Product Safety Assessment

Dipropylene Glycol


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Names
• CAS No. 25265-71-8 (Isomer mixture)
• Dipropylene glycol (DPG)
• Oxybispropanol
• Di-1,2-propyleneglycol

Product Overview
• Dipropylene glycol is a colorless, practically odorless liquid with a medium viscosity. It is completely soluble in water and is hygroscopic (attracts water from the atmosphere). The Dow Chemical Company manufactures and markets two grades of dipropylene glycol: regular grade and a high-purity, low-odor product called Dipropylene Glycol LO+.1 For further details, see Product Description.
• Dipropylene glycol is used in the production of polyester resins, polyurethanes, and plasticizers. It is also used as a solvent, humectant, and coupling agent. Dipropylene glycol LO+ is a solvent for many fragrance and cosmetic/personal-care items, such as perfumes, skincare products, deodorants, haircare products, and many others.2,3 For further details, see Product Uses.
• Occupational exposure to dipropylene glycol can occur at a production facility or at facilities that use this product. Consumer contact is possible through the use of cosmetic and personal-care products that contain dipropylene glycol, such as perfumes, haircare products, and deodorants. Consumers might also come into contact with other products containing dipropylene glycol, such as brake fluids.4 For further details, see Exposure Potential.
• Eye contact with dipropylene glycol may cause slight, temporary irritation. Prolonged skin contact is not likely to cause irritation. Dipropylene glycol is not likely to be absorbed through the skin in harmful amounts.5 For further details, see Health Information.
• Dipropylene glycol is readily biodegradable, unlikely to accumulate in the food chain, and is practically nontoxic to fish and other aquatic organisms; it is not considered to be either PBT or vPvB.6 For further details, see Environmental Information.
• Dipropylene glycol is stable under recommended storage and use conditions. Contact with strong acids, strong bases, or strong oxidizers, as well as exposure to direct sunlight or ultraviolet sources, should be avoided.7 For further details, see Physical Hazard Information.

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Manufacture of Product
- **Capacity** – In 2010, U.S. consumption of dipropylene glycol was 36,000 metric tonnes (79 million pounds). The Dow Chemical Company and its global affiliates have production sites in Freeport, Texas and Plaquemine, Louisiana, USA; Altona, Australia; Aratu, Brazil; Stade, Germany; and Map Ta Phut, Thailand.
- **Process** – Dipropylene glycol is a co-product from the manufacture of monopropylene glycol. Water is added to propylene oxide, a petroleum-based raw material, at high temperature and pressure. The reaction product is a blend of approximately 90% (mono-) propylene glycol and 10% a mixture of dipropylene glycol, tripropylene glycol, and higher glycols. The reaction product is passed through purifying equipment (distillation) to remove excess water, and then the glycols are separated by distillation. The two-step chemical reaction is as follows.

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Product Description
Dipropylene glycol is a colorless, practically odorless liquid with medium viscosity. It has low volatility, is completely soluble in water, and is hygroscopic (attracts water from the atmosphere). A distinguishing feature of dipropylene glycol (compared to other glycols) is its broader range of solvency. For example, its ability to solubilize oil — such as castor oil — makes dipropylene glycol useful for a broad range of applications.

The commercial dipropylene glycol substance (CAS No. 25265-71-8; mixed isomers) occurs as a mixture of three different isomers, each of which has the same chemical formula with atoms connected differently in the dipropylene glycol molecule. These component isomers are identified as follows:
- CAS No. 110-98-5: 1,1′-oxybis-2-propanol (2,2′-dihydroxydipropylether)
- CAS No. 108-61-2: 2,2′-oxybis-1-propanol (2,2′-dihydroxydiisopropylether)
- CAS No. 106-62-7: 2-(2-hydroxypropoxy)-1-propanol (2-hydroxypropyl-2′-hydroxyisopropylether)

Dow manufactures two dipropylene glycol grades: regular grade and a high-purity, low-odor product, Dipropylene Glycol LO+.

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Product Uses
The main commercial uses for regular grade dipropylene glycol are:
- Chemical intermediate in the manufacture of high-performance, unsaturated polyester resins, polyurethanes, and plasticizers
- Hydraulic brake-fluid formulations
- Cutting-oil formulations
- Textile lubricants
- Coatings, paints
- Industrial soaps
- Solvents for agricultural chemicals, insecticides, and inks
- Latex paint formulations, for freeze/thaw protection

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Examples of materials formulated using Dipropylene Glycol LO+ include:

- Fragrances, perfumes, and colognes
- Skincare products (creams, lotions, suncare products)
- Deodorants/antiperspirants (roll-on, stick deodorants)
- Haircare products (shampoos, conditioners, styling and coloring products)
- Shaving products
- Bath and shower products

Dow does not support the use of regular grade dipropylene glycol in high-purity applications.

**Exposure Potential**

Dipropylene glycol is used in the production of industrial and consumer products. Based on the uses for dipropylene glycol, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in facilities that manufacture dipropylene glycol or in facilities that use this product. Those working with dipropylene glycol in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Each manufacturing facility should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit exposure. See Health Information.

