (% by Weight) 0.035	pH N.D.	VAPOR PRESSURE (mm Hg at 20°C) ☐ (PSIG) ☐ @ 21.1oC: 5.6 psia
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☒ (time to evaporate) 1.3	% VOLATILES BY VOLUME (At 20°C) 100	GENESOLV® D is not a photochemically reactive solvent.

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Thermal-oxidative decomposition begins at about 250°C. Avoid contact with active metals, lighted cigarettes, open flames, hot spots, welding.

INCOMPATIBILITY (MATERIALS TO AVOID)

Aluminum powder: will flash or spark on heavy impact. Finely divided barium: may explode by frictional initiation. Lithium shavings: impact-sensitive and may explode violently. Powdered titanium: will flash or spark on heavy impact. —Ref. (d). Chemically-active metals such as calcium, powdered magnesium or zinc, beryllium. Alloys containing more than 2% magnesium: will decompose this material. —Ref. (c).

HAZARDOUS DECOMPOSITION PRODUCTS

Halogens, halogen acids, and possibly carbonyl halides, such as phosgene.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	None known.

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT/C.A.S. #	WT. %	HAZARD DATA (SEE SECT. J)
NOT APPLICABLE		

I. ENVIRONMENTAL

DEGRADABILITY AQUATIC TOXICITY	OCTANOL/WATER PARTITION COEFFICIENT
Not considered degradable; however, it is 100% volatile. Aquatic Toxicity: No published data found.	N.A.: 100% volatile

EPA HAZARDOUS SUBSTANCE? (CLEAN WATER ACT SECT 311) ☐ YES ☒ NO	IF SO, REPORTABLE QUANTITY ___ -- ___ #	40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Disposal of GENESOLV® D as a commercial product, off-specification product or waste contaminated with GENESOLV D may be subject to federal, state and local regulations (EPA spent halogenated solvent F002). Users should review their operations in terms of applicable federal, state and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED	HAZARDOUS WASTE NUMBER: (IF APPLICABLE)	40 CFR 261
Not a "hazardous waste" if discarded, unused.	N.A.	

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

(1) OSHA/TWA: OSHA regulation 29 CFR 1910, (1982), "Z List".
(2) ACGIH/TLV: ACGIH list (1984-85), "Threshold Limit Values for Chemical Substances. . .".

REGULATORY STANDARDS	D O T CLASSIFICATION: Not regulated	49 CFR 173

(3) OSHA regulations on tank entry: 29 CFR 1910.94 (8 through 11).

GENERAL

(a) AIHA hygienic Guide, 1968, American Industrial Hygiene Association.
(b) NIOSH Registry (RTECS), 1981-82, Accession No. KJ4000000.
(c) NIOSH/OSHA, "Pocket Guide to Chemical Hazards", 1978 (8/80 printing).
(d) Bretherick, L., "Handbook of Reactive Chemical Hazards", 2nd ed., 1979, Butterworths, Boston.
(e) Technical Guide No. 6, "Handbook of Organic Industrial Solvents", Alliance of American Insurers, Chicago, IL 60606.
(f) ACGIH: Documentation of TLVs, 4th edition.
(g) EPA: Health Assessment Document for 1, 1, 2-Trichloro – 1, 1, 2-Trifluoroethane, 1983, EPA #600-8-82-002.

K. ADDITIONAL INFORMATION

SECTION C. – HAZARDS INFORMATION (Health) – Unusual Chronic Toxicity

Inhalation, Subacute: Rats @ 2520 ppm/7 hours daily/5 days per week/30 days: no apparent effects. @ 5000 ppm and same exposure time: mild liver effects, prevention of weight gain. Additional information: Reference (a), Section J.

Results of a 2-year chronic inhalation study on rats exposed to 2,000, 10,000 and 20,000 ppm confirmed the low order of toxicity of this material. This, and results of other studies available in the literature, have shown no evidence of carcinogenicity, mutagenicity, or teratogenicity in animal studies and in human experience. (Reference: Haskell Laboratory data).

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SECTION C. HEALTH HAZARD DATA – Inhalation – continued

Effects of Over-Exposure to Trichlorotrifluoroethane:

Low-Level and General: This material is low in toxicity. It is an anesthetic and inhalation of high concentrations can produce asphyxiation. At levels of about 2500 ppm in air there begins to be interference with psychological and psychomotor functions, expressed as excitement and incoordination.

High-Level and Cardiac: Animal studies in various species have indicated arrhythmia at the following concentrations:

Species	(5-minute exposure) Lowest Concentration Causing Arrhythmia (ppm)
Monkey [Ref. (a) below]	25,000 – 50,000
Mouse [Ref. (b) below]	100,000

Also, in the dog, myocardial depression was seen at 50,000 ppm [Ref. (c) below]; and cardiac arrythmias at 5,000 ppm in the presence of large doses of exogenous epinephrine with same exposure time [Ref. (d) below].

References:

(a) Belej, M.A., et al., Toxicology 2, 381-395 (1974).

(b) Aviado, D.M. and Belej, M.A., Ibid, 31-42 (1974).

(c) Aviado, D.M., Ibid 3, 321-332 (1975).

(d) Reinhardt, C.F., et al., Journal of Occupational Medicine, 15, No. 12, (1973).

October, 1985

PSDS File No. 893

ALLIED

PRODUCT SAFETY DATA SHEET

GENESOLV® DES AZEOTROPE

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☐ C.A.S. NO ☒ ALLIED PRODUCT CODE #
GENESOLV® DES Azeotrope	196-002573 See Section H for CAS Nos. for components.

CHEMICAL NAME AND/OR SYNONYM

Azeotropic solvent mixture of Trichlorotrifluoroethane (93.5 wt. %), Ethyl Alcohol (3.5 wt. %), Isopropyl Alcohol (2 wt. %) and Nitromethane (1 wt. %) containing a small amount of Methyl Alcohol.

FORMULA	MOLECULAR WEIGHT
N.A. – Mixture. See Section H for individual components.	N.A. – Mixture. See Section H.

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

ALLIED-SIGNAL INC.
Engineered Materials Sector
P.O. Box 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Product Safety Department	(201) 455-4157	March, 1986	January, 1987

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(201) 455-2000

Inhalation: Immediately remove patient to fresh air. If breathing has stopped, give artificial respiration, preferably mouth-to-mouth. Give oxygen as necessary, provided a qualified operator is available. Call a physician. Do not give epinephrine (adrenaline).

Eyes: Flush with large amounts of water, lifting eyelids occasionally to facilitate irrigation, and continue for 15 minutes. If symptoms persist, consult a physician.

Skin: Wash promptly with soap and water, then flush with water until all chemical is removed. Remove contaminated clothing and wash before reuse.

Ingestion: If conscious, immediately give 2 to 4 glasses of water and induce vomiting by touching finger to back of throat. Call a physician.

