

Material Safety Data Sheet

DOWFROST Propylene Glycol

Product Name: DOWFROST Heat Transfer Fluid

Material Safety Data Sheet

Manufacturer: The Dow Chemical Company

24 Hour Emergency Phone: 989-636-4400

THE DOW CHEMICAL COMPANY

MATERIAL SAFETY DATA SHEET

Product Name: DOWFROST* Heat Transfer * or ® Indicates a Trademark of The Dow Chemical Company. Dow (hereinafter, and for purposes of this MSDS only, refers to The Dow Chemical Company and to Dow Chemical Canada Inc.) encourages and expects you to read and understand the entire MSDS, as there is important information throughout the document. Dow expects you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 IDENTIFICATION

Product Name DOWFROST* Heat Transfer Fluid

1.2 COMPANY IDENTIFICATION

The Dow Chemical Company

Midland, MI 48674

1.3 EMERGENCY TELEPHONE NUMBER

24-HOUR EMERGENCY TELEPHONE NUMBER: (989)636-4400.

Customer Information Number: 1-800-258-2436.

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2. COMPOSITION INFORMATION

Component CAS # Amount (%W/W)

Propylene glycol 57-55-6 > 95 %

Demineralized water 7732-18-5 < 5%

Dipotassium hydrogen phosphate 7758-11-4 < 5%

3. HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Appearance Colorless

Physical

State
Liquid
Odor Mild
Hazards of
product

NO SIGNIFICANT IMMEDIATE HAZARDS FOR EMERGENCY RESPONSE ARE KNOWN.

3.2 POTENTIAL HEALTH EFFECTS

Effects of Single Acute Overexposure

Inhalation At room temperature, exposure to vapor is minimal due to low volatility. Mist may cause irritation of upper respiratory tract (nose and throat).

Eye Contact May cause slight temporary eye irritation. Corneal injury is unlikely.

Skin Contact Prolonged contact is essentially nonirritating to skin. Repeated contact may cause flaking and softening of skin.

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Skin Absorption Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Swallowing Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

Chronic, Prolonged or Repeated Overexposure

Effects of Repeated Overexposure In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

Other Effects of Overexposure No information currently available.

See Section 11 for toxicological information and additional information about potential health effects.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

See Section 12 for Ecological Information.

4. FIRST AID PROCEDURES

4.1 INHALATION

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

4.2 EYE CONTACT

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

4.3 SKIN CONTACT

Wash skin with plenty of water.

4.4 SWALLOWING

No emergency medical treatment necessary.

4.5 NOTES TO PHYSICIAN

No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

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5. FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES - REFER TO SECTION 9, PHYSICAL AND CHEMICAL PROPERTIES

5.2 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.

5.3 FIRE FIGHTING PROCEDURES

Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. 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.

5.4 SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

5.5 UNUSUAL FIRE AND EXPLOSION HAZARDS

Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Liquid mist of

this product can burn. Flammable concentrations of vapor can accumulate at temperatures above flash point; see

Section 9.

5.6 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.

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6. ACCIDENTAL RELEASE MEASURES

Steps to be Taken if Material is Released or Spilled: Small spills: Absorb with materials such as: Cat litter. Sawdust. Vermiculite. Zorb-all®. Collect in suitable and properly labeled containers. Large spills: Dike area to contain spill. Recover spilled material if possible. See Section 13, Disposal Considerations, for additional information. Personal Precautions: Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/ or groundwater. See Section 12, Ecological Information.

7. HANDLING AND STORAGE

7.1 HANDLING

General Handling. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION. Ventilation Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Other Precautions Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

7.2 STORAGE

Store below: 121°C (250°F). Do not store in: galvanized steel.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1 EXPOSURE LIMITS

Component Exposure Limits Skin. Form
Propylene glycol 10 mg/m³ TWA8 AIHA WEEL

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In the Exposure Limits Chart above, if there is no specific qualifier (i.e., Aerosol) listed in the

Form Column for a particular limit, the listed limit includes all airborne forms of the substance that can be inhaled. A "Yes" in the Skin Column indicates a potential significant contribution to overall exposure by the cutaneous (skin) route, including mucous membranes and the eyes, either by contact with vapors or by direct skin contact with the substance. A "Blank" in the Skin Column indicates that exposure by the cutaneous (skin) route is not a potential significant contributor to overall exposure.

8.2 PERSONAL PROTECTION

Respiratory Protection:

Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. In dusty or misty atmospheres, use an approved particulate respirator. Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Eye Protection: Use safety glasses. Other Protective Equipment: No precautions other than clean body-covering clothing should be needed. Use gloves chemically resistant to this material.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Appearance: Colorless

Odor: Mild

Flash Point - Closed Cup: 102 °C 216 °F *Tag Closed Cup ASTM D 56* (Propylene glycol)

Flammable Limits In Air:

Lower 2.6 %(V) 100 °C (Propylene glycol)

Upper 12.5 %(V) 130 °C (Propylene glycol)

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Autoignition Temperature: 416 °C 780 °F

Vapor Pressure: 0.7 mmHg 20 °C

Boiling Point (760 mmHg): 162 °C 323 °F

Vapor Density (air = 1): 2.6

Specific Gravity (H₂O = 1): 1.05 20 °C / 20 °C

Freezing Point: <= -51 °C <= -60 °F

Melting Point: *Not applicable (for liquids)*

Solubility in Water (by weight): 100 % 20 °C

pH: 9 - 11 (5% solution in water)

Evaporation Rate (Butyl Acetate = 1): 0.07

Percent Volatiles: 98 Wt%

10. STABILITY AND REACTIVITY

10.1 STABILITY/INSTABILITY

Thermally stable at recommended temperatures and pressures. Conditions to Avoid: Product can oxidize at elevated temperatures. Generation of gas during

decomposition can cause pressure in closed systems. Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers. Thermal Decomposition: Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Alcohols. Ethers.

