1. IDENTIFICATION
Product Name: PROPYLENE GLYCOL INDUSTRIAL

Chemical Family: Glycols
CAS Number: 57-55-6
EC#: 200-338-0
Chemical Name: 1,2-Propanediol
Synonyms: Propylene Glycol, 1,2-Propanediol, 1,2-Dihydroxypropane, Monopropylene Glycol

PRODUCT USES:
Non-toxic antifreeze, non toxic heat transfer fluid, manufacture of polyester resins & other products

2. HAZARDS IDENTIFICATION
Emergency Overview

This material is NOT HAZARDOUS by OSHA Hazard Communication definition.

Signal Word    Caution.

Hazards
Slightly combustible liquid. Do not handle near heat, sparks, or open flame. May cause minor eye irritation. High aerosol concentrations may cause mild irritation of the nose and throat as well as central nervous system depression. Not expected to cause skin irritation. Not expected to be a sensitizer.

Physical State
Liquid.

Color
Clear, colorless.

Odor
Little or no odor.

Odor Threshold
No value available.

Potential Health Effects
Routes of Exposure
Eye Skin. Inhalation

Signs and Symptoms of Acute Exposure
See component summary.

- Propylene Glycol 57-55-6
  May cause minor eye irritation. High aerosol concentrations may cause mild irritation of the nose and throat as well as central nervous system depression.

Skin
Not a skin irritant. Not expected to be a sensitizer.

Inhalation
High aerosol concentrations may cause mild reversible irritation of the nose and throat as well as CNS depression (primarily fatigue, dizziness and possibly loss of concentration, with collapse, coma and death possible in cases of severe over exposure).

Eye
May cause minor eye irritation. Effects of eye irritation are reversible.

Ingestion
Ingestion of high doses may cause discomfort and irritation of the gastrointestinal tract and CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).

Chronic Health Effects
See component summary.
- Propylene Glycol 57-55-6
  Repeated or prolonged exposure of the skin to this material may cause defatting and drying of the skin. Prolonged or repeated breathing of high concentrations may cause symptoms of central nervous system depression.

Conditions Aggravated by Exposure
This material or its emissions may aggravate pre-existing eye disease.

3. COMPOSITION

<table>
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<tr>
<th>COMPONENT NAME</th>
<th>CAS#</th>
<th>EU INVENTORY</th>
<th>CONCENTRATION WT %*</th>
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<td>200-338-0</td>
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</table>

* Concentration of gaseous products or materials is given in Mole %
  Compositions given are typical values not specifications.

4. FIRST AID MEASURES
General
Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. For information refer to the Emergency Overview in Section 3 of this MSDS.

Skin
Not expected to present a significant skin hazard under anticipated conditions of normal use. If skin contact occurs, contaminated clothing and wash skin thoroughly.

Inhalation
Not expected to present a significant inhalation hazard under anticipated conditions of normal use. If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain medical attention if breathing difficulty persists.
Eye
Thoroughly flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation persists, seek medical attention.

Ingestion
Ingestion unlikely. If large quantity swallowed, give lukewarm water (pint/1/2 litre) if victim completely conscious/alert. Obtain medical attention.

Note to Physician
Treat symptomatically. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES
Flammable Properties

Classification
OSHA/NFPA Class IIIB combustible liquid.

Flash Point:
~ 109 °C (228.2 °F) (PMCC) (Aqueous solution).

Auto-Ignition Temperature
~ 371 °C (699.8 °F)

Lower Flammable Limit
~ 2.4 vol%

Upper Flammable Limit
~ 17.4 vol%

Extinguishing Media
Suitable: SMALL FIRE: Use dry chemicals, CO2, water spray or alcohol-resistant foam. LARGE FIRE: Use water spray, water fog or alcohol-resistant foam.

Unsuitable: Do not use solid water stream.

Protection of Firefighters

Protective Equipment/Clothing: Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters protective clothing will only provide limited protection.

Fire Fighting Guidance: Heat from fire can generate flammable vapor. When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined. May travel long distances along the ground before igniting and flashing back to vapor source. Fine sprays/mists may be combustible at temperatures below normal flash point. Aqueous solutions containing less than 95% propylene glycol by weight have no flash point as obtained by standard test methods. However aqueous solutions of propylene glycol greater than 22% by weight, if heated sufficiently, will produce flammable vapors. Always drain and flush systems containing propylene glycol with water before welding or other maintenance. Refer to NFPA Code 13 for guidance in using propylene glycol in sprinkler system applications. Move containers from fire area if you can do it without risk. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Hazardous Combustion Products: Incomplete combustion may produce carbon monoxide and other toxic gases.

