

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

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IN CASE OF EMERGENCY: Fort Saskatchewan, Alberta: (780) 998-8282  
Sarnia, Ontario: (519) 339-3711  
Varenes, Quebec: (450) 652-1000

Product:DOWTHERM\* 4000 Heat Transfer Fluid, Dyed

Product Code: 04135

Effective Date: 11/25/03 Date Printed: 06/16/04 MSD: 002572

Dow Chemical Canada Inc.  
P.O. Box 1012, Sarnia, Ontario N7T 7K7

Prepared for use in Canada by the EH&S ProductRegulatory  
Management Department; Phone: (450) 652-1015

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ethylene glycol	CAS# 000107-21-1	>90%
Dipotassium phosphate	CAS# 007758-11-4	<5%
Water	CAS# 007732-18-5	<5%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

\*\*\*\*\*  
 \* Orange liquid. Glycol odor. Harmful or fatal if swallowed. May \*  
 \* cause eye irritation. Slipping hazard. Isolate area. \*  
 \*\*\*\*\*

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: May cause slight eye irritation. Corneal injury is unlikely. Vapor or mist may cause eye irritation.

SKIN: Brief contact is essentially nonirritating to skin. Prolonged contact may cause slight skin irritation with local redness. Repeated contact may cause skin irritation with local redness. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive contact with damaged skin or of material sufficiently hot to burn skin may result in absorption of potentially lethal

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amounts.

**INGESTION:** Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Swallowing may result in severe effects, even death. The lethal dose in adult humans for ethylene glycol is approximately 3 ounces (100 ml) (1/3 cup). May cause nausea or vomiting. May cause abdominal discomfort or diarrhea.

**INHALATION:** At room temperature, exposure to vapor is minimal due to low volatility. With good ventilation, single exposure is not expected to cause adverse effects. If material is heated or areas are poorly ventilated, vapor/mist may accumulate and cause respiratory irritation and symptoms such as headache and nausea.

**SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:** Repeated excessive exposure may cause irritation of the upper respiratory tract. In humans, effects have been reported on the following organs: central nervous system. Observations in humans include: nystagmus (involuntary eye movement). In animals, effects have been reported on the following organs: kidney, liver.

**CANCER INFORMATION:** Ethylene glycol did not cause cancer in long-term animal studies.

**TERATOLOGY (BIRTH DEFECTS):** Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major and possibly only route of exposure to produce birth defects. Exposures by inhalation or skin contact, the primary routes of occupational exposure, had minimal effect on the fetus, in animal studies.

**REPRODUCTIVE EFFECTS:** Ingestion of large amounts of ethylene glycol has been shown to interfere with reproduction in animals.

#### 4. FIRST AID

**EYES:** Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

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SKIN: Immediately flush skin with water while removing contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy contaminated articles including leather items such as shoes.

INGESTION: Do not induce vomiting. Seek medical attention immediately. If person is fully conscious, give 1 cup or 8 oz. (240 ml) of water. If medical advice is delayed and if an adult has swallowed several ounces of chemical, then give 3-4 oz. (1/3-1/2 Cup) (90-120ml) of hard liquor such as 80 proof whiskey. For children, give proportionally less liquor at a dose of 0.3 ounces (1 1/2 tsp) (8 ml) liquor for each 10 pounds of body weight, or 2 ml per kg body weight {e.g. 1.2 ounces (2 1/3 Tbsp) for a 40 lb child or 36 ml for an 18 kg child.}

INHALATION: Move person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: If several ounces of ethylene glycol have been ingested, early administration of ethanol may counter the toxic effects (metabolic acidosis, renal damage). Consider hemodialysis or peritoneal dialysis and thiamine 100 mg + pyridoxine 50mg IV every 6 hours. If ethanol is used, a therapeutically effective blood concentration in the range of 100-150mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion. Consult standard literature for details of treatment. 4-methyl pyrazole (Antizol) (R) is an effective blocker of alcohol dehydrogenase and should be used in the treatment of ethylene glycol, di- or triethylene glycol, ethylene glycol butyl ether, or methanol intoxication if available. Fomepizole protocol (Brent, J et al. New Eng J Med Feb 8, 2001 344:6, p424-9): loading dose 15 mg/kg IV, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, ethylene glycol, diethylene glycol, or triethylene glycol are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, central nervous system depression, renal tubular injury, and possible late stage cranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. In severe poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against

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toxicity when considering emptying the stomach.

#### 5. FIRE FIGHTING MEASURES

##### FLAMMABLE PROPERTIES

FLASH POINT: 232F; 111C (ethylene glycol)  
METHOD USED: TCC  
AUTOIGNITION TEMPERATURE: 748F, 398C (in air)

##### FLAMMABILITY LIMITS

LFL: 3.2 vol. percent in air (ethylene glycol)  
UFL: Not determined

HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: carbon monoxide, carbon dioxide.

OTHER FLAMMABILITY INFORMATION: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Liquid mist of this product can burn. Flammable concentrations of vapor can accumulate at temperatures above flash point, see Section 9.

EXTINGUISHING MEDIA: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. May spread fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of re-ignition has passed. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Immediately withdraw all personnel from area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

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PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with SCBA. If this is not available, wear full chemical resistant clothing with SCBA and fight fire from a remote location. For protective equipment in post-fire or non-fire clean up situations, refer to the relevant sections.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

PROTECT PEOPLE: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Refer to Section 7, Handling for additional precautionary measures. Spilled material may cause a slipping hazard. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls/Personal Protection.

