The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

PROPYLENE GLYCOL USP/EP

COMPANY IDENTIFICATION
The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

For MSDS updates and Product Information: 800-258-2436

Revision 2011.10.10
Print Date: 10/17/2011

Customer Information Number: 800-258-2436

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 989-636-4400
Local Emergency Contact: 989-636-4400

2. Hazards Identification

Emergency Overview
Color: Colorless
Physical State: Liquid.
Odor: Odorless

Hazard of product:
No significant immediate hazards for emergency response are known.

Potential Health Effects
Eye Contact: May cause slight temporary eye irritation. Corneal injury is unlikely. Mist may cause eye irritation.
Skin Contact: Prolonged contact is essentially nonirritating to skin. Repeated contact may cause flaking and softening of skin.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility. Mist may cause irritation of upper respiratory tract (nose and throat).

Ingestion: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

Aspiration hazard: Based on physical properties, not likely to be an aspiration hazard.

Effects of Repeated Exposure: In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

### 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount W/W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene glycol</td>
<td>57-55-6</td>
<td>&gt; 99.8 %</td>
</tr>
</tbody>
</table>

Amounts are presented as percentages by weight.

### 4. First-aid measures

**Description of first aid measures**

**General advice:** If potential for exposure exists refer to Section 8 for specific personal protective equipment.

**Inhalation:** Move person to fresh air; if effects occur, consult a physician.

**Skin Contact:** Wash skin with plenty of water.

**Eye Contact:** Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

**Ingestion:** No emergency medical treatment necessary.

**Most important symptoms and effects, both acute and delayed**

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

**Indication of immediate medical attention and special treatment needed**

No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

### 5. Fire Fighting Measures

**Suitable extinguishing media**

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

**Extinguishing Media to Avoid:** Do not use direct water stream. May spread fire.

**Special hazards arising from the substance or mixture**
Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

See Section 9 for related Physical Properties

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Keep unnecessary and unprotected personnel from entering the area. Spilled material may cause a slipping hazard.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Any absorbent material. Collect in suitable and properly labeled open containers. Wash the spill site with large quantities of water. Large spills: Dike area to contain spill. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Handling

General Handling: Product handled hot may require additional ventilation or local exhaust. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Other Precautions: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage

Store away from direct sunlight or ultraviolet light. Keep container tightly closed when not in use. Store in a dry place. Protect from atmospheric moisture. Store in the following material(s): Stainless steel. Aluminum. Container lined with phenolic or epoxy-phenolic FDA food contact approved coating. 316 stainless steel. Opaque HDPE plastic container.

<table>
<thead>
<tr>
<th>Shelf life: Use within</th>
<th>Maximum storage temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Months</td>
<td>40 °C</td>
</tr>
</tbody>
</table>
8. Exposure Controls / Personal Protection

Exposure Limits

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene glycol</td>
<td>WEEL</td>
<td>TWA</td>
<td>10 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aerosol.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAD ON OEL</td>
<td>TWA EV</td>
<td>155 mg/m³ 50 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total vapor</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>and aerosol.</td>
<td></td>
</tr>
</tbody>
</table>

Consult local authorities for recommended exposure limits.

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields). If there is a potential for exposure to particles which could cause eye discomfort, wear chemical goggles.

Skin Protection: No precautions other than clean body-covering clothing should be needed.

Hand protection: Chemical protective gloves should not be needed when handling this material. Consistent with general hygienic practice for any material, skin contact should be minimized.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance

Physical State: Liquid.
Color: Colorless
Odor: Odorless
Odor Threshold: No test data available
pH: Not applicable

Melting Point: < -20 °C EU Method A.1 (Melting / Freezing Temperature)
Freezing Point: < -20 °C EC Method A1
Boiling Point (760 mmHg): 184 °C EU Method A.2 (Boiling Temperature)
Flash Point - Closed Cup: 104 °C EC Method A9 (PMCC)
Flash Point - Open Cup: No test data available
Evaporation Rate (Butyl Acetate = 1): 0.01 Estimated.

Flammability (solid, gas): Not applicable to liquids
Flammable Limits In Air

Lower: 2.6 % (V) Estimated.
Upper: 12.5 % (V) Estimated.

Vapor Pressure: 20 Pa @ 25 °C EC Method A4
Vapor Density (air = 1): 2.62 Literature
Specific Gravity (H2O = 1): 1.03 20 °C/20 °C EU Method A.3 (Relative Density)
Solubility in water (by weight): 100 % @ 20 °C EU Method A.6 (Water Solubility)
Partition coefficient, n-octanol/water (log Pow) -1.07 EU Method A.8 (Partition Coefficient)
Autoignition Temperature 100.01 kPa > 400 °C EC Method A15
Decomposition No test data available
Temperature
Dynamic Viscosity 43.4 mPa.s @ 25 °C Literature
Kinematic Viscosity No test data available
Explosive properties Not explosive
Oxidizing properties No
Liquid Density 1.03 g/cm3 @ 20 °C Literature
Solubility in Solvents No test data available
Pour point < -57 °C Literature
Henry’s Law Constant (H) 1.2E-08 atm*m3/mole Measured

10. Stability and Reactivity

Reactivity
No dangerous reaction known under conditions of normal use.

Chemical stability
Stable under recommended storage conditions. See Storage, Section 7. Hygroscopic.

