Product Safety Assessment

DOWANOL™ PM Glycol Ether [Propylene Glycol Methyl Ether]

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Names
- CAS No. 107-98-2
- EC No. 203-539-1
- Propylene glycol methyl ether (PGME)
- Propylene glycol monomethyl ether
- 1-Methoxy-2-propanol
- 1-Methoxy-2-hydroxypropane
- DOWANOL™ PM Glycol Ether
- 1-Methoxypropan-2-ol
- 1-Methoxypropanol-2
- 2-Methoxy-1-methylethanol
- 2-Propanol-1-methoxy
- Monopropylene glycol methyl ether

Product Overview
- Propylene glycol methyl ether (PGME) is a clear, colorless liquid with an ether-like odor. PGME is completely soluble in water, with moderate volatility. Dow manufactures and markets PGME under the trade name DOWANOL™ PM Glycol Ether. For further details, see Product Description.
- PGME is used in the chemical, agricultural, automotive, paint, lacquer, and varnish industries. Its predominant use is as a solvent in various manufacturing processes and as a chemical building block for the manufacture of propylene glycol methyl ether acetate (PMA). PGME is also formulated into industrial, commercial, automotive, and household cleaners. For further details, see Product Uses.
- Because PGME is formulated into a broad range of products, consumer contact is possible. Workplace exposure is also possible. For further details, see Exposure Potential.
- Eye contact with PGME may cause slight temporary irritation, although corneal injury is unlikely. Prolonged or repeated skin contact may cause slight irritation. PGME has low toxicity if swallowed. The odor of PGME is objectionable at 100 ppm. Vapor levels higher than 100 ppm produce eye, nose, and throat irritation and are intolerable at 1,000 ppm. Anesthetic effects are seen at or above 1,000 ppm. For further details, see Health Information.
- PGME is flammable and vapors may travel a long distance. Store this material away from heat, sparks, and flame. PGME is thermally stable at typical use temperatures. PGME is incompatible with strong acids, strong bases, and strong oxidizers, and contact should be avoided. For further details, see Physical Hazard Information.

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Manufacture of Product
- **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..
- **Process** – Propylene glycol methyl ether is produced by the reaction of propylene oxide with methanol using a catalyst as shown below.

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CH3
H2C\CH + CH3OH -> CH3O-CH2CH2OH
Propylene oxide      Methanol      Propylene glycol methyl ether
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Product Description
Propylene glycol methyl ether (PGME) is a clear, colorless liquid with an ether odor. It is completely soluble in water and has moderate volatility. PGME is a propylene oxide-based or P-series glycol ether. Dow manufactures and sells PGME and other P-series glycol ethers under the trade name DOWANOL™. DOWANOL™ PM Glycol Ether contains min. 99.5% 1-methoxypropan-2-ol.

Product Uses
The main commercial uses for PGME are:
- **Chemical intermediate** – for the manufacture of propylene glycol methyl ether acetate (PMA)
- **Solvent** – for paints, varnishes, inks, strippers, cleaners, and degreasers
- **Coalescing agent** – for water-based paints and inks to promote polymer fusion during the drying process
- **Coatings** – for automotive, architectural, industrial maintenance, wood and coatings, and metal finishing
- **Electronics** – to manufacture copper-clad lamination products

PGME is formulated into a wide variety of household products including:
- Floor polish and related products
- Paints, lacquers, varnishes, and other paint-related products
- Nonstructural caulking compounds and sealants
- Synthetic resin and rubber adhesives
- Pesticides
- Automotive cleaners
- Dyes and inks – ball point and felt-tip pens
- Cleaning products for glass, ovens, hard surfaces, floors, rugs, and upholstery
- Laundry aids – ironing aids and dry-cleaning spot-cleaning preparations
- Specialty cleaning and sanitation products – swimming pool cleaners
Exposure Potential
PGME is used in the production of industrial and consumer products. Based on its uses, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in a PGME manufacturing facility or in the various industrial or manufacturing facilities that use PGME. Those working with PGME in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. The primary potentials for occupational exposure to PGME are through skin contact or vapor inhalation. Each manufacturing facility should have a thorough training program for employees and appropriate work processes, ventilation, and safety equipment in place to limit unnecessary exposure. See [Health Information](#).

