



Material Safety Data Sheet

The Dow Chemical Company

Product Name: DOWFROST* Heat Transfer Fluid

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The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

DOWFROST* Heat Transfer Fluid

COMPANY IDENTIFICATION

The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
United States

Customer Information Number:

800-258-2436

SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact:

989-636-4400

Local Emergency Contact:

989-636-4400

2. Hazards Identification

Emergency Overview

Color: Colorless

Physical State: Liquid.

Odor: Characteristic

Hazards of product:

No significant immediate hazards for emergency response are known.

OSHA Hazard Communication Standard

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

Potential Health Effects

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.

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

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

®(TM)*Trademark

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

Aspiration hazard: Based on physical properties, not likely to be an aspiration hazard.

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

3. Composition Information

Component	CAS #	Amount
Propylene glycol	57-55-6	> 95.0 %
Dipotassium hydrogen phosphate	7758-11-4	< 3.0 %
Water	7732-18-5	< 3.0 %

4. First-aid measures

Description of first aid measures

General advice: If potential for exposure exists refer to Section 8 for specific personal protective equipment.

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

Skin Contact: Wash skin with plenty of water.

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

Ingestion: No emergency medical treatment necessary.

Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed

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

5. Fire Fighting Measures

Suitable extinguishing media

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Extinguishing Media to Avoid: Do not use direct water stream. May spread fire.

Special hazards arising from the substance or mixture

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

Unusual Fire and Explosion Hazards: 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.

Advice for firefighters

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.

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

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: 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.

Methods and materials for containment and cleaning up: 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.

7. Handling and Storage

Handling

General Handling: No special precautions required. Keep container closed. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Other Precautions: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage

Do not store in: Galvanized steel. Opened or unlabeled containers. Store in original unopened container. See Section 10 for more specific information. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Propylene glycol	WEEL	TWA Aerosol.	10 mg/m ³

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields).

Skin Protection: Wear clean, body-covering clothing.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Polyvinyl chloride ("PVC" or "vinyl"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance	
Physical State	Liquid.
Color	Colorless
Odor	Characteristic
Odor Threshold	No test data available
pH	10.0 (@ 50 %) <i>Literature</i>
Melting Point	Not applicable to liquids
Freezing Point	supercools
Boiling Point (760 mmHg)	152 °C (306 °F) <i>Literature</i> .
Flash Point - Closed Cup	104 °C (219 °F) <i>Pensky-Martens Closed Cup ASTM D 93</i> (based on major component), Propylene glycol.
Evaporation Rate (Butyl Acetate = 1)	<0.5 <i>Estimated</i> .
Flammability (solid, gas)	Not applicable to liquids
Flammable Limits In Air	Lower: 2.6 %(V) <i>Literature</i> Propylene glycol. Upper: 12.5 %(V) <i>Literature</i> Propylene glycol.
Vapor Pressure	2.2 mmHg <i>Literature</i>
Vapor Density (air = 1)	>1.0 <i>Literature</i>
Specific Gravity (H₂O = 1)	1.05 20 °C/20 °C <i>Literature</i>
Solubility in water (by weight)	100 % <i>Literature</i>
Partition coefficient, n-octanol/water (log Pow)	No test data available
Autoignition Temperature	371 °C (700 °F) <i>Literature</i> Propylene glycol.
Decomposition Temperature	No test data available
Kinematic Viscosity	43.4 cSt @ 20 °C <i>Literature</i>
Molecular Weight	76.9 g/mol <i>Literature</i>

10. Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Stable under recommended storage conditions. See Storage, Section 7. Hygroscopic.

Possibility of hazardous reactions

Polymerization will not occur.

Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose.

Generation of gas during decomposition can cause pressure in closed systems. Avoid direct sunlight or ultraviolet sources.

Incompatible 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. Organic acids.

11. Toxicological Information

Acute Toxicity

Ingestion

For the major component(s): Propylene glycol. LD50, rat > 20,000 mg/kg

Dermal

For the major component(s): Propylene glycol. LD50, rabbit > 20,000 mg/kg

Inhalation

For the major component(s): No deaths occurred following exposure to a saturated atmosphere. LC50, 4 h, Vapor, rat 6.15 mg/l

Eye damage/eye irritation

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

Skin corrosion/irritation

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

Sensitization

Skin

For the major component(s): Did not cause allergic skin reactions when tested in humans.