PROTECT THE ENVIRONMENT: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

CLEANUP: Small spills: Absorb with material such as: cat litter, sawdust, vermiculite, Zorb-all(R). Large spills: Dike area to contain spill. Pump into suitable and properly labeled containers. Wash the spill site with water. See Section 13, Disposal Considerations for additional information.

7. HANDLING AND STORAGE

HANDLING: Do not swallow. Avoid contact with eyes. Wash thoroughly after handling. See Section 8, Exposure Controls/Personnel Protection.

Spills of these organic liquids on hot fibrous insulations may lead to lowering of the autoignition temperature possibly resulting in spontaneous combustion.

STORAGE: Store in original unopened container. Store away from incompatible containers. See Reactivity and Stability Section.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

#### PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: Use safety glasses. If exposure causes eye discomfort, use a full-face respirator.

SKIN PROTECTION: When prolonged or frequently repeated contact could occur, use chemically protective clothing resistant to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full body suit will depend on operation. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures. When handling hot material, protect skin from thermal burns as well as from skin absorption.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, use an approved air-purifying respirator.

EXPOSURE GUIDELINES: Ethylene glycol: ACGIH TLV is 100 mg/m<sup>3</sup>, aerosol, vapor, and mist, Ceiling, A4.

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE: Orange liquid  
ODOR: Glycol like  
VAPOR PRESSURE: 2.2 mmHg @ 20C, 68F  
VAPOR DENSITY: >1.0  
BOILING POINT: 330F, 166C  
SOLUBILITY/MISCIBILITY IN WATER: Completely miscible  
SPECIFIC GRAVITY OR DENSITY: 1.10 - 1.15 mmHg @ 77F/77F, 25C

#### 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Thermally stable at recommended temperatures and pressures.

CONDITIONS TO AVOID: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems.

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INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with: strong acids, strong bases, strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to aldehydes, alcohols, ethers.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1)

SKIN: The LD50 for skin absorption in rabbits for similar material is >2000 mg/kg.

INGESTION: The oral LD50 for rats for a similar material is 8200 mg/kg.

MUTAGENICITY: For the major component, in vitro mutagenicity studies were negative. Animal mutagenicity studies were negative.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: Based largely or completely on information for ethylene glycol. Bioconcentration potential is low (BCF less than 100 or Log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50). Measured log octanol/water partition coefficient (log Pow) is -1.36. Soil organic carbon/water partition coefficient (Koc) is estimated to be 1.

DEGRADATION & TRANSFORMATION: Based largely or completely on information for ethylene glycol. Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Biodegradation reached in Modified OECD Screening Test (OECD Test No. 301 E) after 28 days: >90%. Biodegradation reached in Manometric Respiratory Test (OECD Test No. 301 F) after 28 days: >94%. The 20-Day Biochemical Oxygen Demand (BOD20) is 89.1%.

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ECOTOXICITY:      Based largely or completely on information for ethylene glycol. Material is practically non-toxic to aquatic organisms on an acute basis (LC50 or EC50 >100 mg/L in the most sensitive species tested). Growth inhibition EC50 in green alga *Selenastrum capricornutum* is  $\geq$ 9500 mg/L.  
Acute LC50 in water flea *Ceriodaphnia dubia* is >10,000 mg/L.  
Acute LC50 in rainbow trout (*Oncorhynchus mykiss*) is  $\geq$ 18,000 mg/L.  
Acute LC50 in bluegill (*Lepomis macrochirus*) is 27,540 mg/kg.  
Acute LC50 in water flea *Daphnia magna* is >46,300 mg/L.  
Acute LC50 in fathead minnow (*Pimephales promelas*) is 51,000 mg/L.

### 13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

### 14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): For D.O.T. regulatory information, if required, consult transportation regulations, product shipping papers or contact your Dow representative.

CANADIAN TDG INFORMATION: For TDG regulatory information, if

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required, consult transportation regulations, product shipping papers or contact your Dow representative.

15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

U.S. REGULATIONS

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SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
ETHYLENE GLYCOL	000107-21-1	91 -93 %

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SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard  
A delayed health hazard

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TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

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## REGULATORY INFORMATION (CONTINUED)

The CAS number(s) for TSCA is(are):

CAS# 000107-21-1

CAS# 007758-11-4

CAS# 007732-18-5

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STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
ETHYLENE GLYCOL	000107-21-1	PA1 PA3

PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

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## OSHA HAZARD COMMUNICATION STANDARD:

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

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## COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND):

This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Category:

Chemical Name	CAS#	RQ	% in Product
Ethylene glycol	000107-21-1	5000	91-93%

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## CANADIAN REGULATIONS

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WHMIS INFORMATION: The Canadian Workplace Hazardous Materials

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## REGULATORY INFORMATION (CONTINUED)

Information System (WHMIS) Classification for this product is:

D2A - material is teratogenic, embryotoxic, or fetotoxic  
Refer elsewhere in the MSDS for specific warnings and  
safe handling information. Refer to the employer's  
workplace education program.

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CPR STATEMENT: This product has been classified in accordance with the  
hazard criteria of the Canadian Controlled Products Regulations (CPR)  
and the MSDS contains all the information required by the CPR.

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HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following  
ingredients which are Controlled Products and/or on the Ingredient  
Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS:	CAS #	AMOUNT (%w/w)
ETHYLENE GLYCOL	000107-21-1	>90%

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## CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

This product contains one or more substances which are not listed on  
the Canadian Domestic Substances List (DSL). Contact your Dow  
representative for more information.

## 16. OTHER INFORMATION

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	1
Flammability	1
Reactivity	0

MSDS STATUS: Revised Section 8.

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The Information Herein Is Given In Good Faith, But No Warranty,  
Express Or Implied, Is Made. Consult The Dow Chemical Company  
For Further Information.