10.2 HAZARDOUS POLYMERIZATION Will not occur.

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11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Peroral

Rat; female; LD50 = 20300 mg/kg

Percutaneous

Based on information for a similar material:

Rabbit; LD50 = > 10000 mg/kg

DEVELOPMENTAL TOXICITY

Contains component(s) which did not cause birth defects or any other fetal effects in lab animals., The component(s) is/are:, Propylene glycol.

REPRODUCTIVE TOXICITY

Contains component(s) which did not interfere with reproduction in animal studies.,

Contains component(s) which did not interfere with fertility in animal studies., The component(s) is/are:,

Propylene glycol.

CHRONIC TOXICITY AND CARCINOGENICITY

Similar formulations did not cause cancer in laboratory animals.

GENETIC TOXICOLOGY

In Vitro

In vitro genetic toxicity studies were negative.

In Vivo

Genetic toxicity studies in animals were negative for component(s) tested.

SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMANS

In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

12. ECOLOGICAL INFORMATION

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Product Name: DOWFROST* Heat Transfer

12.1 ENVIRONMENTAL FATE

Based largely or completely on information for: Propylene glycol. Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Degradation is expected in the atmospheric environment within minutes to hours.

12.2 ECOTOXICITY

Based largely or completely on information for:, Propylene glycol., Material is practically nontoxic to aquatic organisms on an acute basis (LC50/EC50 >100 mg/L in the most sensitive species tested).

12.3 FURTHER INFORMATION

Based largely or completely on information for: Propylene glycol. Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Potential for mobility in soil is very high (Koc between 0 and 50).

13. DISPOSAL CONSIDERATIONS

13.1 DISPOSAL

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DOW HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 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 Group at 1-800- 258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details .

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14. TRANSPORT INFORMATION

14.1 U.S. D.O.T.

NON-BULK

Proper Shipping Name : NOT REGULATED

BULK

Proper Shipping Name : NOT REGULATED

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

15.1 FEDERAL/NATIONAL

OSHA HAZARD COMMUNICATION STANDARD

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III

(EMERGENCY PLANNING AND

COMMUNITY RIGHT-TO-KNOW ACT OF 1986) SECTION 313

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III

(EMERGENCY PLANNING AND

COMMUNITY RIGHT-TO-KNOW ACT OF 1986) SECTION 302

To the best of our knowledge this product does not contain chemicals at levels which

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require reporting under this statute.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III

(EMERGENCY PLANNING AND

COMMUNITY RIGHT-TO-KNOW ACT OF 1986) SECTIONS 311 AND 312

Delayed (Chronic) Health Hazard : No

Fire Hazard : No

Immediate (Acute) Health Hazard : No

Reactive Hazard : No

Sudden Release of Pressure Hazard : No

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory

requirements under 40 CFR 720.30.

CEPA - DOMESTIC SUBSTANCES LIST (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List

(DSL) or are not required to be listed.

EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS)

The components of this product are on the EINECS inventory or are exempt from EINECS inventory requirements.

15.2 STATE/LOCAL PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT): PENNSYLVANIA HAZARDOUS SUBSTANCES

LIST AND/OR PENNSYLVANIA ENVIRONMENTAL HAZARDOUS SUBSTANCE LIST:

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component CAS # Amount

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Propylene glycol 57-55-6 96.0000 %

**PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT): PENNSYLVANIA
SPECIAL HAZARDOUS**

SUBSTANCES LIST:

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute. CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986) This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

CALIFORNIA SCAQMD RULE 443.1 (SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
RULE 443.1,

LABELING OF MATERIALS CONTAINING ORGANIC SOLVENTS)

VOC: Vapor pressure 0.66 mmHg @ 20° C

1002 g/l VOC

1030 g/l less water and less exempted solvents

This section provides selected regulatory information on this product including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.

16. OTHER INFORMATION

16.1 ADDITIONAL INFORMATION

Additional information on this and other Dow products may be obtained by visiting our web page at www.dow.com. Additional information on this product may be obtained by calling Dow's Customer Information

Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada).

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16.2 HAZARD RATING SYSTEM

NFPA ratings for this product are: H - 0 F - 1 R - 0

These ratings are part of a specific hazard communication program and should be disregarded where individuals are not trained in the use of this hazard rating system. You should be familiar with the hazard communication programs applicable to your workplace.

16.3 RECOMMENDED USES AND RESTRICTIONS

Intended as a heat transfer fluid for closed-loop systems.

Dow recommends that you use this product in a manner consistent with the listed use. If your intended use is not consistent with Dow's stated use, please contact Dow's Customer Information Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada) for more information.

16.4 REVISION

Version: 5.0

Revision: 05/27/2004

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

16.5 LEGEND

Bacterial/NA Non Acclimated Bacteria
F Fire
H Health
IHG Industrial Hygiene Guideline
N/A Not available
NFPA National Fire Protection Association
O Oxidizer
R Reactivity
TS Trade secret
VOL/VOL Volume/Volume
W Water Reactive
W/W Weight/Weight

NOTICE: Dow urges each customer or recipient of this MSDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data

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Product Name: DOWFROST* Heat Transfer *contained in this MSDS and any hazards associated with the product. The information herein is provided in good faith and believed to*

be accurate as of the effective date shown above. However, no warranty, express or implied, is given., Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that its activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of Dow, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product., Due to the proliferation of sources for information such as manufacturer-specific MSDSs, Dow is not and cannot be responsible for MSDSs obtained from any source other than Dow. If you have obtained a Dow MSDS from a non-Dow source or if you are not sure that a Dow MSDS is current, please contact Dow for the most current version.