1. Chemical Product and Manufacturer
   A. Product Name: Propylene glycol USP (PG-USP).
   B. Recommended Use and Restrictions on Use
      • Recommended Use: Medicines, cosmetics, food additives, essence/flavor.
      • Restrictions on use: Prohibited for uses other than those specified above.
   C. Manufacturer/Supplier/Distributor
      • Supplier: SKC Co., Ltd
      • Address: 55, Gosa-dong, Nam-gu, Ulsan, Korea
      • Information Service or Emergency Contact Number: 052)278-5511–6
      • Department in Charge: Safety Environment Team

2. Hazards-Risks
   A. Classification of Hazards-Risks
      • PG USP is not a dangerous material per the OSHA Hazard Communication
        Definition.
   B. Warning Sign, Including Caution
      • Pictograph: No pictograph.
      • Signal words: No signal words.
      • Hazard-Risk Words: No hazard/signal words.
      • Precaution Words: No precaution words.
   C. Other Hazards and Risks Not Included in the Hazard and Risk Classification (NFPA)
      • Public Health: 0, Fire: 1, Reactivity: 0

3. Name and Contents of Ingredients
   Substance Name
   Propylene glycol
   1,2-PROPYANEDIOL
   57-55-6
   Over 99.9
   Under 0.1
   Dipropylene Glycol, Others

4. First Aid Measures
   A. Eye
      • Irrigate eyes with a heavy stream of water for over 15 minutes.
   B. Skin
      • Wash clothing or shoes contaminated with a chemical substance before reuse.
      • Take off clothing or shoes contaminated with a chemical substance, wash out the
        affected area with soap for over 15 minutes.

Ulsan Plant of SKC
Material Safety Data Sheet (MSDS)

Classificatio
n No. | Propylene Glycol USP (PG-USP) | Page
--- | --- | ---
US-P-205 | 2/8 |

- Immediately wash with soapy water for over 15 minutes to remove chemical substances.

C. Inhalation
- If effects of exposure appear move the patient to a non-polluted area.
- If chemical is inhaled, consult with medical personnel immediately.

D. Ingestion
- If chemicals are ingested, consult with medical personnel.

E. First Aid and Doctor’s Caution: No data.

5. Fire Fighting and Explosion Measures

A. Suitable (Unsuitable) Fire Extinguishing Agents
- Suitable Fire Extinguishing Agents: CO2, powder fire extinguishing agent, carbon dioxide, water, ordinary foam, alcohol resistant foam.
- Unsuitable Fire Extinguishing Agents: No data.
- For Big Fires: Use an alcohol resistant foam and a fine water spray.

B. Specific Hazards from Chemical Substances
- Pyrolysis Products: Carbon dioxide, carbon monoxide.
- Fire and Explosion risk: Slight risk of fire.

C. Protective Devices to Wear for Fire Extinguishing and Preventive Actions
- Move the case from near the fire if work can be done without risk.
- Spray high-pressure water on the leaked substance to prevent scattering.
- Construct a bank for further processing.
- Use a fire extinguisher that has been used and found effective for nearby fire.
- Avoid inhalation of substances or their fumes.
- Stand facing the wind and avoid low areas.

6. Measures for Accidental Spillages

A. Actions and Protective Devices Required to Protect the Body
- Workers should only stop a chemical spill if it is not dangerous to do so.

B. Actions for the Protection of the Environment
- Air: No data.
- Soil: No data.
- Water: No data.

C. Purification or Removal Method
- Small Spills
  - For further disposal, move the leaked substance to a suitable case and dispose.
  - Absorb using nonflammable substances.
  - Quarantine the exposed area and restrict access to the area except for the related personnel.

Ulsan Plant of SKC
7. Handling and Storage
A. Tips for Safe Handling
   • Store in an enclosed case.
   • Ventilate using an overall or local air exhauster.
   • Wash the body and clothing after using chemicals.
B. Safe Storage
   • Store in an enclosed case.
   • Store in a cool and dry place.
   • Avoid contact with moisture.
   • Avoid contact with halogens and intermediate halogens.
   • Store and use in accordance with the laws and regulations of the relevant
goVERNMENT department and local self-governing bodies.
   • Store in well-ventilated areas.