C. HAZARDS INFORMATION

HEALTH

INHALATION

For the fluorocarbon, at low concentrations, headache, drowsiness, loss of concentration have been experienced (human: 2500 ppm, 0.5 - 1.0 hours). For toxicity data on the components, see Section H and continuation on page 5. Vapors reduce oxygen available for breathing, resulting in an asphyxiation hazard.

INGESTION

May cause discomfort. May also give some of the same symptoms and toxicity as those for inhalation above.
[Note: Methyl alcohol, although present in minute amount, cannot be made non-poisonous.]

SKIN

Irritant: excessive contact may cause defatting of tissue. Rabbit irritation data (mild) for the major component are reported in Reference (a), Section J.

EYES

Vapor may act as mild irritant. Liquid contact will irritate eyes and may cause (temporary) conjunctivitis.

PERMISSIBLE CONCENTRATION - AIR (SEE SECTION J)	BIOLOGICAL
No established OSHA/TWA or ACGIH/TLV for mixture. A TLV of 720 ppm has been calculated in-house for the mixture.	None established.

See Section H for individual component values.

UNUSUAL CHRONIC TOXICITY

See Section K for subacute inhalation data and cardiac effect of high concentrations.

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
°C Not applicable to the mixture. ☐ OPEN CUP ☐ CLOSED CUP	422 °C (ethyl alcohol component)	Unknown for mixture. LOWER – 3.3 UPPER – 19 (ethyl alcohol component)

UNUSUAL FIRE AND EXPLOSION HAZARDS

See Section G relative to hazardous decomposition products and possible exothermic reactions with some hot reactive metals.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

Any standard agent – select the one most suitable for surrounding fire; material itself is not flammable.

FIRE EXTINGUISHING AGENTS TO **AVOID**

None known.

SPECIAL FIRE FIGHTING PRECAUTIONS

Firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against vapors and possible toxic decomposition products. Proper eye and skin protection should be provided. Use water spray to keep fire-exposed containers cool, to keep spillage away from fire and heat, and to knock down vapors.

VENTILATION

Provide local exhaust at filling zones, material transfer areas and other operating areas where leakage is probable. Mechanical (General) ventilation may be adequate for storage areas or other areas where vapors may accumulate.

NORMAL HANDLING

Avoid breathing vapors and liquid contact with eyes, skin and clothing. Use with adequate ventilation. Keep away from open flame. See reference for tank entry safety procedures, Section J, Reference (1). See precautions on label.

STORAGE

Store in a cool, clean, well-ventilated area of low fire-risk. Protect containers from physical damage and keep tightly closed. Do not enter storage areas unless they are adequately ventilated. See precautions on label.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT – SECTION E)

Evacuate unprotected personnel. Protected personnel, per Section E, should remove any flames, shut off leak, if without risk, and provide ventilation. Absorb liquid spill with commercial absorbent, shovel into drums, close, label and store as above. Dike up large spills with commercial absorbent and pump into drums, making sure pump does not overheat. Close and label for further disposal. Attempt to keep spills out of sewer.

SPECIAL PRECAUTIONS PROCEDURES/LABEL INSTRUCTIONS **SIGNAL WORD** – WARNING!

Product can displace air for breathing, resulting in an asphyxiation hazard. Tanks cannot be effectively flushed of vapor if sumps contain liquid. Tank-cleaning personnel should use only a formal tank entry procedure based on recognized safety principles – see Ref. (1), Section J. Employee training and medical surveillance are recommended.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

For accidental, emergency or non-ventilated situations, use a self-contained breathing apparatus or supplied-air respirator, approved by NIOSH. For escape: gas mask with organic vapor canister or self-contained breathing apparatus, NIOSH-approved.

EYES AND FACE

Under normal conditions, wear safety glasses. Where the possibility of liquid contact exists, wear chemical safety goggles. Do not wear contact lenses in such situations. Add a face shield if there is danger of liquid splashing while handling.

HANDS, ARMS, AND BODY

Wear protective gloves (preferred material: PVA or neoprene), rubber apron and full protective clothing. All should be worn if there is repeated or prolonged liquid contact. Wash promptly any impervious items that become wet; remove promptly any non-impervious items that become contaminated.

OTHER CLOTHING AND EQUIPMENT

Provide eyewash stations and quick-drench shower facilities at convenient locations. High dose-level warning signs are recommended for areas of principal exposure. For tank cleaning, see OSHA regulations, Ref. (1), Section J.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS)	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Colorless liquid with ethereal and peppermint-like odor.	
BOILING POINT 44 °C MELTING POINT < −35 °C	SPECIFIC GRAVITY (H_2O = 1) (liquid) 1.486	VAPOR DENSITY (AIR = 1) 5.0
SOLUBILITY IN WATER (% by Weight) .05	pH Unknown. Estimated to be neutral.	VAPOR PRESSURE (mm Hg at 20°C) ☐ (PSIG) ☐ Lower than 5.6 psia @ 21.1°C / 70°F.
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☒ (time to evaporate) 4.2	% VOLATILES BY VOLUME (At 20°C) 100	Not a photochemically reactive solvent.

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Avoid sparks, hot spots, welding flames and lighted cigarettes. Will decompose at temperatures above 250°C.

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidants; e.g., nitric acid, oleum. Hot reactive metals, such as molten aluminum, finely divided barium, aluminum, zinc, magnesium and lithium (produce exothermic reactions).

HAZARDOUS DECOMPOSITION PRODUCTS

Halogens, halogen acids, possibly carbonyl halides (such as phosgene) CO CO_2 and oxides of nitrogen.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	None known.

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C.A.S. #	WT %	HAZARD DATA (SEE SECT. J)
Trichlorotrifluoroethane CAS #76-13-1 Synonyms: GENESOLV® D, GENETRON® 113. Formula: $C_2Cl_3F_3$ Molecular weight: 187.4 Vapor pressure: 5.6 psia @ 21.1°C / 70°F. Not regulated by DOT.	93.5	OSHA TWA: 1000 ppm. ACGIH TLV: 1000 ppm. ACGIH STEL: 1250 ppm. LC_{50} (ihl-rat): 52,000 to 68,000 ppm 4 hrs. – Ref. (b). LD_{50} (orl-rat): 43 g/kg. CNS and cardiac effects at high concentrations – See Section K.
Ethyl Alcohol (SDA 30 Grade) CAS #64-17-5 Synonyms: Ethanol; grain alcohol. Formula: CH_3CH_2OH Molecular weight: 46.07 Vapor pressure: 43.9 mm Hg @ 20°C. DOT Classification: Flammable liquid / UN1170 ** These values are applicable to ethyl alcohol component, only, not to the SDA 30 Grade. See page 5 for figures for methyl alcohol constituent in SDA 30 Grade.	3.5	OSHA TWA: 1000 ppm.** ACGIH TLV: 1000 ppm.** LD_{50} (orl-rat): 7060 mg/kg. LC_{50} (ihl-rat): 20,000 ppm / 10 hrs. – Ref. (a). Flash pt.: 55°F / 13°C (c.c.). Inhalation or ingestion can cause intoxication.
Isopropyl Alcohol CAS #67-63-0 Synonyms: IPA, 2-Propanol, Isopropanol. Formula: $(CH_3)_2CHOH$ Molecular weight: 60.10 Vapor pressure: 33 mg Hg @ 20°C. DOT Classification: Flammable liquid / UN1219.	2	OSHA/TWA: 400 ppm. ACGIH/TLV: 400 ppm. ACGIH/STEL: 500 ppm. LD_{50} (orl-rat): 5840 mg/kg. LC_{50} (ihl-rat): 16,000 ppm / 8 hrs. – Ref. (a). Flash Pt.: 11.7°C / 53°F. (c.c.).