6. ACCIDENTAL RELEASE MEASURES
Release Response
In case of accidental spill, may contaminate water supplies/pollute public waters. Evacuate/limit access. Equip responders with proper protection. Extinguish ignition sources; stop release; prevent flow to sewers or public waters. Notify fire and environmental authorities. Restrict water use for cleanup. Slippery walking/spread granular cover or soak up. Impound/recover large land spill; soak up small spill with inert solids. Use suitable disposal containers. On water, material is soluble and will disperse rapidly unless contained and collected quickly to minimize dispersion. Report per regulatory requirements.

7. HANDLING AND STORAGE
Handling
Hygroscopic. Handle with care. After handling, always wash hands thoroughly with soap and water. Always drain and flush systems containing propylene glycol with water before welding or other maintenance. Wear recommended personal protective equipment. Observe precautions pertaining to confined space entry.

Storage

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION
Engineering Controls
No special ventilation is recommended under anticipated conditions of normal use beyond that needed for normal comfort control.

Personal Protection
Inhalation: No special respiratory protection is recommended under anticipated conditions of normal use with adequate ventilation. A respiratory protection program that meets OSHA's 29 CFR 1910.134 or ANSI Z88.2 requirements must be followed whenever workplace conditions warrant respirator use.

Skin: Wear chemical resistant gloves such as: Neoprene. Where use can result in skin contact, practice good personal hygiene. The equipment must be cleaned thoroughly after each use.

Eye: Use splash goggles when eye contact due to splashing or spraying liquid is possible.

Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing/wash thoroughly before reuse.

Occupational Exposure Limits

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<tr>
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<th>VALUE</th>
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<td>US (OSHA)/2004</td>
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</table>

9. PHYSICAL AND CHEMICAL PROPERTIES

Odor: Little or no odor.

Odor Threshold: No value available. pH: ~7

Boiling Point/Boiling Range: ~ 188 °C (370.4 °F) @ 760 mm Hg

Freezing Point/Melting Point: ~ -60 °C (-76 °F)

Flash Point: ~ 109 °C (228.2 °F) (PMCC) (Aqueous solution).

Auto-ignition: ~ 371 °C (699.8 °F)
Flammability: OSHA/NFPA Class IIIB combustible liquid.

Lower Flammable Limit: ~ 2.4 vol%

Upper Flammable Limit: ~ 17.4 vol%

Explosive Properties: No Data Available.

Oxidizing Properties: No Data Available.

Vapor Pressure: < 0.1 mm Hg @ 25 °C (77 °F)

Evaporation Rate: 0.01 (butyl acetate = 1)

Relative Density: ~ 1.04 @ 25 °C (77 °F)

Relative Vapor Density: ~ 2.6 @ ~ 15 - 32 °C (59 - 89.6 °F) (Air = 1.0)

Viscosity: ~ 46 mPa.s @ 25 °C (77 °F) (Brookfield).

Solubility (Water): Complete (In All Proportions).

Partition Coefficient (Kow): ~ 0.92

Additional Physical and Chemical Properties: Volatile Characteristics: Slight: 0.1 to 1.0% Hygroscopic. Additional properties may be listed in Sections 3 and 5.

10. STABILITY AND REACTIVITY

Chemical Stability
Stable.

Conditions to Avoid
High temperatures, oxidizing conditions. May degrade when exposed to light or other radiation sources.

Substances to Avoid
Reacts with strong oxidizing agents. Strong acids. Isocyanates.

Decomposition Products
Carbon Monoxide and other toxic vapors.

Hazardous Polymerization
Not expected to occur.

Reactions with Air and Water
Not expected to occur.

11. TOXICOLOGICAL INFORMATION

Product Summary
No additional toxicology information is available for this product itself. (See Component Toxicity Information).

- Propylene Glycol 57-55-6 Acute Toxicity - Lethal Doses
  LD50 (Oral) Rat 22,000 MG/KG BWT
  LD50 (Skin) Rabbit 20,800 MG/KG BWT
Irritation
Skin Not a skin irritant. Repeated or prolonged contact with skin may cause dermatitis.
Eye May cause minor eye irritation. Effects of eye irritation are reversible.

Sensitization
Not expected to cause sensitization by skin contact, however skin reactions of unknown etiology have been described in some hypersensitive individuals following topical application.

Target Organ Effects
Skin. Repeated or prolonged contact with skin may cause defatting and drying of the skin which may result in dermatitis.

Repeated Dose Toxicity
No adverse systemic changes were reported in rats or dogs following repeated dietary exposure to high concentrations of propylene glycol. Cats responded with species-specific hematological changes (Heinz body formation) yet all other tissues were unaffected. No systemic effects, but mild eye and nasal irritation were noted in rats following sub-chronic exposure to high concentrations of propylene glycol aerosol. Overall propylene glycol is of low inherent toxicity following repeated oral or inhalation exposure.