- **Consumer exposure to products containing PGME** – PGME is not marketed for direct consumer use, but it is used in household-cleaning formulations, paints, and other products. Products containing PGME generally contain levels between 1 and 10%, although some products may have levels as high as 50%. The highest exposures to consumers are likely to be associated with the use of paints and varnishes that contain PGME. Inhalation exposures to relatively high concentrations of PGME are believed to be self-limiting due to the irritant effects of the chemical. See [Health Information](#).

- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent contamination of soil, sewers, and surface or ground water. Isolate the area. For small spills, PGME should be absorbed with clay or sand. Collect material in suitable and properly labeled containers. See [Environmental, Health, and Physical Hazard Information](#).

- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, isolate the area, keeping personnel out of low areas. PGME vapors are heavier than air. Keep upwind of the spill and ventilate the area. Warn the public of any downwind explosion hazard. Eliminate all sources of ignition and ground and bond all containers and handling equipment. Check the area with a combustible-gas detector before reentering. Use appropriate safety equipment. Use an approved air-purifying or positive-pressure, supplied-air respirator if atmospheric levels are above exposure guidelines. Contain the spilled material if possible. Use nonsparking tools in cleanup operations. Absorb with materials such as clay or sand. If available, use foam to smother or suppress vapors.

- **In case of fire** – Keep people away and deny any unnecessary entry. Stay upwind and keep out of low areas where fumes can accumulate. Water may not be effective in extinguishing the fire and use of a direct water stream may spread the fire. Wear positive-pressure, self-contained breathing apparatus (SCBA) or fight the fire from a safe distance. Consider the use of unmanned hose holders or monitor nozzles. Violent steam generation or eruption may occur upon application of a direct water stream to hot liquids. Use water fog or fine spray, dry-chemical or carbon-dioxide extinguishers, or foam. Use water spray to cool fire-exposed containers and the fire-affected zone until fire is out and the danger of reignition has passed. 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 PGME may cause slight temporary irritation, although corneal injury is unlikely. Prolonged or repeated skin contact may cause irritation. Prolonged skin contact with very large amounts may cause dizziness or drowsiness. PGME is not a skin sensitizer.

PGME has low toxicity if swallowed. Swallowing small amounts incidental to normal handling operations are not likely to cause injury. Swallowing larger amounts may cause injury.
The odor of PGME is objectionable at 100 ppm. Higher vapor levels produce eye, nose, and throat irritation and become intolerable at 1,000 ppm. Anesthetic effects are seen at levels at or above 1,000 ppm. Symptoms of excessive exposure may be anesthetic or narcotic effects including dizziness and drowsiness. In animal vapor exposure studies, effects have been seen in the liver and kidneys.

In laboratory animal testing, exposure to PGME did not cause cancer or birth defects. Exposure to high vapor concentrations caused fetal effects but only at doses toxic to the mother. Genetic toxicity studies were negative.

For more information, see the relevant Safety Data Sheet.

Environmental Information
PGME is practically nontoxic to aquatic organisms on an acute basis. PGME is not likely to accumulate in the food chain (bioconcentration potential is low) and is readily biodegradable.

For more information, see the relevant Safety Data Sheet.

Physical Hazard Information
PGME is flammable, and vapors may travel a long distance. PGME should be stored away from heat and ignition sources. PGME is thermally stable at typical use temperatures. The product can oxidize at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Decomposition products can include and are not limited to aldehydes, ketones, and organic acids. PGME is incompatible with strong acids, strong bases, and strong oxidizers and contact should be avoided.

During a fire, containers may rupture due to gas generation. PGME vapors are heavier than air and may accumulate in low-lying areas. PGME vapors are extremely flammable. Ignition and/or flashback may occur. Smoke may contain the original material, in addition to unidentified toxic or irritating compounds that may include but are not limited to carbon monoxide and carbon dioxide.

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 PGME. 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.
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Additional Information

- Contact Us (http://www.dow.com/oxysolvents/contact/index.htm).
- DOWANOL™ PM Technical Data Sheet, The Dow Chemical Company.

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

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References

2 DOWANOL PM Product Information Datasheet, The Dow Chemical Company.
5 Dow Oxygenated Solvents website – P-Series Glycol Ethers (http://www.dow.com/oxysolvents/prod/pseries.htm)
6 Dow Oxygenated Solvents website – Applications Center (http://www.dow.com/oxysolvents/app/index.htm)

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