(cont'd. page 5)

I. ENVIRONMENTAL

DEGRADABILITY AQUATIC TOXICITY

No data found for fluorocarbon and nitromethane.

Degradability:

BOD_5 (g/g). Std. Dilution / Sewage Seed: 0.93 - 1.67 (ethyl alcohol) / 1.29 - 1.59 (Isopropyl Alcohol) / 0.76 - 1.12 (methyl alcohol).

Aquatic Toxicity: TLm96: over 1000 ppm (ethyl & methyl alcohols); 1000 - 100 ppm (isopropyl alcohol).

[TLm96 = lethal concentration, 50% kill, 96 hours]

OCTANOL/WATER PARTITION COEFFICIENT (alcohol components) – 0.32 (ethyl); 0.34 (isopropyl)

EPA HAZARDOUS SUBSTANCE? (CLEAN WATER ACT SECT 311) ☐ YES ☒ NO IF SO, REPORTABLE QUANTITY — — #

40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

GENESOLV® DES solvent contains a chlorinated fluorocarbon, alcohols and a nitro compound. Treatment or disposal of wastes generated by use of this product may be of concern as a RCRA Hazardous Waste (F001 and/or F002), depending on the nature of the use.

Users of this product should review their operations in terms of applicable federal, state and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED:

Not a "hazardous waste" if discarded, unused.

HAZARDOUS WASTE NUMBER (IF APPLICABLE) N.A.

40 CFR 261

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

As applicable to components:

TWA: OSHA regulation 29 CFR 1910.1000 (1982), "Z List".

TLV: ACGIH 1985-86 List: "Threshold Limit Values and Biological Exposure Indices".

REGULATORY STANDARDS

DOT CLASSIFICATION Not regulated

49 CFR 173

DOT Classifications of components: Hazardous Materials Table, 49 CFR 172.101.

(1) Tank entry standard: OSHA regulation 29 CFR 1910.94 (8 through 11).

GENERAL

(a) NIOSH Registry (RTECS), 1981-82, Accession Nos. KJ4000000; KQ6300000; NT8050000; PA9800000 and PC1400000.
(b) ACGIH: Documentation of Threshold Limit Values, 4th edition.
(c) AIHA Hygienic Guide, 1968, (Trichlorotrifluoroethane), Amer. Industrial Hygiene Assoc.
(d) EPA: Health Assessment Document for Trichlorotrifluoroethane, EPA #600-S8-82-002F.
(e) Bretherick, L., "Handbook of Reactive Chemical Hazards", 2nd ed., 1979, Butterworths, Boston.
(f) NIOSH/OSHA: "Pocket Guide to Chemical Hazards", 1978 (8/80 printing).

K. ADDITIONAL INFORMATION

SECTION C – HAZARDS INFORMATION (Health) – continued

Effects of Over-Exposure to Trichlorotrifluoroethane (major component of GENESOLV® DES)

Animal studies in various species have indicated cardiac arrhythmia (which can be fatal in animals and in man) at the following concentrations at 5-minute exposures:

Species		Lowest Concentration Causing Arrhythmia (ppm)
Monkey	[Ref. (a) below]	25,000 – 50,000
Mouse	[Ref. (b) below]	100,000

Also, myocardial depression was seen in the dog at 50,000 ppm [Ref. (c) below]; and cardiac sensitization, resulting in cardiac arrhythmias, were observed at levels as low as 5000 ppm in the presence of large doses of exogenous epinephrine (adrenaline) with same exposure time [Ref.: Reinhardt, C.F. et al., J. Occ. Med., 15, No. 12 (1973)].

Subacute data: Rats exposed at 2520 ppm, 7 hrs. / day, 5 days / wk. / 30 days – no apparent effects.

At 5000 ppm and same time exposure – mild liver effects with prevention of weight gain. Additional data: See Ref. (c), Section J.

(a) Belej, M.A. et al., Toxicology, 2 (1974), 381-395.
(b) Aviado, D.M. and Belej, M.A., Toxicology, 2 (1974), 31-42.
(c) Aviado, D.M., Toxicology, 3 (1975), 321-332.

PSDS FILE NO. 972

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H. HAZARDOUS INGREDIENTS (Mixtures Only) – continued

MATERIAL OR COMPONENT/C.A.S. #	WT.%	HAZARD DATA (SEE SECT. J)
Nitromethane CAS #75-52-5 Synonym: Nitrocarbol Formula: CH_3NO_2 Molecular weight: 61.04 Vapor pressure: 27.8 mm Hg @ 20°C. DOT Classification: Flammable liquid / UN1261	1	OSHA/TWA: 100 ppm. ACGIH/TLV: 100 ppm. LD_{50} (orl-rat): 1210 mg/kg. Flash Pt.: 35°C / 95°F (c.c.).
Methyl Alcohol (minor ingredient of SDA-30 Ethyl Alcohol, Section H, page 3) Synonyms: Wood alcohol, Methanol. CAS #67-56-1 Formula: CH_3OH Molecular weight: 32.04 Vapor pressure: 92 mm Hg @ 20°C. DOT Classification: Flammable liquid / UN1230	0.4	OSHA/TWA: 200 ppm. ACGIH/TLV: 200 ppm (skin). ACGIH/STEL: 250 ppm (skin). LD_{50} (orl-rat): 5628 mg/kg. LDLo (orl-human): 340 mg/kg. Vapor: visual damage at 1200 ppm (human).

Allied Signal

PRODUCT SAFETY DATA SHEET

GENESOLV® DFX SOLVENT

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ C A S NO ☐ ALLIED PRODUCT CODE #
GENESOLV® DFX Solvent	See Section H for components.

CHEMICAL NAME AND/OR SYNONYM

Constant Boiling Mixture of Trichlorotrifluoroethane (90.9 Wt. %) / Methanol (5.9 Wt. %) / Isohexane (2.0 Wt. %) / Acetone (1.0 Wt. %) / Nitromethane (0.2 Wt. %).

FORMULA	MOLECULAR WEIGHT
N.A. – Mixture – See Section H for components.	N.A. – Mixture See Section H.

