

Material Safety Data Sheet (MSDS)

Class No.	Propylene Glycol USP (PG USP)	Page
US-P-205		1/8

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: +82-52-278-5511~6
 - 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	Dipropylene Glycol, Others
Nickname (Usual Name)	1,2-Propanediol	-
CAS No.	57-55-6	-
Contents (%)	Over 99.8	Under 0.2

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

Material Safety Data Sheet (MSDS)

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

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 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 Protecting 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.
- Big Spills: No data.

Material Safety Data Sheet (MSDS)

Class No.	Propylene Glycol USP (PG USP)	Page
US-P-205		3/8

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.

Material Safety Data Sheet (MSDS)

Class No.	Propylene Glycol USP (PG USP)	Page
US-P-205		4/8

- D. Melting Point/Freezing Point : -60 °C.
- E. Initial Boiling Point and Range of Boiling Point: 186 ~ 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.

Material Safety Data Sheet (MSDS)

Class No.	Propylene Glycol USP (PG USP)	Page
US-P-205		5/8

- 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 $\geq 1,000$ 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.

Material Safety Data Sheet (MSDS)

Class No.	Propylene Glycol USP (PG USP)	Page
US-P-205		6/8

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.
 - EU Classification Information (Risk Words): N/A.
 - EU Classification Information (Safety Words): N/A.

Material Safety Data Sheet (MSDS)

Class No.	Propylene Glycol USP (PG USP)	Page
US-P-205		7/8

16. Other References

A. Source of Data

- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (Physical Properties)
- o International Program on Chemical Safety (IPCS INCHEM) (<http://www.inchem.org/>) (Color)
- o The Chemical Database, The Department of Chemistry at the University of Akron (<http://ull.chemistry.uakron.edu/erd>) (B. Smell)
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (E. Melting Point/Freezing Point)
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (G. Flashing Point)
- o 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)
- o National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (I. Steam Pressure)
- o National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (J. Solubility)
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (a. n-Octanol/Water Partition Coefficient)
- o The Chemical Database, The Department of Chemistry at the University of Akron (<http://ull.chemistry.uakron.edu/erd>) (c. Decomposition Temperature)
- o International Program on Chemical Safety (IPCS INCHEM) (<http://www.inchem.org/>) (d. Molecular Weight)
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (Oral)
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (Injectant)
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (Skin Corrosion or Irritation)
- o Corporate Solution From Thomson Micromedex (<http://csi.micromedex.com>) (Skin Corrosion or Irritation)
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (Severe Eye Damage or Irritation)
- o Corporate Solution From Thomson Micromedex (<http://csi.micromedex.com>) (Severe Eye Damage or Irritation)
- o International Program on Chemical Safety (IPCS INCHEM) (<http://www.inchem.org/>) (Skin Irritation)
- o National Library of Medicine/genetic toxicology (NLM/GENETOX) (<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?GENETOX>) (Reproductive Cell Mutagenicity)
- o National Library of Medicine/Chemical Carcinogenesis Research Information System (NLM/CCRIS) (<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?CCRIS>)

Material Safety Data Sheet (MSDS)

Class No.	Propylene Glycol USP (PG USP)	Page
US-P-205		8/8

(Reproductive Cell Mutagenicity)

- o National Library of Medicine/Agency for Toxic Substances and Disease Registry (NLM/ATSDR) (<http://www.atsdr.cdc.gov/MHMI/mmg111.html>)(reproductive toxicity)
- o International Uniform Chemical Information Database(IUCLID) (<http://ecb.jrc.it/esis>) (Target Organ· Whole Body Poisonous Substance (One Exposure))
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (Target Organ· Whole Body Poisonous Substance (Repeated Exposure))
- o ECOTOX (Fish)
- o ECOTOX (Crustaceans)
- o National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (Birds)
- o International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>) (Residual Tendency)
- o SIDS (Condensability)
- o SIDS (Bio-degradability)

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

C. Number of Revision and Final Date of Revision

- Number of Revision : 5 times
- Final Revision Date : Mar. 17, 2016

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).

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