Product Safety Assessment

**DOW™ Triethylene Glycol**


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**Names**
- CAS No. 112-27-6
- Triethylene glycol
- Triglycerol
- Trigol
- 2,2’-[1,2-ethanediylbis(oxy)] bis-ethanol
- ethylene glycol-bis-(2-hydroxyethyl ether)
- 1,2-bis(2-hydroxyethoxy)ethane
- ethylene glycol dihydroxydiethyl ether

**Product Overview**
- DOW™ triethylene glycol is a colorless, low-volatility, water-soluble liquid produced as a coproduct in the production of ethylene glycol.\(^1\) See **Product Description**.
- DOW triethylene glycol is widely used as a dehumidifying agent (water removal) in natural-gas production. Due to its chemical properties, triethylene glycol is used for a variety of industrial uses, including as a plasticizer, solvent, chemical intermediate, and chemical additive.\(^2\) See **Product Uses**.
- DOW triethylene glycol is used industrially with limited if any direct presence in consumer products. Occupational exposure can occur in an ethylene glycol manufacturing facility, in facilities using triethylene glycol, or in triethylene glycol-containing products.\(^3\) See **Exposure Potential**.
- Triethylene glycol does not cause adverse health or environmental effects at levels typically found in the workplace.\(^3\) See **Health Information**.
- Triethylene glycol is stable at room temperature. Elevated temperatures can cause triethylene glycol to decompose, resulting in pressure build-up in closed systems. Triethylene glycol is incompatible with strong acids, strong bases, and strong oxidizers.\(^3\) See **Physical Hazard Information**.

**Manufacture of Product**
- **Capacity** – Dow is the world’s largest producer of ethylene oxide and glycols, including triethylene glycol. Total world consumption of triethylene glycol in 2013 (HDK) was estimated at 51 thousand metric tons (115 million pounds).\(^4\)
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- **Process** – DOW™ triethylene glycol is derived as a co-product in the manufacture of ethylene glycol. Ethylene oxide is reacted with a controlled amount of water in a closed, continuous process. Ethylene glycol then reacts with ethylene oxide producing diethylene glycol, triethylene glycol, and tetraethylene glycol. The polyglycols are separated and purified by distillation. Triethylene glycol may be manufactured intentionally by the reaction of diethylene glycol with ethylene oxide.²

The chemical reaction is as follows:

\[
\text{Ethylene oxide} + \text{Water} \rightarrow \text{Ethylene glycol} + \text{Di-, tri- and tetra-ethylene glycols}
\]

**Product Description**¹

DOW™ triethylene glycol is a colorless liquid with very low volatility. It is hygroscopic (picks up water from the air), completely water soluble, and mixes readily with many organic compounds. Triethylene glycol has chemical and physical properties similar to mono- and diethylene glycol and may be preferred due to its higher boiling point, lower volatility, and lower toxicity.

Dow offers two grades of triethylene glycol: regular and high-purity.

**Product Uses**¹,⁵

The main commercial uses for DOW™ triethylene glycol include:

- **Dehumidifying agent** – for water removal in natural gas
- **Solvent** – for resins, steam-set printing inks, and cleaning compounds
- **Plasticizer** – for use in safety glass, separation membranes and ceramic materials
- **Chemical intermediate** – to make unsaturated polyester resins, adhesives, lacquers, polyurethanes, silicone compounds, emulsifiers, and lubricants
- **Humectant** – to keep cork, paper, and synthetic sponges from becoming brittle
- **Chemical additive** – in heat-transfer fluids

**Exposure Potential**

Based on the uses for DOW™ triethylene glycol, the public could be exposed through:

- **Workplace exposure**² – The use of enclosed equipment, engineering controls, and personal protective equipment during the manufacture of triethylene glycol minimize the opportunity for human contact. The most likely exposure is industrial; either in a triethylene glycol distillation facility or facilities using triethylene glycol-containing products. Those working with triethylene glycol

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²Revised: June 4, 2014  The Dow Chemical Company  Page 2 of 5
glycol 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 chemical exposure. See Health Information.