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

ALLIED-SIGNAL INC.
Engineered Materials Sector
P.O. Box 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Product Safety Department	(201) 455-4157	March, 1986	April, 1987

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(201) 455-2000

Inhalation: Promptly remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. **If breathing** is difficult, give oxygen, provided a qualified operator is available. Do not give epinephrine (adrenaline).

Skin and Eye Contact: **Immediately** flush eyes with plenty of water for at least 15 minutes, occasionally holding eyelids apart to assist irrigation. Wash skin with soap and water and flush with water until all chemical is removed. Remove any contaminated clothing and wash before reuse.

Ingestion: If conscious, induce vomiting by giving two glasses of warm water and touching finger to back of throat. Avoid stimulants. Never give anything by mouth to an unconscious person. Call a physician.

C. HAZARDS INFORMATION

HEALTH

INHALATION

At low concentration levels, drowsiness, headache, nausea, loss of concentration and flushing of the skin may result. At high levels, intoxication, central nervous system (CNS) depression, cardiac arrhythmia (which can be fatal) may occur. Vapors can displace oxygen in the air resulting in a suffocation hazard. See Section K for further discussion.

INGESTION

May cause discomfort. Although relatively low in oral toxicity, similar symptoms as those described for inhalation may be experienced, including central nervous system depression with large doses; respiratory failure may also occur. Methanol poison hazard: See Section H. (Methanol cannot be made non-poisonous.)

SKIN

Irritant: excessive or prolonged contact may cause defatting, erythema (reddening of the skin) or dermatitis.

EYES

Vapor may act as a mild irritant. Liquid contact will irritate eyes and may cause conjunctivitis.

PERMISSIBLE CONCENTRATION (SEE SECTION J)	AIR	BIOLOGICAL
A TLV of 480 ppm has been calculated in-house, based on TLV's of components.	No OSHA/TWA or ACGIH/TLV values established for the mixture. See Section H for values for the components.	Action Level: None established for mixture. See Section H for methanol and acetone components.

UNUSUAL CHRONIC TOXICITY

Damage to the pancreas and kidneys has been reported for methanol ingestion.

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
Not flammable °C ☐ OPEN CUP ☐ CLOSED CUP	485 °C	LOWER – N.D. UPPER – N.D. See Section H for hydrocarbons.

UNUSUAL FIRE AND EXPLOSION HAZARDS See Section G for exothermic reactions with some metals and hazardous decomposition products.
FLAMMABILITY HAZARD: If a water layer is allowed to develop on top of a layer of an acetone-containing fluorocarbon solvent in a degreaser under non-operating conditions, acetone can be extracted into the water layer and eventually released into the air space above it, creating a potentially flammable atmosphere.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

Use water spray. Material is nonflammable; choose an extinguishing agent most suitable for surrounding fire.

FIRE EXTINGUISHING AGENTS TO **AVOID**

None known.

SPECIAL FIRE FIGHTING PRECAUTIONS

When material is involved in a fire, firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against vapors and toxic decomposition products. Proper eye and skin protection should be provided. Use water spray to keep fire-exposed containers cool, and to keep spillage away from fire and heat, and to knock down vapors.

VENTILATION

Provide local exhaust for filling zones, product transfer and other use areas.
Mechanical (General) ventilation is adequate for storage areas.

NORMAL HANDLING Use in well-ventilated areas. Avoid contact with eyes, skin and clothing (see Section E – Protective Equipment). Do not use around flames. Tank-cleaning personnel should use only a formal tank entry procedure based on recognized safety principles (see Reference (4), Section J, and follow precautions on label.

STORAGE

Store in a cool, dry, well-ventilated area of low fire risk. Protect containers from physical damage and keep tightly closed. Do not enter storage areas unless adequately ventilated.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT – SECTION E)

Immediately evacuate unprotected personnel. Protected personnel should remove any flame or heat, shut off leak, if without risk, and provide ventilation. Absorb spill with commercial absorbent, shovel into metal drum(s), close, label and store as above. Dike up large spills with commercial absorbent and pump into drums, making sure that pump does not overheat.

SPECIAL PRECAUTIONS PROCEDURES LABEL INSTRUCTIONS **SIGNAL WORD** – WARNING!

Tanks cannot be effectively flushed of vapor if sumps contain liquid. Empty containers may contain product residues (vapor or liquid); observe all labeled hazard precautions. Emphasize medical surveillance and training of personnel.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

None required in adequately-vented work situations. For accidental or non-ventilated situations or for entry into tanks or confined areas which may contain free liquid or vapors, use a self-contained breathing apparatus or supplied-air respirator, approved by NIOSH.

EYES AND FACE

Wear chemical safety goggles if there is any possibility of contact with liquid. Do not wear contact lenses under such conditions. Add a face shield if there is danger of liquid splashing while handling.

HANDS, ARMS, AND BODY

Normally wear cloth or leather gloves and full work clothing. If repeated or prolonged contact with liquid is anticipated, wear impervious gloves (preferably made of PVA or neoprene) and full protective clothing.

OTHER CLOTHING AND EQUIPMENT

Provide eyewash stations and/or a source of running water convenient to work areas.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS)	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Colorless liquid with faint ethereal odor.	
BOILING POINT 40.2 °C MELTING POINT < −35 °C	SPECIFIC GRAVITY (H_2O = 1) 1.43	VAPOR DENSITY (AIR = 1) 4.84
SOLUBILITY IN WATER (% by Weight) < 0.005	pH N.D. but estimated to be neutral	VAPOR PRESSURE (mm Hg at 20°C) ☒ (PSIG) ☐ 340
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☒ Approx. 2	% VOLATILES BY VOLUME (At 20°C) 100	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Thermal-oxidative decomposition of the fluorocarbon component begins at 250°C. Avoid lighted cigarettes, open flames, welding, hot metal surfaces.

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidizers. Hot and/or powdered, chemically-active metals such as powdered or molten aluminum, lithium, barium, zinc, magnesium. Alloys containing more than 2% magnesium will decompose the fluorocarbon component.

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition products include halogens (i.e., fluorine, chlorine), halogen acids (i.e., hydrochloric and hydrofluoric acids), possibly carbonyl halides (such as phosgene), CO, CO_2 and NO_x.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	None known.