Respiratory

No relevant data found.

Repeated Dose Toxicity

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

Chronic Toxicity and Carcinogenicity

Similar formulations did not cause cancer in laboratory animals.

Developmental Toxicity

For the major component(s): Did not cause birth defects or any other fetal effects in laboratory animals.

Reproductive Toxicity

For the major component(s): In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

Genetic Toxicology

In vitro genetic toxicity studies were negative. For the major component(s): Animal genetic toxicity studies were negative.

12. Ecological Information

Toxicity

Data for Component: **Propylene glycol**

|| Material is practically non-toxic to aquatic organisms on an acute basis
|| (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

|| LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 h: 40,613 mg/l

Aquatic Invertebrate Acute Toxicity

|| LC50, Ceriodaphnia Dubia (water flea), static test, 48 h: 18,340 mg/l

Aquatic Plant Toxicity

|| ErC50, Pseudokirchneriella subcapitata (green algae), Growth rate inhibition, 96 h: 19,000 mg/l

Toxicity to Micro-organisms

|| NOEC, no data available; Pseudomonas putida, 18 h: > 20,000 mg/l

Aquatic Invertebrates Chronic Toxicity Value

|| Ceriodaphnia Dubia (water flea), semi-static test, 7 d, number of offspring, NOEC: 13020 mg/l

Data for Component: **Dipotassium hydrogen phosphate**

|| Material is practically non-toxic to aquatic organisms on an acute basis
 || (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity

|| LC50, Leuciscus idus (Golden orfe), static test, 48 h: > 900 mg/l

Data for Component: **Water**

|| Not expected to be acutely toxic to aquatic organisms.

Persistence and DegradabilityData for Component: **Propylene glycol**

|| Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.
 || Biodegradation may occur under anaerobic conditions (in the absence of oxygen).

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
81 %	28 d	OECD 301F Test	pass
96 %	64 d	OECD 306 Test	Not applicable

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
1.28E-11 cm ³ /s	10 h	Estimated.

Biological oxygen demand (BOD):

BOD 5	BOD 10	BOD 20	BOD 28
69.0 %	70.0 %	86.0 %	

|| **Chemical Oxygen Demand:** 1.53 mg/mg

|| **Theoretical Oxygen Demand:** 1.68 mg/mg

Data for Component: **Dipotassium hydrogen phosphate**

|| Biodegradation is not applicable.

Data for Component: **Water**

|| Biodegradation is not applicable.

Bioaccumulative potentialData for Component: **Propylene glycol**

|| **Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

|| **Partition coefficient, n-octanol/water (log Pow):** -1.07 Measured

|| **Bioconcentration Factor (BCF):** 0.09; Estimated.

Data for Component: **Dipotassium hydrogen phosphate**

|| **Bioaccumulation:** No bioconcentration is expected because of the relatively high water solubility.

Data for Component: **Water**

|| **Bioaccumulation:** Partitioning from water to n-octanol is not applicable.

Mobility in soilData for Component: **Propylene glycol**

|| **Mobility in soil:** Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process., Potential for mobility in soil is very high (Koc between 0 and 50).

|| **Partition coefficient, soil organic carbon/water (Koc):** < 1 Estimated.

|| **Henry's Law Constant (H):** 1.2E-08 atm*m³/mole Measured

Data for Component: **Dipotassium hydrogen phosphate**

|| **Mobility in soil:** No relevant data found.

Data for Component: **Water**

|| **Mobility in soil:** No relevant data found.

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Recycler. Reclaimer. Incinerator or other thermal destruction device.

14. Transport Information

DOT Non-Bulk
NOT REGULATED

DOT Bulk
NOT REGULATED

IMDG
NOT REGULATED

ICAO/IATA
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

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) Sections 311 and 312

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

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

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

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
Propylene glycol	57-55-6	> 95.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

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

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

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.

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	0	0	0

Recommended Uses and Restrictions

Identified uses

Intended as a heat transfer fluid for closed-loop systems. This product is acceptable for use where there is possibility of incidental food contact and as a product for use in the immersion or spray freezing of wrapped meat and packaged poultry products. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

Revision

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

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no

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