- **Consumer exposure to products containing DOW™ triethylene glycol** – The predominate use of DOW triethylene glycol is industrial, with very limited presence in consumer products such as brake fluids. Not all consumer applications are supported by Dow. Consumers should always read product information before use and follow the label/use instructions. See Health Information.

- **Environmental releases** – Triethylene glycol production or the variety of uses for triethylene glycol and triethylene glycol-containing products could result in the release of triethylene glycol to the environment through various waste streams. 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, absorb triethylene glycol with materials such as dirt, sand, sawdust, vermiculite, or equivalent filler. See Environmental, Health, and Physical Hazard Information.

- **Large release** – For large spills, dike the area. Pump recovered material into suitable and properly labeled containers and dispose of containers in compliance with all governmental requirements. Keep unnecessary personnel and all wildlife from entering area. Use appropriate safety equipment. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Use water fog or fine spray, dry-chemical or carbon-dioxide extinguishers, or foam to put out the fire. Alcohol-resistant foams (ATC type) are preferred. Burning liquids may be extinguished by dilution with water. Do not use a direct water stream. See Environmental, Health, and Physical Hazard Information.

For more information, request the relevant Safety Data Sheet from the Dow Customer Information Group.

**Health Information**

The most likely exposure to triethylene glycol is dermal contact. Skin or eye contact with triethylene glycol may cause irritation. The response may be more severe if skin is scratched or cut. Prolonged contact may cause skin irritation with redness. Absorption of significant amounts through the skin is unlikely. Massive contact with damaged skin, or material sufficiently hot to burn skin, may result in absorption of potentially lethal amounts.

The risks from the inhalation of triethylene glycol at room temperature are minimal due to its low volatility. Inhalation of mist may cause irritation of nose and throat. Repeated exposures to triethylene glycol vapors at room temperatures are not expected to cause significant adverse effects. Repeated excessive aerosol exposures may cause respiratory tract irritation or death.

Triethylene glycol did not cause cancer or birth defects in laboratory animals. Reduced fetal body weight effects were seen only at very high doses.

For more information, request the relevant Safety Data Sheet from the Dow Customer Information Group.

**Environmental Information**

DOW™ triethylene glycol is practically nontoxic to aquatic organisms on an acute basis. It is likely that atmospheric triethylene glycol concentrations are low since triethylene glycol is expected to

Footnotes:

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undergo photodegradation with a short half-life. Concentrations in water and soil are also likely to be low since triethylene glycol has high soil mobility and biodegrades readily.

For more information, request the relevant Safety Data Sheet from the Dow Customer Information Group.

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Physical Hazard Information

DOW™ triethylene glycol is a stable liquid at room temperature. Exposure to elevated temperatures can cause decomposition. Gas generated during decomposition can cause pressure build-up in closed systems. The decomposition products of triethylene glycol depend upon temperature, air supply, and the presence of other materials. Decomposition products may include aldehydes, ketones, and organic acids. Triethylene glycol is incompatible with strong acids, strong bases, and strong oxidizers.

For more information, request the relevant Safety Data Sheet from the Dow Customer Information Group.

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Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of triethylene glycol. These regulations may vary by city, state, country, or geographic region. Information may be found by contacting the Customer Information Group or Contact Us.

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Additional Information

- Contact Us (http://www.dow.com/ethyleneglycol/contact/index.htm)
- Dow Ethylene Glycol web site (http://www.dow.com/ethyleneglycol/prod/teg.htm)
- Organization for Economic Cooperation and Development (OECD) Screening Information Data Set (SID) Dossier on the HPV Chemical Triethylene glycol

References

1. Triethylene Glycol, The Dow Chemical Company, Form No. XXX-0207X CRCG
3. Triethylene Glycol Material Safety Data Sheet, The Dow Chemical Company, ID No. 2150/1001

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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