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT/C.A.S. #	WT.%	HAZARD DATA (SEE SECT J)
Trichlorotrifluoroethane CAS #76-13-1 $C_2Cl_3F_3$ Mol. Wt. 187.4 Synonyms: GENESOLV® D; GENETRON® 113; Fluorocarbon 113	90.9	OSHA/TWA: 1000 ppm ACGIH/TLV: 1000 ppm ACGIH/STEL: 1250 ppm Low oral toxicity: LD_{50} (rat): 43 g/kg Inhalation hazard: See Section K.
Methanol CAS #67-56-1 CH_3OH Mol. Wt. 32.04 Synonyms: Methyl alcohol; Wood alcohol; Carbinol	5.9	OSHA/TWA: 200 ppm ACGIH/TLV: 200 ppm (skin) ACGIH/STEL: 250 ppm (skin) Biological Action Level: 50 mg/L limit in urine at end of shift. Flash point: 12°C (c.c.) Flammable Limits in Air: 6.0 — 36.5 (% by vol.) Symptoms of methanol poisoning: visual disturbance, blindness, metabolic acidosis.
Isohexane CAS #107-83-5 C_6H_{14} Mol. Wt. 86.20 Synonyms: Methyl pentane; 2-Methylpentane	2.0	OSHA/TWA: 500 ppm ACGIH/TLV: 500 ppm ACGIH/STEL: 1000 ppm Low to moderate oral toxicity.
Acetone CAS #67-64-1 C_3H_6O Mol. Wt. 58.08 Synonyms: Dimethylketone; 2-Propanone	1.0	OSHA/TWA: 1000 ppm ACGIH/TLV: 750 ppm ACGIH/STEL: 1000 ppm Low oral toxicity: LD_{50} (rat): 9750 mg/kg Biological Action Level: 270 mg/L in urine, end of workshift = excessive exposure to acetone. Flash point: −17.8°C (c.c.) Flammable Limits in Air: 2.6 — 12.8 (% by vol.)
Nitromethane CAS #75-52-5 CH_3NO_2 Mol. Wt. 61.04 Synonym: Nitrocarbol	0.2	OSHA/TWA: 100 ppm ACGIH/TLV: 100 ppm A weak narcotic and respiratory irritant. Prolonged exposure: liver damage.

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY

Degradability

Fluorocarbon component: not considered biodegradable.

Acetone: BOD_5 (g/g): 0.31 – 1.63 Std. Dilution / Sewage Seed. Isohexane: no data found.

Methanol: BOD_5 (g/g): 0.76 – 1.12 Std. Dilution / Sewage Seed. Nitromethane: no data found.

Aquatic Toxicity: Fluorocarbon component and Nitromethane: No published data found.

Methanol and Isohexane: TLm96: over 1000 ppm. [TLm96 = Lethal conc., 50% kill (96 hrs.)]

Acetone: 14,250 ppm / 24 hr. / sunfish / killed / tap water ; 13,000 ppm / 48 hr. / mosquito fish / TLm / turbid water.

OCTANOL/WATER PARTITION COEFFICIENT
N.A. – Mixture (100% volatile)
(Methanol: –0.74) (Acetone: –0.24)

EPA HAZARDOUS SUBSTANCE? (CLEAN WATER ACT SECT 311) ☐ YES ☒ NO IF SO, REPORTABLE QUANTITY: — — #

40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Disposal of GENESOLV® DFX as a commercial product, off-specification product or waste contaminated with GENESOLV® DFX may be subject to federal, state and local regulations (EPA spent halogenated solvent waste F002). Users should review their operations in terms of applicable federal, state and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED
Not a "hazardous waste" if discarded, unused.

HAZARDOUS WASTE NUMBER (IF APPLICABLE)
N.A.

40 CFR 261

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

Applicable to the components:

(1) TWA OSHA regulations: 29 CFR 1910 (1982), "Z List".

(2) TLV: ACGIH 1984-85 List: "Threshold Limit Values for Chemical Substances . . .".

(3) Biological Action Levels: Baselt, R.C., "Biological Monitoring Methods for Industrial Chemicals", 1980, Biomedical Publications, Davis, CA 95616.

REGULATORY STANDARDS

D O T CLASSIFICATION Not regulated

49 CFR 173

(4) OSHA regulations on tank entry: 29 CFR 1910.94 (8 through 11).

GENERAL

(a) EPA: Health Assessment Document for 1, 1, 2-Trichloro-1, 2, 2-Trifluoroethane, 1983, EPA =600-8-82-002.

(b) ACGIH: Documentation of Threshold Limit Values, 4th edition.

(c) Patty's "Industrial Hygiene and Toxicology", 3rd edition, 1981.

(d) NIOSH/OSHA: "Pocket Guide to Chemical Hazards", 1978 (8/80 printing).

(continued Section K)

K. ADDITIONAL INFORMATION

SECTION J – REFERENCES (General) – continued

(e) Bretherick, L., "Handbook of Reactive Chemical Hazards", 2nd ed., 1979, Butterworths, Boston.

(f) NIOSH Registry (RTECS): Accession Nos. KJ4000000; PC1400000; SA2995000; AL3150000; and PA9800000.

(g) AIHA Hygienic Guide, 1968, Trichlorotrifluoroethane, Am. Industrial Hygiene Association.

SECTION C – HAZARDS INFORMATION – Inhalation – continued

Inhalation toxicity data from NIOSH Registry, 1981-1982:

Trichlorotrifluoroethane: Ihl (rat): LCLo: 87,000 ppm / 6 hrs.

Methanol: Ihl (human): TCLo: 86,000 mg/cu.m.

Ihl (rat): LC_{50}: 64,000 ppm / 4 hrs.

Isohexane: No inhalation data found.

Acetone: Ihl (man) TCLo: 500 ppm; 12,000 ppm / 4 hrs.

Ihl (rat): TCLo: 16,000 ppm / 4 hrs.

Nitromethane: Ihl (monkey) LCLo: 1000 ppm

The prime hazard of the mixture is one of asphyxiation (when oxygen levels in air are reduced to 12 - 14%), with possible cardiac effects and/or CNS depression at high concentration levels. Accordingly, the following data on the major (90.9 wt. %) component, Trichlorotrifluoroethane, are considered conservatively applicable to the GENESOLV® DFX blend:

(continued – page 5)

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SECTION C & K – HAZARDS INFORMATION – INHALATION – continued

Effects of Overexposure to Trichlorotrifluoroethane:

Inhalation, Subacute: Rats @ 2520 ppm / 7 hours daily / 5 days per week / 30 days: no apparent effects. At 5000 ppm and the same exposure time, mild liver effects, prevention of weight gain were observed. See, also, Reference (g), Section J, (AIHA Guide) for further information.

Published animal studies in various species have indicated cardiac arrhythmia (which can be fatal in animals and in humans) at the following concentrations and exposure time:

Species	(5-minute exposure) Lowest Concentration Causing Arrhythmia (ppm)
Monkey [Ref. (a) below]	25,000 – 50,000
Mouse [Ref. (b) below]	100,000

Also, in the dog, myocardial depression was seen at 50,000 ppm [Ref. (c) below]. Additionally, cardiac arrhythmias at 5000 ppm were produced in the dog in the presence of large doses of exogenous epinephrine with the same exposure time [Ref. (d) below].

References:

(a) Belej, M.A., et al., Toxicology 2, 381-395 (1974).
(b) Aviado, D.M. and Belej, M.A., Ibid, 31-42 (1974).
(c) Aviado, D.M., Ibid 3, 321-332 (1975).
(d) Reinhardt, C.F., et al., J. Occ. Med. 15, No. 12 (1973).