Reproductive Effects
No adverse effect on reproductive performance was seen in male and female mice exposed continuously to high doses of propylene glycol in drinking water for up to 3 months.

Developmental Effects
Results from studies in pregnant rats, mice, hamsters and rabbits demonstrate that propylene glycol is not teratogenic or fetotoxic.

Genetic Toxicity
Negative for genotoxicity both in vitro and in vivo tests.

Carcinogenicity
No increase in tumors was noted in rats and dogs exposed to high concentrations of propylene glycol via the diet for up to 2 years. The incidence of skin tumors was unaltered in mice following dermal application over a lifetime. Not listed by IARC, NTP, or OSHA.

12. ECOLOGICAL INFORMATION
Ecotoxicity
This material is expected to be non-hazardous to aquatic species.

Environmental Fate and Pathway
See component summary.

Current page: 6
Toxicity to aquatic plants
EC50 / 72 HOUR Freshwater Algae. 24,200 mg/l
EC50 / 72 HOUR Marine algae 19,300 mg/l

Toxicity to microorganisms
Summary: No Data Available.

Chronic toxicity to fish
Summary: No Data Available.

Chronic toxicity to aquatic invertebrates
IC25 / waterflea. 13,470 mg/l
Summary: A three generation reproductive study.

Environmental Fate and Pathway

Mobility
Transport between environmental compartments: Environmental releases of propylene glycol will tend to partition to water and soil, with little potential for evaporation.

Persistence and Degradability
Biodegradation: Readily biodegradable in aerobic conditions. There is evidence that it is degraded under anaerobic conditions.

Bioaccumulation: This material is not expected to bioaccumulate. BCF < 1.5

Other Adverse Effects
No additional information available.

13. DISPOSAL CONSIDERATIONS
Comply with federal, state, or local regulations for disposal. Landfill solids at permitted sites. Burn concentrated liquids, diluting with clean, low viscosity fuel. Avoid flame outs and assure that emissions comply with all applicable standards/regulations. Dilute aqueous waste may biodegrade. Assure effluent complies with applicable regulations.

14. TRANSPORT INFORMATION
Special Requirements
If you reformulate or further process this material, you should consider re-evaluation of the regulatory status of the components listed in the composition section of this sheet, based on final composition of your product.

Proper Shipping Name PROPYLENE GLYCOL

15. REGULATORY INFORMATION
Regulatory Status
X = All components are included or are otherwise exempt from inclusion on this inventory.

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<thead>
<tr>
<th>Country</th>
<th>Inventory</th>
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</table>

SDS: PROPYLENE GLYCOL, INDUSTRIAL
If identified components of this product are listed under the TSCA 12(b) Export Notification rule, they will be listed below.

SARA 302/304
Chemicals with provided CAS numbers in this material are not subject to the reporting requirements of CERCLA.

SARA 311/312
Based upon available information, this material is not classified as a health and/or physical hazard according to Section 311 & 312.

SARA 313
This material does not contain any chemical components with known CAS numbers that exceed the De Minimis reporting levels established by SARA Title III, Section 313 and 40 CFR 372.

Component Reporting Threshold

State Reporting
This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins under California Proposition 65 at levels which would be subject to the proposition.

Massachusetts Substances List (MSL) - Extraordinarily hazardous substances must be identified when present in materials at levels greater than state specified criterion. The criterion is >= 0.0001%. Hazardous Substances (MSL-HS) on the MSL must be identified when present in materials at greater than the state specified criterion. The criterion is >= 1%. Components with CAS numbers present in this material, at levels specified in Section 2 - Composition do not require reporting under the statute.

Hazardous Substances listed by the State of Pennsylvania must be identified when present in materials at levels greater than the state specified criterion. The criterion is >= 1%. Components with CAS numbers in this material at a level which could require reporting under the statute are:

• Propylene Glycol / CAS# 57-55-6.

Special Hazardous Substances listed by the State of Pennsylvania must be identified when present in materials at levels greater than the state specified criterion. The criterion is >= 0.01%. Components with CAS numbers present in this material, at levels specified in Section 2 - Components, do not require reporting under the statute.

16. OTHER INFORMATION

DISCLAIMER OF RESPONSIBILITY
This document is generated for the purpose of distributing health, safety, and environmental data. It is not a specification sheet nor should any displayed data be construed as a specification. The information on this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with handling, storage, use, or disposal of this product. If the product is used as a component in another product, this MSDS information may not be applicable.

Numerical Data Presentation
The presentation of numerical data, such as that used for physical and chemical properties and toxicological values, is expressed using a comma (,) to separate digits into groups of three and a period (.) as the decimal marker. For example, 1,234.56 mg/kg = 1 234.56 mg/kg

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Date Updated: 6/5/2015