Product Safety Assessment

Propylene Glycol-Based Low Temperature Thermal Fluids

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Names

- CAS No. 57-55-6
- AMBITROL™ NTC coolant, dyed
- AMBITROL™ NTC coolant, no dye
- AMBITROL™ NTF 30 coolant, dyed
- AMBITROL™ NTF 40 coolant, dyed
- AMBITROL™ NTF 50 coolant, dyed
- DOWCAL™ 200 Heat Transfer Fluid
- DOWCAL™ 20G fluids
- DOWCAL™ N fluids
- DOWFROST™ GEO 20
- DOWFROST™ HD HTF, dyed family of fluids
- DOWFROST™ HTF family of fluids
- DOWFROST™ RV plumbing antifreeze
- NORKOOL™ LTC family of fluids

Product Overview

- Propylene glycol-based low temperature transfer fluids (PG-based LTTFs) are mixtures of propylene glycol with water, corrosion and scale inhibitors, and dyes. They are much less toxic than heat transfer fluids based on ethylene glycol and can depress freezing points to as low as –60°F (–51°C). They are marketed by Dow under the trade names AMBITROL™ coolants, DOWCAL™ fluids, DOWFROST™ fluids, and NORKOOL™ coolants. See Product Description.
- These products are widely used for secondary cooling and heating applications, for freeze and burst protection of pipes, and for various defrosting, and dehumidifying applications.
- These products have very low toxicity. They are essentially nonirritating to the skin and mildly irritating to the eyes. They are not skin sensitizers or carcinogens. See Health Information.
- Occupational and consumer exposure is possible because the products are used in a variety of heating and cooling operations. See Exposure Potential.
- These products are not expected to bioaccumulate and they are not acutely toxic to aquatic organisms, except at very high concentrations. They degrade readily in the environment. They are not volatile and are miscible with water. See Environmental Information.

Manufacture of Product

- Capacity – Dow is the world’s largest producer of propylene glycols, with about 35% of the world’s capacity. Dow has production facilities in the United States, Germany, Brazil, and Australia. Total world consumption of propylene glycol in 2003 was estimated at 2.6 billion pounds (1.2 million metric tons). Two
- Process – Most commercial production of propylene glycol is by noncatalytic hydrolysis of propylene oxide using high temperature and high pressure. These products are formulated

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with propylene glycol as the main ingredient. Water, corrosion and scale inhibitors, and dyes are added to provide the desired combination of properties for the end use of the product.

**Product Description**

Propylene glycol is a colorless, odorless liquid. It is soluble to some extent in a wide range of organic materials and is completely soluble in water. Propylene glycol-based low temperature transfer fluids (PG-based LTTFs) are mixtures of propylene glycol with water, corrosion and scale inhibitors, and dyes. They are much less toxic than heat transfer fluids based on ethylene glycol and therefore are favored for many applications, particularly when human exposure can occur. Depending on the concentration of propylene glycol in the product, these products can depress freezing points to as low as −60°F (−51°C). They are marketed by Dow under the trade names AMBITROL™ coolants, DOWCAL™ fluids, DOWFROST™ fluids, and NORKOOL™ coolants. The AMBITROL, DOWCAL and NORKOOL family of products also include products that are based on ethylene glycol. Thus, the information included in this Product Safety Assessment is for DOWCAL, NORKOOL or AMBITROL fluids that are propylene glycol based. Many of the products include both dyed and un-dyed versions of the product. The PG-based heat transfer fluids are dyed for leak detection. Dyed products can be either blue or yellow dependent on the family of the product.

Only DOWCAL 10, DOWFROST, DOWFROST RV and DOWCAL N are approved for “food grade” applications. AMBITROL NTC / NTF, DOWCAL 20G, DOWFROST HD and NORKOOL LTC family of fluids are not approved for “food grade” applications.

**Product Uses**

These are high performance products widely used for secondary heating and cooling of pipelines, engines, vaporizers, and compressors; freeze and burst protection of pipes; corrosion protection and various deicing, defrosting, and dehumidifying applications. Industries that commonly use these products include food and beverage, pharmaceutical, oil and gas processing, chemical processing, and heating/ventilation/air conditioning (HVAC). The pie chart shows the applications in which Dow products are commonly used.

**Exposure Potential**

These products are used in the production of consumer and industrial products. Based on the uses for these products, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in a production or formulating facility or in the various industrial, commercial service, or consumer settings that use these products. Because propylene glycol is not acutely toxic and is not a sensitizer, incidental exposure does not pose significant health risks. However, each manufacturing, commercial service, and consumer facility should have appropriate work processes, safety equipment, and

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policies in place to limit unnecessary propylene glycol exposure. Skin exposure is the most likely exposure route for propylene glycol in the work place. However in commercial service and consumer settings, use as a functional fluid may present a potential for inhalation exposure as well. For more information on inhalation, see Health Information.