Possibility of hazardous reactions
Polymerization will not occur.

Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Avoid direct sunlight or ultraviolet sources.


Hazardous decomposition products
Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Alcohols. Ethers. Organic acids.

11. Toxicological Information

Acute Toxicity
Ingestion
LD50, rat > 20,000 mg/kg
Dermal
LD50, rabbit > 2,000 mg/kg
Inhalation
No deaths occurred at this concentration. LC50, 2 h, Aerosol, rabbit 317.042 mg/l
Eye damage/eye irritation
May cause slight temporary eye irritation. Corneal injury is unlikely. Mist may cause eye irritation.
Skin corrosion/irritation
Prolonged contact is essentially nonirritating to skin. Repeated contact may cause flaking and softening of skin.
Sensitization
Skin
Did not cause allergic skin reactions when tested in humans.
Respiratory
No relevant data found.
Repeated Dose Toxicity
In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects.

**Chronic Toxicity and Carcinogenicity**
Did not cause cancer in laboratory animals.

**Developmental Toxicity**
Did not cause birth defects or any other fetal effects in laboratory animals.

**Reproductive Toxicity**
In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

**Genetic Toxicology**
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

## 12. Ecological Information

### Toxicity

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 > 100 mg/L in the most sensitive species tested).

**Fish Acute & Prolonged Toxicity**
LC50, Oncorhynchus mykiss (rainbow trout), static test, 96 h: 40,613 mg/l

**Aquatic Invertebrate Acute Toxicity**
LC50, Ceriodaphnia Dubia (water flea), static test, 48 h: 18,340 mg/l

**Aquatic Plant Toxicity**
ErC50, Pseudokirchneriella subcapitata (green algae), Growth rate inhibition, 96 h: 19,000 mg/l

**Toxicity to Micro-organisms**
NOEC, no data available; Pseudomonas putida, 18 h: > 20,000 mg/l

**Aquatic Invertebrates Chronic Toxicity Value**
Ceriodaphnia Dubia (water flea), semi-static test, 7 d, reproduction, NOEC: 13020 mg/l

### Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Biodegradation may occur under anaerobic conditions (in the absence of oxygen).

**OECD Biodegradation Tests:**

<table>
<thead>
<tr>
<th>Biodegradation</th>
<th>Exposure Time</th>
<th>Method</th>
<th>10 Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>81 %</td>
<td>28 d</td>
<td>OECD 301F Test</td>
<td>pass</td>
</tr>
<tr>
<td>96 %</td>
<td>64 d</td>
<td>OECD 306 Test</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**Indirect Photodegradation with OH Radicals**

<table>
<thead>
<tr>
<th>Rate Constant</th>
<th>Atmospheric Half-life</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.28E-11 cm3/s</td>
<td>10 h</td>
<td>Estimated.</td>
</tr>
</tbody>
</table>

**Biological oxygen demand (BOD):**

- BOD 5: 69.000 %
- BOD 10: 70.000 %
- BOD 20: 86.000 %
- BOD 28: 86.000 %

**Chemical Oxygen Demand:** 1.53 mg/mg

**Theoretical Oxygen Demand:** 1.68 mg/mg

**Bioaccumulative potential**

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

**Partition coefficient, n-octanol/water (log Pow):** -1.07 EU Method A.8 (Partition Coefficient)

**Bioconcentration Factor (BCF):** 0.09; Estimated.

**Mobility in soil**

**Mobility in soil:** Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process. Potential for mobility in soil is very high (Koc between 0 and 50).

**Partition coefficient, soil organic carbon/water (Koc):** < 1 Estimated.
13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Recycler. Reclaimer. Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details.

14. Transport Information

TDG Small container
NOT REGULATED

TDG Large container
NOT REGULATED

IMDG
NOT REGULATED

ICAO/IATA
NOT REGULATED

15. Regulatory Information

CEPA - Domestic Substances List (DSL)
All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

European Inventory of Existing Commercial Chemical Substances (EINECS)
The components of this product are on the EINECS inventory or are exempt from inventory requirements.

Hazardous Products Act Information: CPR Compliance
This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Hazardous Products Act Information: WHMIS Classification
This product is not a " Controlled Product" under WHMIS.
16. Other Information

Product Literature
Additional information on this and other products may be obtained by visiting our web page.

Hazard Rating System

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Revision
Identification Number: 40806 / 0000 / Issue Date 2011.10.10 / Version: 5.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Not available</td>
</tr>
<tr>
<td>W/W</td>
<td>Weight/Weight</td>
</tr>
<tr>
<td>OEL</td>
<td>Occupational Exposure Limit</td>
</tr>
<tr>
<td>STEL</td>
<td>Short Term Exposure Limit</td>
</tr>
<tr>
<td>TWA</td>
<td>Time Weighted Average</td>
</tr>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists, Inc.</td>
</tr>
<tr>
<td>DOW IHG</td>
<td>Dow Industrial Hygiene Guideline</td>
</tr>
<tr>
<td>WEEL</td>
<td>Workplace Environmental Exposure Level</td>
</tr>
<tr>
<td>HAZ_DES</td>
<td>Hazard Designation</td>
</tr>
<tr>
<td>VOL/VOL</td>
<td>Volume/Volume</td>
</tr>
</tbody>
</table>

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.