Effects of Overexposure to Isohexane:

High exposure levels may sensitize the heart muscle, especially under stress or physical exertion [General Reference (c), Section J, page 4].

ALLIED

PRODUCT SAFETY DATA SHEET

GENESOLV® DW SOLVENT

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☐ CAS NO ☒ ALLIED PRODUCT CODE #
GENESOLV® DW Solvent	196-008080 See Section H for CAS Nos. of the components.

CHEMICAL NAME AND/OR SYNONYM

Trichlorotrifluoroethane, containing water and a detergent.

FORMULA	MOLECULAR WEIGHT
N.A. – mixture. See Section H for individual components.	N.A. – mixture. See Section H.

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

ALLIED-SIGNAL INC.
Engineered Materials Sector
P.O. Box 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Product Safety Department	(201) 455-4157	April, 1986	January, 1987

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(201) 455-2000

Inhalation: Immediately remove patient to fresh air. If breathing has stopped, give artificial respiration, preferably mouth-to-mouth. Give oxygen as necessary, provided a qualified operator is available. Call a physician. Do not give *epinephrine (adrenaline)*.

Eyes: Flush with large amounts of water, lifting eyelids occasionally to facilitate irrigation, and continue for 15 minutes. If symptoms persist, consult a physician.

Skin: Wash promptly with soap and water, then flush with water until all chemical is removed. Remove contaminated clothing and wash before reuse.

Ingestion: If conscious, and if more than a mouthful has been ingested without vomiting, immediately give 2 to 4 glasses of water and induce vomiting by touching finger to back of throat. Call a physician.

C. HAZARDS INFORMATION

HEALTH

INHALATION

At low level of concentration (human: 2500 ppm fluorocarbon component, 0.5 - 1.0 hour exposure): headache, dizziness, nausea, loss of concentration have been experienced. With high exposure levels: cardiac effects and CNS depression (loss of consciousness or even death) may occur. (See Section K for further discussion.) Vapors can displace air, resulting in an asphyxiation hazard.

INGESTION

May cause discomfort (see vapor pressure, Section F).
Some of the same symptoms as those for inhalation would be expected.

SKIN

Irritant: excessive or prolonged contact with liquid may cause defatting action on tissues.

EYES

Vapors may act as mild irritant. Liquid contact will affect eyes, causing irritation and possibly (temporary) conjunctivitis.

PERMISSIBLE CONCENTRATION AIR (SEE SECTION J)	BIOLOGICAL
No OSHA/TWA or ACGIH/TLV established. An estimated TLV of 1000 ppm has been calculated, in-house, for the emulsion.	None established.

UNUSUAL CHRONIC TOXICITY

See Section K for subacute data and cardiac effects relative to overexposure to fluorocarbon component.

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
N.A. °C No flash point. ☐ OPEN CUP ☐ CLOSED CUP	°C Not applicable	LOWER – Not applicable UPPER – Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS

Contact with very hot surfaces will generate toxic fumes. See Section G relative to hazardous decomposition products and exothermic reactions with some hot metals.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

Its presence in a fire does not hinder use of any standard medium. Choose an extinguishing agent suitable for surrounding fire.

FIRE EXTINGUISHING AGENTS TO **AVOID**

None known.

SPECIAL FIRE FIGHTING PRECAUTIONS

When material is involved in a fire, firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against vapors and toxic and corrosive decomposition products. Use water spray to keep fire-exposed containers cool, and to keep spillage away from fire and heat, and to knock down vapors.

VENTILATION

Provide local exhaust at filling zones and other operating spaces where leakage is probable. Mechanical (General) ventilation is adequate for other operating and storage areas.

NORMAL HANDLING

Avoid breathing vapor, liquid contact with eyes, skin or clothing. Tank-cleaning personnel should use only a formal tank entry procedure based on recognized safety principles [see reference (3), Section J, and follow precautions on label].

STORAGE

Store in a clean, cool, dry and well-ventilated area of low fire risk. Protect containers from physical damage and keep closed. Do not enter storage areas unless adequately ventilated. See precautions on label.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT – SECTION E)

Evacuate unprotected personnel. Protected personnel, per Section E, should remove any flames, shut off leak, if without risk, and provide ventilation. Absorb liquid spill with commercial absorbent, shovel into metal drums, close and store as above. Dike up large spills with commercial absorbent and pump into drums, making sure pump does not overheat. Attempt to keep out of sewer. Any release to the environment of this product may be subject to federal and/or state reporting requirements. Check with appropriate agencies.

SPECIAL PRECAUTIONS PROCEDURES LABEL INSTRUCTIONS **SIGNAL WORD** – WARNING!

Tanks cannot be effectively flushed of vapor if sumps contain liquid. Empty container may contain product residues (vapor or liquid); observe all labeled hazard precautions. Tank cleaning personnel should use only a formal tank entry procedure based on recognized safety principles [see Ref. (3)]. Medical surveillance and employee training are recommended.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

None required for adequately vented work situations. For accidental or non-ventilated situations, where concentrations exceed the TLV, use a self-contained breathing apparatus or supplied-air respirator, approved by NIOSH.

EYES AND FACE

Wear chemical safety goggles if there is any possiblility of contact with liquid. Do not wear contact lenses. Add a face shield if there is danger of liquid splashing while handling.

HANDS, ARMS, AND BODY

Wear protective, impervious gloves and clothing (preferably made of PVA or neoprene) if there is repeated or prolonged contact with liquid. Remove and wash clothing promptly upon contamination.

OTHER CLOTHING AND EQUIPMENT

Posting of warning signs is recommended for areas of principal exposure. Provide eyewash stations and quick-drench shower facilities. For tank cleaning, see OSHA regulations, Reference (3), Section J.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS)	APPEARANCE AND ODOR	
☐ LIQUID ☐ SOLID ☐ GAS ☒ Emulsion	Clear, colorless to pale yellow, liquid with ethereal odor.	
BOILING POINT 44.4 °C MELTING POINT Unknown °C	SPECIFIC GRAVITY (H_2O = 1) (liquid) approx. 1.47	VAPOR DENSITY (AIR = 1) (fluorocarbon) 6.5
SOLUBILITY IN WATER (% by Weight) Approx. 5.0	pH N.D.	VAPOR PRESSURE (mm Hg at 20°C) ☐ (PSIG) ☐ 7 psia @ 25°C
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☒ (time to evaporate): > 1	% VOLATILES BY VOLUME (At 20°C) 90.5 (approx.) (fluorocarbon)	Not a photochemically reactive solvent.

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Avoid lighted cigarettes, flames, hot spots, welding: these conditions yield toxic, corrosive gases. Thermal-oxidative decomposition of the fluorocarbon begins at about 250°C.

