Product Safety Assessment

**PROGLYDE™ DMM Glycol Diether [Dipropylene Glycol Dimethyl Ether]**

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**Names**
- CAS No. 111109-77-4
- EC No. 404-640-5
- Dipropylene glycol dimethyl ether
- Bis(methoxypropyl)ether
- PROGLYDE™ DMM Glycol Diether
- DPGDME

**Product Overview**
- Dipropylene glycol dimethyl ether (DPGDME) is a colorless liquid with a mild odor. It is a propylene oxide-based diether and is hygroscopic (attracts water). The Dow Chemical Company (“Dow”) manufactures this product under the trade name PROGLYDE™ DMM Glycol Diether.\(^1\) For further details, see Product Description.
- Due to its chemical properties, DPGDME is used as a solvent and coupling agent in a wide range of agricultural formulations and cleaning products. It is also used in water-based polyurethane coatings and solvent-based coatings applications.\(^2\) For further details, see Product Uses.
- Eye contact with DPGDME may cause slight irritation, although corneal injury is unlikely. Prolonged skin contact is not likely to cause significant irritation or result in absorption of harmful amounts. Prolonged inhalation of DPGDME is not expected to cause adverse effects.\(^1\) For further details, see Health Information.
- Because DPGDME is formulated into a broad range of products, consumer contact is possible. Workplace exposure is also possible.\(^1\) For further details, see Exposure Potential.
- DPGDME is inherently biodegradable, unlikely to accumulate in the food chain, and is practically non-toxic to fish and aquatic organisms. See Environmental Information.
- DPGDME liquid and vapor are combustible. The product is stable under recommended storage conditions. Contact with strong acids, strong bases, and strong oxidizers should be avoided.\(^1\) For further details, see Physical Hazard Information.

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**Manufacture of Product\(^3\)**
- **Capacity** – Western Europe is the largest producer and consumer of propylene oxide-based glycol ethers. The Dow Chemical Company ("Dow") produces propylene oxide-based glycol ethers in the United States at facilities in Plaquemine, Louisiana and Seadrift, Texas in Europe in Stade, Germany, and in China at Zhangjiagang Ltd.

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- **Process** – DPGDME may be manufactured by a number of methods including the Williamson ether synthesis and alkylation methods. Overall DPGDME is manufactured from propylene oxide and methanol.

\[
\begin{align*}
2 \text{CH}_3\text{C} = \text{CH} + 2 \text{CH}_3\text{OH} &\rightarrow \text{CH}_3\text{OCH}_2\text{CH}_2\text{CHOCH}_3 + \text{H}_2\text{O} \\
\text{Propylene oxide} &\quad \text{Methanol} &\quad \text{Dipropylene glycol dimethyl ether}
\end{align*}
\]

**Product Description**

Dipropylene glycol dimethyl ether (DPGDME) is a colorless liquid with a mild odor. It is a propylene oxide-based diether and is hygroscopic (attracts water). DPGDME is an aprotic solvent, meaning it is relatively inert because it does not have hydroxyl groups that readily donate or accept protons. Dow manufactures DPGDME under the trade name PROGLYDE™ DMM Glycol Diether and contains a minimum purity of 99.2%.

**Product Uses**

DPGDME is used for industrial and residential applications, including:
- **Cleaners** – in cleaning formulations that require stability over a wide pH range, such as paint-stripping formulations and printed circuit board cleaners
- **Coatings** – as a solvent for water-based polyurethane/isocyanate coating systems and solvent-based coating systems, including architectural and industrial maintenance coatings
- **Paint strippers**

**Exposure Potential**

DPGDME is used in the production of industrial and consumer products. Based on the uses for DPGDME, the public could be exposed through:
- **Workplace exposure** – Exposure can occur either in a glycol ether manufacturing facility or in the various industrial or manufacturing facilities that use DPGDME. Those working with DPGDME 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 unnecessary exposure. See [Health Information](#).
- **Consumer exposure to products containing DPGDME** – Dow does not sell DPGDME for direct consumer use; however, consumers can be exposed through the use of cleaning products, pesticides, or other products containing DPGDME. See [Health Information](#).
- **Environmental releases** – DPGDME may be released to air by evaporation from coatings or other products containing it. However, once DPGDME is introduced to water, the compound will tend to remain dissolved because it is moderately soluble in water. DPGDME is inherently biodegradable, and the compound will be removed by sewage treatment plants.
- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, contain the spilled material if possible. Pump the recovered material into suitable and properly labeled containers using appropriate equipment.
• **In case of fire** – Keep people away and deny unnecessary entry. Wear positive-pressure, self-contained breathing apparatus (SCBA) and protective fire-fighting clothing or fight the fire from a safe distance. Do not use a direct water stream, as it may spread the fire. Use water fog or fine spray, carbon-dioxide or dry-chemical extinguishers, or foam. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

For more information, see the relevant Safety Data Sheet.

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**Health Information**

Eye contact with DPGDME may cause slight irritation, although corneal injury is unlikely. Prolonged skin contact is not likely to cause significant irritation or result in absorption of harmful amounts. DPGDME has shown limited potential to produce allergic skin reactions. Prolonged inhalation of DPGDME is not expected to cause adverse effects.

DPGDME has low toxicity if swallowed. Swallowing small amounts as a result of normal handling operations is unlikely to cause injury. However, swallowing larger amounts may cause injury.

In laboratory animal testing, exposure to DPGDME is not anticipated to cause birth defects or interfere with reproduction. Genetic toxicity studies were negative.

For more information, see the relevant Safety Data Sheet.

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**Environmental Information**

DPGDME is volatile, and will evaporate from products containing it. However, because it is moderately soluble in water, once introduced, it has a tendency to remain in water. It has minimal tendency to bind to soil or sediment.

DPGDME is unlikely to persist in the environment. DPGDME is inherently biodegradable, which suggests the chemical will be removed from water and soil environments, including biological wastewater treatment plants.

DPGDME 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.

For more information, see the relevant Safety Data Sheet.

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**Physical Hazard Information**

DPGDME liquid and vapor are combustible. The product is stable under recommended storage conditions. Store this material in carbon steel, stainless steel, or phenolic-lined steel drums. Do not store in aluminum, copper, galvanized steel, or galvanized iron. DPGDME can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Decomposition products depend on temperature, air supply, and the presence of other materials, but can include aldehydes, ketones, organic acids, and other compounds.

DPGDME is incompatible with strong acids, strong bases, and strong oxidizers and contact should be avoided.
During a fire, smoke may contain the original material in addition to toxic or irritating combustion products of varying compositions. Hazardous combustion products may include carbon monoxide and carbon dioxide. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

For more information, see the relevant Safety Data Sheet.

Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of DPGDME. 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 (http://www.dow.com/oxysolvents/contact/index.htm)
- PROGLYDE™ DMM Technical Data Sheet, The Dow Chemical Company

For more business information about DPGDME, visit Dow’s Oxygenated Solvents web site. (http://www.dow.com/oxysolvents/index.htm)

References

1 PROGLYDE™ DMM Glycol Diether Material Safety Data Sheet, The Dow Chemical Company, ID NO. 50659/1001
2 PROGLYDE™ DMM Product Information, The Dow Chemical Company.
5 Estimates by The Dow Chemical Company.

NOTICES:

As part of its 2015 Sustainability Goals, Dow has committed to make publicly available safety assessments for its products globally. This product safety assessment is intended to give general information about the chemical (or categories of chemicals) addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the relevant Safety Data Sheet, which should be consulted before use of the chemical. This product safety assessment does not replace required communication documents such as the Safety Data Sheet.

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