Product Safety Assessment
Diethylene Glycol Monoethyl Ether

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Names ¹
- CAS No. 111-90-0
- Diethylene glycol monoethyl ether
- DEGEE
- CARBITOL™ solvent

Product Overview
- Diethylene glycol monoethyl ether (DEGEE) is a type of glycol ether and is sold by Dow under the tradename CARBITOL™ solvent. DEGEE is an ethylene-series or E-series glycol ether that is an important component in wood stains and industrial cleaners. Textile printing and dyeing processes also use DEGEE.² See Product Uses.
- DEGEE is a colorless liquid with a mild odor. Swallowing large amounts of DEGEE may cause injury, and contact with the eye may cause moderate irritation.³ See Product Description and Health Information.
- Consumer exposure to DEGEE may occur through the use of wood stains. Check the product label for ventilation and protective equipment requirements. Chemical protective gloves should not be needed when handling pure DEGEE.⁴ See Exposure Potential.
- DEGEE has a high boiling point and low vapor pressure.⁵ It is stable under recommended storage conditions and readily biodegradable. See Physical Hazard Information.

Manufacture of Product
- Capacity⁶ – In 2004, global industry capacity for E-series glycol ethers, including DEGEE, was 952 thousand metric tons (2,098 million pounds). U.S. consumption of glycol ethers was 309 metric tons (682 million pounds). Dow has production facilities in the following U.S. locations: Midland, Michigan; Hahnville and Plaquemine, Louisiana; and Seadrift, Texas. Dow also has production facilities in San Lorenzo, Argentina and Stade, Germany.
- Process² – Ethylene glycol monoethers are produced by reacting ethylene oxide with anhydrous (dry) alcohol (usually methyl, ethyl or butyl alcohol). Ethanol is used for DEGEE production.

\[ \text{Ethylene Oxide} \quad \text{n-Ethanol} \quad \text{Diethylene Glycol Monoethyl Ether} \]

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Product Description

DEGEE (a glycol ether) is a clear liquid with a mild, pleasant odor. It is miscible with water and most organic solvents.

Diethylene glycol monoethyl ether (DEGEE) is a type of glycol ether and is sold by Dow under the tradename CARBITOL™ solvent. DEGEE is an ethylene-series or E-series glycol ether.

Product Uses

Glycol ethers are primarily used as solvents in various formulations, such as: cleaning fluids, paints, coatings and inks. Dow CARBITOL solvents are used in applications such as:

- Non-grain-raising wood stains
- Industrial cleaners
- Textile printing and dyeing processes
- Mineral oil soap solvents (including floor polishes)

Exposure Potential

DEGEE is used in the production of industrial and consumer products. Based on these uses, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in a DEGEE manufacturing facility or in the various industrial or manufacturing facilities that use it in production. Those working with DEGEE in manufacturing operations could be exposed during maintenance, sampling, testing or other procedures. Adequate ventilation should be employed to maintain atmospheric vapor levels below recommended guidelines. Each manufacturing facility should have a thorough training program for employees, appropriate work processes and safety equipment in place to limit unnecessary exposure. See Health Information or consult the Safety Data Sheet (SDS).

- **Consumer exposure to products containing DEGEE** – DEGEE may be found in various paints, stains and cleaning products used by consumers. Use safety glasses to protect eyes when using products that contain DEGEE. Even though chemical gloves should not be needed when handling pure DEGEE, commercial products may have other ingredients that require protective clothing, gloves or other precautions such as adequate ventilation. Follow product instructions carefully to minimize the risk of exposure. See Health Information.

- **Environmental releases** – In the event of a spill, absorb DEGEE with materials such as sand or vermiculite. Collect material in suitable and properly labeled containers. Prevent material from reaching surrounding soil, streams or ground water. Use appropriate safety equipment for clean up. Consult the relevant SDS for more information about protective equipment and procedures. See Environmental, Health and Physical Hazard Information.

- **Large release** - Industrial spills or releases are infrequent and are generally contained. If a large spill does occur, the material should be captured, collected and re-processed, or disposed of according to applicable governmental requirements. If DEGEE is present in a fire situation, it can produce carbon monoxide (highly toxic) and carbon dioxide (an asphyxiant at sufficient concentrations). Containers may rupture from gas generation in a fire situation. Use water spray to cool fire-exposed containers until danger of re-ignition has passed. Violent steam generation may occur upon applications of direct water stream to hot liquids. Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Use of a...
direct water stream may spread fire. Immediately withdraw all personnel from the area in case of rising sounds from venting safety device or discolorations of the container. Emergency personnel should wear proper protective equipment, including self-contained breathing apparatus (SCBA), and follow emergency procedures carefully. When relevant in scale or risk, the community should be notified of the hazards associated with the specific release event. See Environmental, Health and Physical Hazard Information.

**Health Information**

Exposure to DEGEE may cause moderate eye irritation; however, corneal injury is unlikely. Prolonged skin exposure is not likely to cause significant irritation or result in absorption of harmful amounts.

No adverse effects are anticipated from single exposure to vapor and DEGEE has a low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

The effects of repeated exposure to DEGEE in animals have been reported on the following: blood, kidney, liver, testes. Studies in laboratory animals indicate that DEGEE is not a reproductive toxicant even when given in large amounts (a few percent in the drinking water). However, at the highest doses tested, it caused some toxic effects in the offspring of treated animals, such as: increased liver weight, decreased brain weight and reduced sperm motility.

DEGEE did not cause cancer, birth defects or any other fetal effects in laboratory animals. In vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

For specific health information, review the Safety Data Sheet (SDS).

**Environmental Information**

DEGEE is readily biodegradable, and its bioconcentration potential is low. Because it is miscible in water, the potential for mobility in soil is very high.

Additional environmental information for DEGEE is available on the SDS and the Ecological and Toxicological Data of DOW Glycol Ethers brochure.

**Physical Hazard Information**

DEGEE is a combustible liquid and is stable under recommended conditions. Storage containers made from carbon steel, stainless steel or phenolic-lined steel are recommended. DEGEE should not be stored in containers made from aluminum, copper, galvanized iron or galvanized steel. Contact with strong acids, strong bases and strong oxidizers should also be avoided.

DEGEE should not be distilled to dryness because it can form peroxides that are unstable. DEGEE can oxidize at elevated temperatures. Thermal decomposition products can include and are not limited to: aldehydes, ketones and organic acids.

Spills of glycol ethers, including DEGEE, on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. Additional physical property information for DEGEE is available on the SDS.
Regulatory Information
Regulations may exist that govern the manufacture, sale, transportation, use and/or disposal of DEGEE. These regulations may vary by city, state, country or geographic region. Information may be found by consulting the relevant Safety Data Sheet or Contact Us.

Additional Information
- Safety Data Sheet (http://www.dow.com/webapps/msds/msdssearch.asp)
- Contact Us (www.dow.com/oxysolvents/contact/index)

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

References
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