- **Consumer exposure to products containing dipropylene glycol** – Dipropylene glycol is not sold in pure form for direct consumer use, but is used in the formulation of many personal care products used by the general public. Propylene glycols have been evaluated by the Cosmetic Ingredient Review (CIR) Expert Panel and deemed safe as cosmetic ingredients. Always read and follow product label instructions before use. See Health Information.

- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. For small spills, dipropylene glycol should be absorbed with any suitable adsorbent. Dipropylene glycol has a low vapor pressure and very little will evaporate to the air. However, because it is highly soluble in water and unlikely to bind to soil or sediment, once dipropylene glycol is introduced to water, the substance will tend to remain dissolved in water. Because dipropylene glycol is readily biodegradable, it will be efficiently removed in wastewater-treatment facilities, and will be ultimately destroyed by bacteria present in soil, surface waters, and sediments. See Environmental, Health, and Physical Hazard Information.

- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, dike the area to contain the spill. Keep spilled material out of sewers and open bodies of water. Dipropylene glycol should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. Respiratory protection is recommended for cleaning up spills and leaks, especially if the material is hot. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Deny any unnecessary entry into the area and consider the use of unmanned hose holders. If possible, fight the fire from a protected location. Use water spray or fog, carbon-dioxide or dry-chemical extinguishers, or foam to fight the fire. Alcohol-resistant foams (ATC type) are preferred. Use of a direct water stream may spread the fire. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Immediately withdraw all personnel from the area in case of rising sounds from venting safety device or discolorations of the container. Keep fire water out of waterways and sewers to minimize the potential for environmental damage. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

For more information, request the relevant Safety Data Sheet from the [Dow Customer Information Group](#).

**Health Information**

Dipropylene glycol is not considered a hazardous chemical; it is not labeled for any hazards under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

**Eye contact** – Contact with liquid may cause slight temporary irritation. Contact with mist may cause irritation.

**Skin contact** – Prolonged contact is not likely to cause irritation, sensitization, or result in absorption in harmful amounts.

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**Inhalation** – Due to its low vapor pressure, inhalation is unlikely at ambient temperatures.

**Ingestion** – This product has a very low toxicity if swallowed. Harmful effects are not anticipated from swallowing small amounts.

**Repeated Exposure** – In animal studies, repeated chronic (2-yr) overexposure to dipropylene glycol via drinking water was reported to affect the kidneys, liver, and nasal tissue in rodents.

**Carcinogenicity** – Repeated excessive lifetime exposure of rodents to dipropylene glycol in drinking water did not result in any increased incidence of tumors. Dipropylene glycol is not classified as a carcinogen, or as a mutagen, by any regulatory authority.

For more information, request the relevant Safety Data Sheet from the [Dow Customer Information Group](http://www.dow.com/assistance/dowcig.htm).

**Environmental Information**

Dipropylene glycol has low volatility and is unlikely to evaporate from water or solid surfaces to the atmosphere. However, because it is highly soluble in water and is unlikely to bind to soil or sediment, once introduced to water, dipropylene glycol will tend to remain dissolved in water.

Dipropylene glycol is unlikely to persist in the environment. It is readily biodegradable, which suggests the product will be ultimately removed from water and soil environments, including biological wastewater-treatment facilities.

Dipropylene glycol is not likely to accumulate in the food chain (bioconcentration potential is low), and it is practically nontoxic to fish and other aquatic organisms on an acute basis. Thus, it is not considered to be either PBT (persistent bioaccumulative toxic) or vPvB (very persistent and very bioaccumulative), and is not classified for any environmental hazard under the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

For more information, request the relevant Safety Data Sheet from the [Dow Customer Information Group](http://www.dow.com/assistance/dowcig.htm).

**Physical Hazard Information**

Dipropylene glycol is stable under recommended storage and use conditions. Exposure to high temperatures can cause the product to decompose. Generation of gas during decomposition can cause pressure build-up in closed systems.

Avoid contact with strong acids, strong bases, and strong oxidizers. Avoid moisture. Keep away from direct sunlight or ultraviolet (UV) light sources.

For more information, request the relevant Safety Data Sheet from the [Dow Customer Information Group](http://www.dow.com/propyleneglycol/contact).

**Regulatory Information**

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of dipropylene glycol. These regulations may vary by city, state, country, or geographic region. Information may be found by requesting the relevant Safety Data Sheet or using Contact Us.

**Additional Information**

- Request the relevant Safety Data Sheet from the [Dow Customer Information Group](http://www.dow.com/assistance/dowcig.htm)
- Contact Us ([http://www.dow.com/propyleneglycol/contact](http://www.dow.com/propyleneglycol/contact))

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- Dipropylene Glycol Regular Grade (DPG) web page, The Dow Chemical Company (www.dow.com/propyleneglycol/products/dipropylene_regular.htm)
- Dipropylene Glycol LO+ (DPG LO+) web page, The Dow Chemical Company (www.dow.com/propyleneglycol/products/dipropylene_lo.htm)
- Propylene Glycols: About Propylene Glycols web page, The Dow Chemical Company (www.dow.com/propyleneglycol/about/)

For more information about dipropylene glycol, visit the Dow Propylene Glycols web site at www.dow.com/propyleneglycol/index.htm.

References
3 DOW™ Dipropylene Glycol LO+ Grade Technical Data Sheet, The Dow Chemical Company, Form No. 117-01581-703CRCG, page 2.

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NOTICES

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