- **Consumer exposure to PG-based LTTF products** – These materials are used in many manufacturing and processing applications. They are also used in many home heating and cooling systems like ground source heat pumps, snow melt systems, radiant floor heating, hydronic (hot water) heating systems, so consumers may have contact with these products. Please review product labels and follow all instructions and guidelines for proper use to help prevent unnecessary exposure. See Health Information.

- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent contamination of soil, surface, or ground water. If these products do reach nearby soil and water, they are considered practically nontoxic to aquatic organisms, and they biodegrade rapidly. If propylene glycol is present in a fire situation, it can produce toxic fumes. Proper protective equipment should be worn. See Environmental, Health, and Physical Hazard Information.

- **Large release** – Industrial spills or releases are infrequent and are generally contained. If a large spill does occur, the material should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. If these products are exposed to a fire, they can decompose and release toxic fumes. Emergency personnel should wear proper protective equipment and follow emergency procedures carefully. When relevant in scale or risk, the community should be notified of the hazards associated with the specific release event. See Environmental, Health, and Physical Hazard Information.

For more information, see the Safety Data Sheet.

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**Health Information**

Prolonged contact with propylene glycol is essentially nonirritating to the skin. Undiluted propylene glycol is slightly irritating to the eye and can produce slight, temporary conjunctivitis. Inhalation of propylene glycol vapors is not a hazard in ordinary applications. However, exposure to mists may cause eye irritation as well as upper respiratory tract irritation for some people. Therefore, exposure to mists of these materials should be avoided. In general, Dow does not support or recommend the use of propylene glycol in applications where inhalation exposure or eye contact with the spray mists of these materials is likely, such as fogs for theatrical productions or antifreeze solutions for emergency eye wash stations. Propylene glycol does not cause sensitization and shows no evidence of being a carcinogen or of being genotoxic.

Toxicology information for propylene glycol has been reviewed and agreed upon by the Organization for Economic Cooperation and Development (OECD) SIAM process. The oral toxicity of propylene glycol is low and, as a result, propylene glycol is generally recognized as safe (GRAS) for use as a direct food additive. It has long been included in New and Non-Official Remedies as a proper ingredient for pharmaceutical products, and it is listed in the United States Pharmacopoeia.

For more information, see the Safety Data Sheet.

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Environmental Information
Concentrations of propylene glycol in the air are expected to be extremely low because of its low vapor pressure. It biodegrades readily in water or soil by both aerobic and anaerobic mechanisms. Propylene glycol is not expected to bioaccumulate and is practically nontoxic to fish and aquatic invertebrates on an acute basis. If a spill should occur, propylene glycol partitions predominantly to water.

For more information, see the Safety Data Sheet.

Physical Hazard Information
These products are stable under normal storage and use conditions, but can decompose at high temperatures. During a fire, smoke may contain hazardous combustion products such as aldehydes, alcohols, ethers, and carbon monoxide.

As with any liquid, spills can create slip hazards.

These products should not be stored in direct sunlight or at elevated temperatures. Avoid contact with oxidizing materials, strong bases, and strong acids.

For more information, see the Safety Data Sheet.

Regulatory Information
Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of these products. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet, Technical Data Sheet, or Contact Us.

Additional Information
- Safety Data Sheet (http://www.dow.com/webapps/msds/msdssearch.aspx)
- Contact Us (www.dow.com/heattrans/contact/)
- SIDS Initial Assessment Profile, 1,2-Dihydroxypropane (CAS No. 57-55-6), UNEP Publications, SIAM 11, USA, January 2001 (http://www.chem.unep.ch/irptc/sids/OECDSIDS/57-55-6.pdf)
- Product Line Overview: NORKOOL™ and AMBITROL™ Industrial Coolants, The Dow Chemical Company, Form No. 180-01486-0905 AMS (www.dow.com/heattrans/literature/ or request from www.dow.com/heattrans/contact/)

References

5. DOWTHERM™, DOWFROST™, AMBITROL™ Heat Transfer Fluids Product Information, The Dow Chemical Company, Form No. 180-01397-1099QRP
7. Estimates by The Dow Chemical Company.
9. DOWFROST RV Inhibited Propylene Glycol Fluid, Material Safety Data Sheet, The Dow Chemical Company
10. Propylene Glycol Industrial Grade, Material Safety Data Sheet, The Dow Chemical Company
11. SIAM stands for the SIDS (Screening Information Data Set) Initial Assessment Meeting.
NOTICES:

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