8. Prevention of Exposure and Personal Protective Devices
A. Exposure Standard of Chemicals, Biological Exposure Criteria
   • Domestic Regulations: No data.
   • ACGIH Regulations: No data.
   • Biological Exposure Criteria: No data.
B. Suitable Engineering Management
   • Check whether the work process complies with the allowable standards and
   exposure standards of the Ministry of Labor.
   • Install a ventilation device, such as a local exhauster, to ensure a suitable control
   wind speed.
C. Personal Protective Devices
   • Protection of Respiratory Organs
     - Make sure to wear protection devices certified by KOSHA.
   • Eye Protection
     - Install an emergency shower and basins for easy use by workers.
     - Wear protective glasses to protect the eyes from scattering substances.
   • Eye Protection
     - Wear chemical resistant gloves to avoid the direct contact of water and chemicals.
   • Body Protection
     - Wear chemical resistant protective wear to protect the skin.

9. Physical/Chemical Characteristics
A. Appearance
   Physical Properties: Liquid.
   Color: Achromatic.
B. Smell: Odorless.
C. Detection Threshold: No data.
D. Melting Point/Freezing Point: -60 °C.
E. Initial Boiling Point and Range of Boiling Point: 188 ~ 189 °C.
F. Steam Pressure: 0.08 mm Hg (at 25 °C).
G. Solubility: 1,000 g/ml.
H. Steam Density: 2.6-2.62.
I. Specific Gravity: 1.0361.
J. n-Octanol/Water Partition Coefficient: -1.4.
K. Viscosity: 58.1 cP (20°C).
L. Molecular Weight: 76.09.

10. Stability and Reactivity
A. Chemical Stability: Stable at room temperature and normal pressure.
B. Possibility of hazardous reaction: No polymerization.
C. Conditions to Avoid
   - Avoid heat, flames, sparks and other sources of ignition. Avoid contact with
     substances that are prohibited for mixing.
D. Substances to Avoid
   - Acids, bases, combustible substances, halogen carbon chemicals, metals, metallic
     salts, oxidizers, reducers.
E. Hazardous Substances Created at the Time of Decomposition
   - Pyrolysis products or burning products: Carbon oxide.

11. Information on Toxicity
A. Information on Route of Highly Likely Exposure
   - Respiratory Organ: No data.
   - Oral: No data.
   - Skin Contact: No data.
   - Eye Contact: No data.
B. Delay by Short-term and Long-term Exposure, Acute Effects and Chronic Effects
   - Acute Toxicity
     - Oral: LD50 2000 mg/kg rat (Classification 4 by the Ministry of Labor).
     - Percutaneous: LD50 > 16000 mg/kg rabbit.
     - Inhalation: No data.
   - Skin Corrosion or Stimulation
     - Rabbit/OECD Guide-line 404: No irritation.
     - Human/Skin (104 mg/2D): Moderate irritation.
     - Male/Skin (10%/2D): Moderate irritation.
     - Children/Skin (30%/96H): Moderate irritation.
   - Severe Eye Damage or Irritation
     - Human/Eye: Weak irritation.
- Rabbit/Eye (100 mg): Minor irritation.
- Hypersensitivity of Respiratory Organ: No data.
- Skin Hypersensitivity: Human/Draize Test: No hypersensitivity.
- Carcinogenicity
  - IARC: No data.
  - NTP: No data.
  - OSHA: No data.
  - WISHA: No data.
  - ACGIH: No data.
- Mutagenesis of reproductive cells
  - In vitro - Salmonella typhimurium/TA 98, TA100, TA1535, TA1537 (Reverse Mutation Test; Ames Test): Negative; Human/sister chromatid exchange test: Negative.
- Reproductive Toxicity
  - If 1230 mg/kg is administered to a pregnant rabbit for 10 days as food, no effect on fertilization rate is observed together with no effect on the survival rate of the embryo or mother.
  - Skeletal system and teratogenesis are the biggest index for toxicity in the embryo and none in the mother. It is observed in mouse ≥500 mg/kg/day and rat ≥1,000 mg/kg/day. Effects on the weight and survival rate of the embryo occur at the higher densities.
- Target Organ: Whole Body Poisonous Substance (One Exposure)
  - Non-toxicity symptom is the restriction of central nerve if anesthetized. No organ to target.
- Target Organ: Whole Body Poisonous Substance (Repeated Exposure)
  - If exposed to rats for 90 days, weight and feed intake decreases, but no change is seen in the clinical-chemical and blood values. No toxic effects on organs (liver, kidney, pancreas and lung).
- Inhalation Toxicity: No data.

