Material Safety Data Sheet (MSDS)

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1. Chemical Product and Manufacturer

A. Product Name: Dipropylene Glycol (DPG).

B. Recommended Use and Restrictions on Use

- Recommended Use: Paints and general solvents
- Restrictions on use: Prohibited for uses other than those specified above.

C. Manufacturer/Importer/Distributor

- Supplier: SK picglobal Co.,Ltd
- Address: 255, Yongjam-ro, Nam-gu, Ulsan 44782, 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

- DPG 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	Oxybispropanol
Nickname (Usual Name)	Dipropylene Glycol
CAS No.	25265-71-8
Contents (%)	Over 99.5

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 and remove clothing or shoes contaminated with a chemical substance.
- Immediately take off and 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, water, ordinary foam.
- Unsuitable Fire Extinguishing Agents: No data.
- For Big Fires: Use an ordinary fire fighting agent and a fine water spray.

B. Specific Hazards from Chemical Substances
- Pyrolysis Products: Acids, aldehydes, 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.

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-vented 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. pH: N/A

D. Melting Point/Freezing Point : -32 ℃.

E. Initial Boiling Point and Range of Boiling Point: 228 ~ 240℃.

F. Flash Point: 121 ℃ (PMCC).

G. Steam Pressure: 0.0319 ㎜ Hg (at 25℃).

H. Water Solubility: Soluble (1000g/L).
I. Steam Density: 4.63 (air=1).
J. Specific Gravity: 1.02-1.04 (water=1).
K. Viscosity: 107 cP (at 20 ℃).
L. Molecular Weight: 134.18

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 ㎎/㎏ rat (Classification 4 by the Ministry of Labor).
  - Percutaneous: LD50 > 16000 ㎎/㎏ 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 ㎎/ℓ 96 hr Oncorhynchus mykiss.
- Crustacean: EC50 > 1000 ㎎/ℓ 48 hr Daphnia magna.
- Birds: EC50 > 1000 ㎎/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. Caution 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 Chemical Management Law

- Existing chemicals to be registered : No data
- New chemical substances : No data
- toxic substances : No data
- Restricted material : No data
- prohibited substances : No data
- Accident preparation material : No data

C. Regulations of the Hazardous Chemical Management Act: No data.

D. Regulations by the Hazardous Substance Safety Management Act: 4 Class 3 Petroleum (Soluble Liquid) 4000ℓ.

E. Regulations by the Waste Management Act: No data.

F. 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.

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)
- National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (I. Steam Pressure)
- National Institute of Technology and Evaluation (NITE) (http://www.safe.nite.go.jp/ghs/h18_bunrui.html) (J. Solubility)
- 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)
- National Library of Medicine/genetic toxicology (NLM/GENETOX)

(http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?GENETOX) (Reproductive Cell Mutagenicity)

- National Library of Medicine/Chemical Carcinogenesis Research Information System (NLM/CCRIS) (http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?CCRIS) (Reproductive Cell Mutagenicity)
- National Library of Medicine/Agency for Toxic Substances and Disease Registry (NLM/ATSDR) (http://www.atsdr.cdc.gov/MHMI/mmg111.html)(reproductive toxicity)
- 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 : 6 times
- Final Revision Date : Jan 31. 2020

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).