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidants (e.g., nitric acid, oleum): may produce exothermic reaction. Hot reactive metals, such as molten aluminum; finely divided barium, lithium shavings, powdered magnesium, zinc, titanium, aluminum or beryllium (produce exothermic reactions with flash, spark and/or explosion – depending on specific conditions). Avoid alloys containing more than 2% magnesium (will decompose this material). [See References (e) and (f)].

HAZARDOUS DECOMPOSITION PRODUCTS

Halogens, halogen acids, and possibly carbonyl halides, such as phosgene. Thermal-oxidative degradation or combustion would yield carbon monoxide, carbon dioxide, and oxides of sulfur and nitrogen.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	None known.

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C.A.S. #	WT. %	HAZARD DATA (SEE SECT. J)
Trichlorotrifluoroethane CAS = 76-13-1 Synonyms: GENESOLV® D; GENETRON® 113; Fluorocarbon 113. Formula: $C_2Cl_3F_3$ Molecular weight: 187.4 Vapor pressure: 5.6 psia @21.1°C / 70°F. Not regulated by DOT.	90.5	OSHA/TWA: 1000 ppm. ACGIH/TLV: 1000 ppm. ACGIH/STEL: 1250 ppm. LC_{50} (inhl-rat): 52,000 to 68,000 ppm / 4 hrs. – Ref. (b). LD_{50} (orl-rat): 43 g/kg – Ref. (a). CNS and cardiac effects at high concentrations – see Section K.
Dodecylbenzene sulfonate isopropylamine salt CAS = 26264-05-1 Synonym: Dodecylbenzene isopropylamine sulfonate Formula: $C_{18}H_{30}O_3S.C_3H_9N$ Molecular weight: 385.6	4.75	No TWA/TLV available. Most toxicological properties have not been evaluated. Primary hazard: irritant to skin, eye and respiratory tract.
Water – Deionized	4.75	

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY

Fluorocarbon – not considered biodegradable.
Detergent (DDBSA-IPA) – biodegradable.
Aquatic Toxicity: No data found.

OCTANOL/WATER PARTITION COEFFICIENT
Unknown

EPA HAZARDOUS SUBSTANCE? (CLEAN WATER ACT SECT 311) ☐ YES ☒ NO IF SO REPORTABLE QUANTITY ____ # — 40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Disposal of waste GENESOLV® DW Solvent may be subject to federal, state and local regulations (EPA spent halogenated solvent – F001 and/or F002), depending on the nature of the waste. Users should review their operations in terms of applicable federal, state and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED
Not a "hazardous waste" if discarded, unused.

HAZARDOUS WASTE NUMBER (IF APPLICABLE)
N.A.

40 CFR 261

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

For the fluorocarbon:
(1) TWA: OSHA regulation 29 CFR 1910.1000 (1982), "Z List".
(2) TLV: ACGIH 1985-86 List: "Threshoid Limit Values and Biological Exposure Indices".

REGULATORY STANDARDS

D O T CLASSIFICATION: Not regulated — 49 CFR 173

(3) OSHA tank entry standard: 29 CFR 1910.94 (8 through 11).

GENERAL
(a) NIOSH Registry (RTECS), 1981-82, Accession No. KJ4000000 (for the fluorocarbon).
(b) ACGIH: Documentation of Threshold Limit Values, 4th edition.
(c) AIHA Hygienic Guide, 1968, (Trichlorotrifluoroethane), Amer. Industrial Hygiene Assoc.
(d) EPA: Health Assessment Document for Trichlorotrifluoroethane, EPA #600-S8-82-002F.
(e) Bretherick, L., "Handbook of Reactive Chemical Hazards", 2nd ed., 1979, Butterworths, Boston.
(f) NIOSH/OSHA: "Pocket Guide to Chemical Hazards", 1978 (8/80 printing).

K. ADDITIONAL INFORMATION

SECTION C – HAZARDS INFORMATION (Inhalation) and SECTION H (Hazards Data) – continued

Effects of Over-Exposure to Trichlorotrifluoroethane (Major component of GENESOLV® DW Solvent).

This material is low in toxicity. It is anesthetic and inhalation of high concentrations can produce asphyxiation. At levels of about 2500 ppm in air there begins to be interference with psychological and psychomotor functions, expressed as excitement and incoordination.

Subacute data: Rats exposed at 2520 ppm, 7 hrs./day, 5 days/week/30 days – no apparent effects.
At 5000 ppm and same time exposure: mild liver effects with prevention of weight gain. [Reference (c) Section J]

Animal studies in various species have indicated cardiac arrhythmia at the following concentrations at 5-minute exposures:

Species	Lowest Concentration Causing Arrhythmia (ppm)
Monkey [Reference (a) below]	25,000-50,000
Mouse [Reference (b) below]	100,000

Also, myocardial depression was seen in the dog at 50,000 ppm [Reference (c) below]; and cardiac sensitization, resulting in cardiac arrhythmias (which can be fatal in animals and in man) was observed at levels as low as 5000 ppm in the presence of large doses of exogenous epinephrine (adrenaline) with same exposure time [Reference: Reinhardt, C.F. et al., J. Occ. Med. 15, No. 12 (1973).

(a) Belej, M.A. et al., Toxicology 2 (1974), 381-395.
(b) Aviado, D.M. and Belej, M.A., Toxicology 2 (1974), 31-42.
(c) Aviado, D.M., Toxicology 3 (1975), 321-332.

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ALLIED

PRODUCT SAFETY DATA SHEET

GENESOLV® 5535 SOLVENT

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ C A S NO. ☐ ALLIED PRODUCT CODE #
GENESOLV® 5535 Solvent	See Section H.

CHEMICAL NAME AND/OR SYNONYM

Constant Boiling Mixture of Trichlorotrifluoroethane (84.2% Wt.), Acetone (8.0% Wt.), Iso-Hexane (5.4%Wt.), Ethanol (2.2% Wt.), and Nitromethane (0.2% Wt.)

FORMULA	MOLECULAR WEIGHT
Mixture	Mixture

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

ALLIED-SIGNAL INC.
Engineered Materials Sector
P.O. Box 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Product Safety Department	(201) 455-4157	December, 1984	January, 1987

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(201) 455-2000

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen, provided a qualified operator is present. Do not give adrenaline (epinephrine). Call a physician.
Eyes: Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Skin: Flush with water.
Ingestion: If conscious, induce vomiting by giving two glasses of warm water and touching finger to back of throat. Avoid stimulants. Never give anything by mouth to an unconscious person. Call a physician.

C. HAZARDS INFORMATION

HEALTH

INHALATION

At low concentrations, flushing, headache, drowsiness, nausea. At high levels, intoxication, central nervous system depression, cardiac arrythmia (and even death) may occur. Can displace air resulting in a suffocation hazard. (Also see Section K).

INGESTION

Relatively low oral toxicity. Similar symptoms as for inhalation. In large doses, central nervous system depression with respiratory failure may occur.