### 12. Effects on Environment

**A. Aquatic: Terrestrial Ecological Toxicity**
- Fish: LC50 710 mg/l 96 hr Oncorhynchus mykiss.
- Crustacean: EC50 > 1000 mg/l 48 hr Daphnia magna.
- Birds: EC50 > 1000 mg/l 72 hr Selenastrum capricornutum.

**B. Residual Tendency and Resolvability**
- Residual Tendency: log Kow -1.4.
- Resolvability: No data.

**C. Biological Condensability**
- Condensability: BCF < 1.
- Biological Condensability: > 60 (%) 10 days.

**D. Soil Mobility: No data.**
E. Other Hazardous Effects: No data.

13. Cautions for Disposal

A. Disposal Method
   • Discard the contents and case according to the regulations if it is regulated in the Waste Management Act.

B. Caution for Disposal
   • Consider the caution indicated in the regulations if it is regulated in the Waste Management Act.

14. Information on Transportation

A. UN No.: No information on the classification of the UN Transport of Hazardous Substances.
B. Suitable Ship Name: N/A.
C. Class of Risk at Transportation: N/A.
D. Case Grade: N/A.
E. Marine Pollutants: No data.
F. Special Measures That a User Should Know with Regard to Transportation or Means of Transportation
   • Emergency Measures for Fire: N/A.
   • Emergency Measures for Leakage: N/A.

15. Legal Regulation Status

A. Regulations of the Occupational Safety and Health Acts: No data.
B. Regulations of the Hazardous Chemical Management Act: No data.
C. Regulations by the Hazardous Substance Safety Management Act: 4 Class 3 Petroleum (Soluble Liquid) 4000ℓ.
D. Regulations by the Waste Management Act: No data.
E. Regulations by Other Domestic and Foreign Acts
   • Domestic Regulations
     - Residue-Prone Organic Pollutant Management Act: N/A.
   • International Regulations
     - America Management Information (OSHA Regulations): N/A.
     - America Management Information (CERCLA Regulations): N/A.
     - America Management Information (EPCRA 302 Regulations): N/A.
     - America Management Information (EPCRA 304 Regulations): N/A.
     - America Management Information (EPCRA 313 Regulations): N/A.
     - America Management Information (Rotterdam Convention): N/A.
     - America Management Information (Stockholm Convention): N/A.
     - America Management Information (Montreal Protocol): N/A.
     - EU Classification Information (Fixed Classification): N/A.
16. Other References

A. Source of Data

- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (Physical Properties)
- International Program on Chemical Safety (IPCS INCHEM) (http://www.inchem.org/) (Color)
- The Chemical Database, The Department of Chemistry at the University of Akron (http://ull.chemistry.uakron.edu/erd) (B. Smell)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (E. Melting Point/Freezing Point)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (G. Flashing Point)
- National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (H. Upper/Lower Limit of Ignition or Exposure Range)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (a. n-Octanol/Water Partition Coefficient)
- The Chemical Database, The Department of Chemistry at the University of Akron (http://ull.chemistry.uakron.edu/erd) (c. Decomposition Temperature)
- International Program on Chemical Safety (IPCS INCHEM) (http://www.inchem.org/) (d. Molecular Weight)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (Oral)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (Injectant)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (Skin Corrosion or Irritation)
- Corporate Solution From Thomson Micromedex (http://csi.micromedex.com) (Skin Corrosion or Irritation)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (Severe Eye Damage or Irritation)
- Corporate Solution From Thomson Micromedex (http://csi.micromedex.com) (Severe Eye Damage or Irritation)
- International Program on Chemical Safety (IPCS INCHEM) (http://www.inchem.org/) (Skin Irritation)
Mutagenicity

- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (Target Organ: Whole Body Poisonous Substance (One Exposure))
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (Target Organ: Whole Body Poisonous Substance (Repeated Exposure))
- ECOTOX (Fish)
- ECOTOX (Crustaceans)
- National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (Birds)
- International Uniform Chemical Information Database (IUCLID) (http://ecb.jrc.it/esis) (Residual Tendency)
- SIDS (Condensability)
- SIDS (Bio-degradability)

B. Date of Initial Creation: Mar. 1, 1996

C. Number of Revision and Final Date of Revision
   - Number of Revision: 4 times
   - Final Revision Date: Feb. 10, 2011

D. Others
   - The above Material Safety Data Sheet (MSDS) was created with some modifications in reference to the MSDS provided by the Korea Occupational Safety & Health Agency (KOSHA).