Product Safety Assessment

Triethylene Glycol Monobutyl Ether (Butoxytriglycol)

Select a Topic:

Names
Product Overview
Manufacture of Product
Product Description
Product Uses
Exposure Potential
Health Information
Environmental Information
Physical Hazard Information
Regulatory Information
Additional Information
References

Names
- CAS No. 143-22-6
- Butoxytriglycol
- Triethylene glycol monobutyl ether (TGBE)
- Triethylene glycol n-butyl ether
- 2-(2-(2-butoxyethoxy)ethoxy)ethanol
- 3,6,9-trioxatridecan-1-ol
- Butyltriglycol
- Butoxytriethylene glycol

Product Overview
- Butoxytriglycol is another name for triethylene glycol monobutyl ether (TGBE), a solvent produced by The Dow Chemical Company. It is a colorless liquid with a mild odor that is completely soluble in water. TGBE has low volatility (doesn't evaporate easily). See Product Description.
- The major use of butoxytriglycol is in automotive brake fluid formulations. Other possible uses include: low-volatility component in paint stripping formulations, dye carrier for textile dye processes, chemical process solvent, chemical intermediate, and household and industrial cleaning formulations. See Product Uses.
- High boiling glycol ethers such as TGBE are manufactured and stored in closed systems. The greatest exposure potential exists in automotive plants and brake service/repair shops using TGBE-containing hydraulic brake fluids. Consumer exposure could occur through the use of household cleaners, paint and floor polish strippers, or disinfectants containing TGBE. See Exposure Potential.
- Eye contact with TGBE may cause severe irritation and/or moderate corneal injury. Brief skin contact may cause irritation with local redness. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Inhalation of TGBE is not expected to cause adverse effects. See Health Information.
- TGBE is thermally stable at typical use temperatures. Avoid contact with strong acids and strong oxidizers. See Physical Hazard Information.

Manufacture of Product
- Capacity – Dow is the world’s largest producer of ethylene-oxide-based glycol ethers. In 2002, global consumption of E-series glycol ethers, including TGBE, was 606,000 metric tons (1,336 million pounds). Global consumption of TGBE 21,000 metric tons (46 million pounds) in 2002. Dow has glycol ether production facilities in the following U.S. locations: Midland,
Product Safety Assessment: Triethylene Glycol Monobutyl Ether

Michigan; Hahnville† and Plaquemine, Louisiana; and Seadrift†, Texas. Dow also has production facilities in San Lorenzo, Argentina and Stade, Germany.

- **Process** – TGBE is produced by reacting n-butanol with ethylene oxide in a 1:3 ratio.\(^\text{10}\) The chemical reaction is as follows:

\[
3 \text{H}_2\text{C}=\text{CH}_2 + \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH} \rightarrow \text{HOCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_3
\]

- **Product Description**\(^\text{11}\)

TGBE, a solvent produced by Dow, is a colorless liquid with a mild odor and very low volatility. This material is completely soluble in water.

Butoxytriglycol contains greater than 85% TGBE. Minor chemical components are: polyethylene glycol monobutyl ether, diethylene glycol monobutyl ether, diethylene glycol, and triethylene glycol.

- **Product Uses**\(^\text{12,13,14}\)

TGBE is used for a wide variety of applications. The main commercial uses for TGBE made by Dow are:

- Chemical intermediate for several industries, primarily automotive break fluid
- Mining
- Other

Household products which may contain butoxytriglycol are: hard surface cleaners, disinfectants, paint or floor polish strippers, and automotive brake fluid.

- **Exposure Potential**

Based on the uses for TGBE, the public could be exposed through:

- **Workplace exposure**\(^\text{15}\) – The use of enclosed equipment, engineering controls, and personal protective equipment during the manufacture of TGBE minimizes the opportunity for human contact. The greatest exposure potential (through skin contact) exists in automotive plants and brake service/repair shops using TGBE-containing hydraulic brake fluids. Workplace exposure could also occur in facilities using TGBE to manufacture other products or in the textile industry during the fabric dying process. Each facility should have a thorough training program for employees, appropriate work processes, and safety equipment in place to limit unnecessary exposure. See Health Information.

- **Consumer exposure to products containing TGBE** – The public could be exposed to this material through the use of household cleaners, hydraulic brake fluid, disinfectants, and paint or floor polish strippers containing TGBE. Read and follow product instructions carefully to minimize the risk of exposure. See Health Information.

† Site of Union Carbide Corporation, a wholly owned subsidiary of The Dow Chemical Company
• **Environmental releases**\(^{16}\) – 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 TGBE with materials such as sand or vermiculite. Collect in suitable and properly labeled containers. See Environmental, Health and Physical Hazard Information.

• **Large release**\(^{17}\) – For large spills, contain spilled material if possible. Isolate area. Pump into suitable and properly labeled containers. Keep unnecessary personnel from entering area. Use appropriate safety equipment. Follow emergency procedures carefully. In case of fire, do not use direct water stream. Use dry chemical fire extinguisher, water fog or fine spray. Alcohol resistant foams (ATC type) are preferred. See Environmental, Health and Physical Hazard Information.

For more information, see the relevant Safety Data Sheet (SDS).

**Health Information**\(^{18}\)

Eye contact with TGBE may cause moderate to severe injury.

Brief skin contact with this material may cause irritation. Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Inhalation of TGBE is not expected to cause adverse effects. This material has a very low toxicity if swallowed.

TGBE did not cause birth defects or any other fetal effects in laboratory animals. An *in vitro* genetic toxicity study was negative.

For more information, see the relevant SDS.

**Environmental Information**\(^{19,20}\)

TGBE is readily biodegradable and practically non-toxic to aquatic organisms. TGBE is not expected to accumulate in the food chain.

For more information, see the relevant SDS.

**Physical Hazard Information**\(^{21}\)

TGBE is thermally stable at typical use temperatures. Do not distill to dryness. This material can oxidize at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems. Decomposition products depend upon temperature, air supply, and the presence of other materials. Decomposition products can include and are not limited to: aldehydes, ketones, and organic acids.

Store TGBE in carbon steel, stainless steel, or phenolic-lined steel drums. Do not store in aluminum, copper, galvanized iron, or galvanized steel. Avoid contact with strong acids and strong oxidizers.

Spills of these organic materials on hot fibrous insulations may lead to lowering of the auto-ignition temperatures, possibly resulting in spontaneous combustion.

For more information, see the relevant SDS.
Regulatory Information
Regulations may exist that govern the manufacture, sale, transportation, use and/or disposal of TGBE. These regulations may vary by city, state, country or geographic region. Information may be found by consulting the relevant Safety Data Sheet (SDS) or Contact Us.

Back to top

Additional Information
- Safety Data Sheet (Request using Contact Us) (http://www.dow.com/oxysolvents/contact/)
- Contact Us (http://www.dow.com/oxysolvents/contact/)

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

Back to top

Reference
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.

The information herein is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Dow be responsible for damages of any nature whatsoever resulting from the use of or reliance upon the information herein or the product to which that information refers.

Nothing contained herein is to be construed as a recommendation to use any product, process, equipment or formulation in conflict with any patent, and Dow makes no representation or warranty, express or implied, that the use thereof will not infringe any patent.

NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREBUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Dow makes no commitment to update or correct any information that appears on the Internet or on its World-Wide Web server. The information contained in this document is supplemental to the InternetDisclaimer, http://www.dow.com/homepage/disclosure.html

Back to top