SKIN

Irritant: excessive or prolonged contact may cause defatting.

EYES

Vapor: mild irritant
Liquid contact: irritant

PERMISSIBLE CONCENTRATION. AIR (SEE SECTION J)	BIOLOGICAL
See Section H.	None.

UNUSUAL CHRONIC TOXICITY

None.

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
°C Not Flammable ☐ OPEN CUP ☐ CLOSED CUP	455 °C	LOWER – N.D. UPPER –

UNUSUAL FIRE AND EXPLOSION HAZARDS See Section G – Reactivity Data, Decomposition Products.

FLAMMABILITY HAZARD: If a water layer is allowed to develop on top of a layer of an acetone-containing fluorocarbon solvent in a degreaser under non-operating conditions, acetone can be extracted into the water layer and eventually released into the air space above it, creating a potentially flammable atmosphere.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

Water spray – see "Special fire fighting precautions".

FIRE EXTINGUISHING AGENTS TO **AVOID**

None.

SPECIAL FIRE FIGHTING PRECAUTIONS

Wear NIOSH approved self-contained breathing apparatus.
Use water spray to keep containers cool and to keep any spillage away from fire and heat.

VENTILATION

General, mechanical ventilation for storage areas.
Local exhaust for product transfer, use areas.

NORMAL HANDLING

Use in well ventilated areas. Avoid contact with eyes, skin and clothing. (See Section E - Protective Equipment). Do not use around flames. (See Section G).

STORAGE

Store in a cool, dry, well-ventilated area. Keep containers tightly closed.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT – SECTION E)

Small spills: Vacate area and allow to evaporate. Flush area with water.
Large spills: Wear recommended safety equipment (Section E). Evacuate unprotected personnel. Absorb with commercial absorbent and collect in covered metal drums. Dispose of in approved facility.

SPECIAL PRECAUTIONS/PROCEDURES LABEL INSTRUCTIONS **SIGNAL WORD** – WARNING!

Tanks cannot be effectively flushed of vapor if <u>any</u> product is present.
See tank entry reference, Section J.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

Not required in properly ventilated areas. Use NIOSH approved self-contained breathing apparatus for spills and for entry into tanks or confined areas that may contain free liquid or vapors.

EYES AND FACE

Wear chemical safety goggles if there is reasonable probability of eye contact with liquid or mist. Under these conditions, do not wear contact lenses.

HANDS, ARMS, AND BODY

Normally wear cloth or leather gloves and full work clothing. If repeated or prolonged contact with liquid is anticipated, wear impervious* gloves and full protective clothing. *Recommended material: Neoprene

OTHER CLOTHING AND EQUIPMENT

Eyewash and/or source of running water.

F PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS	Colorless liquid with ethereal odor.	
BOILING POINT 43.3 °C MELTING POINT ND °C	SPECIFIC GRAVITY (H_2O = 1) 1.33	VAPOR DENSITY (AIR = 1) 5
SOLUBILITY IN WATER (% by Weight) <0.02	pH Organic mixture, estimated to be neutral.	VAPOR PRESSURE (mm Hg at 20°C) ☒ (PSIG) ☐ 322
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☒ 2	% VOLATILES BY VOLUME (At 20°C) 100	

G REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Fluorocarbon component decomposes at temperatures above 250°F. Avoid lighted cigarettes, open flames, welding, hot metal surfaces.

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidizers, hot and/or powdered reactive metals (i.e., powdered or molten aluminum, lithium, barium, zinc, magnesium).

HAZARDOUS DECOMPOSITION PRODUCTS

Thermal decomposition products include: halogens (i.e., fluorine, chlorine), halogen acids (i.e., hydrochloric and hydrofluoric acids), possibly carbonyl halides (i.e., phosgene), CO, CO_2 and NO_x.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	None.

H HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT/C.A.S. #		WT.%	HAZARD DATA (SEE SECT J)
Trichlorotrifluoroethane $C_2Cl_3F_3$	76-13-1	84.2	TLV: 1000 ppm. STEL: 1250 ppm. OSHA TWA: 1000 ppm. See Sections B, K. Low oral toxicity.
Acetone C_3H_6O	67-64-11	8.0	TLV: 750 ppm. STEL: 1000 ppm. OSHA/TWA: 1000 ppm. Low oral toxicity.
Iso-Hexane C_6H_{14}	107-83-5	5.4	TLV: 500 ppm. STEL: 1000 ppm. OSHA TWA: 500 ppm. Low to moderate oral toxicity. See Section K.
Ethanol C_2H_5OH	64-17-5	2.2	TLV: 1000 ppm. OSHA/TWA: 1000 ppm. Low oral toxicity.
Nitromethane CH_3NO_2	75-52-5	0.2	TLV: 100 ppm. OSHA/TWA: 100 ppm. Moderate oral toxicity.

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY

Fluorocarbon component: Not biodegradable
Acetone BOD: 20 day-78% theoretical

OCTANOL/WATER PARTITION COEFFICIENT
Acetone: –0.24

EPA HAZARDOUS SUBSTANCE? (CLEAN WATER ACT SECT 311) ☐ YES ☒ NO IF SO REPORTABLE QUANTITY: _____ # — 40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Used material must be disposed of in compliance with RCRA regulations as a hazardous waste - #F002.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED
Not a hazardous waste

HAZARDOUS WASTE NUMBER: (IF APPLICABLE) — 40 CFR 261

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

OSHA 29 CFR 1910 "Z list"
ACGIH "Threshold Limit Values . . ." 1984/85.

REGULATORY STANDARDS

D.O.T. CLASSIFICATION: Not Regulated — 49 CFR 173

OSHA Tank Entry Standards 29 CFR 1910.94

GENERAL

1. ACGIH – "Documentation of TLV's". 1984/85
2. Patty's Industrial Hygiene and Toxicology, 3rd Edition.
3. EPA – "Health Assessment Document for 1, 1, 2-Trichloro-1, 2, 2-Trifluoroethane" 1983 #600-8-82-002.
4. AIHA Hygienic Guide, 1968, American Industrial Hygiene Association.

K. ADDITIONAL INFORMATION

Effects of overexposure to trichlorotrifluoroethane:
Inhalation: Animal studies in various species have indicated cardiac arrhythmia at the following concentrations:

Species	(5 minute exposure) Lowest Concentration Causing Arrhythmia (ppm)
Monkey (a)	25,000 - 50,000
Mouse (b)	100,000

Also, in the dog, (c) myocardial depression was seen at 50,000 ppm.

Inhalation, Subacute: Rats @ 2520 ppm 7 hrs. daily, 5 days/wk, 30 days: no apparent effects. @ 5,000 ppm and same exposure time, mild liver effects, prevention of weight gain. See also General Reference, Section J - AIHA Guide.
Effects of overexposure to isohexane: High exposure levels may sensitize the heart muscle, especially under stress or physical exertion (ref 2).

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