Glory Global
CO.,LTD

Material Safety Data Sheet

Product name	IPA

1. Identification of the substance/mixture and of the company/undertaking

1.1. Product name	IPA
1.2. CAS-No.	67-63-0
1.3. Other names / Synonyms	Dimethyl carbinol Propanol, secIsopropanol Propyl alcohol, secIPA propan-2-ol
1.4. Relevant identified uses of the substance or mixture and uses advised against	
Identified uses	Industrial Solvent.
1.5. Details of the supplier of the safety data sheet	
Company	Glory Global CO.,LTD
Address	C-208, 10, Nowon-ro 15-gil, Nowon-gu, Seoul, Korea
Emergency Phone	+82 2 6223 0862

2. Hazards identification

2.1. GHS Classification	Flammable liquids, Category2 Serious eye damage/eye irritation, Category 2 Specific target organ toxicity - single exposure, Category 3, Inhalation, Oral, Narcotic effects. Aspiration hazard, Category 2
2.2. GHS Label Elements Symbol(s)	
2.3. Signal Words	Danger
2.4. GHS Hazard statements	
PHYSICAL HAZARDS	- H225: Highly flammable liquid and vapor. - HEALTH HAZARDS: - H319: Causes serious eye irritation. - H336: May cause drowsiness or dizziness. - H305: May be harmful if swallowed and enters airways. - ENVIRONMENTAL HAZARDS: Not classified as an environmental hazard under GHS criteria.
GHS Precautionary Statements	- H225 Highly flammable liquid and vapor - H302 Harmful if swallowed - H304 May be fatal if swallowed and enter airways - H315 Causes skin irritation - H319 Causes serious eye irritation - H335 May cause respiratory irritation - H336 May cause drowsiness or dizziness - H351 Suspected of causing cancer - H360 May damage fertility or the unborn child - H371 Causes damage to organs (Respiratory system) - H372 Causes damage to organs (Central nervous system, Hematopoietic system) through prolonged or repeated exposure - H400 Very toxic to aquatic life - H411 Toxic to aquatic life with long lasting effects
PRECAUTIONARY STATEMENTS	PREVENTION - P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking. - P233: Keep container tightly closed. - P240: Ground/bond container and receiving equipment. - P241: Use explosion-proof electrical/ventilating/lighting equipment. - P242: Use only non-sparking tools. - P243: Take precautionary measures against static discharge. - P280: Wear protective gloves/protective clothing/eye protection/face protection. - P264: Wash hands thoroughly after handling. - P261: Avoid breathing dust/fume/gas/mist/vapours/spray. - P271: Use only outdoors or in a well-ventilated area.

RESPONSE
- P303+P361+P353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- P370+P378: In case of fire: Use appropriate media for extinction.
- P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P337+P313: If eye irritation persists: Get medical advice/attention.
- P301+P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P331: Do NOT induce vomiting.
- P304+P340: IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
- P312: Call a POISON CENTER or doctor/physician if you feel unwell.

STORAGE
- P403+P235: Store in a well-ventilated place. Keep cool.
- P233: Keep container tightly closed.
- P405: Store locked up.

DISPOSAL
- P501: Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

2.5. Other hazards which do not result in classification. Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire danger. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Slightly irritating to respiratory system.

Aggravated Medical Condition - Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Eyes. Skin. Respiratory system.

3. Composition/information on ingredients

3.1. Substances

Chemical Identity : Propan-2-ol — Propan-2-ol

Synonyms — Dimethyl carbinol
Propanol, secIsopropanol
Propyl alcohol, secIPA
propan-2-ol

CAS No — 67-63-0

EINECS No. — 200-661-7

3.2. Classification of components according to GHS

Chemical Name	SYNONYMS	CAS NO.	Hazard Class (categoty)	Hazard statement	Conc.
Isopropyl Alcohol		67-63-0	Flam. Liq., 2; Eye Dam,. 2A; STOT SE. 3; Asp. Tox., 2;	H225; H319; H336; H305;	100.00%

Additional Information — The below phrase is for noticing the detail hazard information to user, although there is no Korean GHS category: The subdivision (A) of “Serious eye damage/eye irritation Cat. 2” (linked to “H319 = Causes serious eye irritation”) is a detailed UN GHS subdivision which has not been adopted in Korea and it is applicable to consolidate into Korea category 2.

4. First aid measures

4.1. Description of first aid measures

General advice — - In general no treatment is necessary, however, obtain medical advice.

If inhaled — - Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

In case of skin contact — - Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.

In case of eye contact — - Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Transport to the nearest medical facility for additional treatment.

If swallowed — - If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3° C), shortness of breath, chest congestion or continued coughing or wheezing. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Give nothing by mouth. Do not induce vomiting.

4.2. Most important symptoms and effects, both acute and delayed — - Eye irritation signs and symptoms may include a burning sensation and a temporary redness of the eye. Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.

4.3. Indication of any immediate medical attention and special treatment needed	- Potential for chemical pneumonitis. Consider: gastric lavage with protected airway, administration of activated charcoal. Call a doctor or poison control center for guidance.

5. Firefighting measures

5.1. Suitable extinguishing media	- Alcohol-resistant foam, water spray or fog. - Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. - Do not discharge extinguishing waters into the aquatic environment.
5.2. Special hazards arising from the substance or mixture	- Carbon monoxide may be evolved if incomplete combustion occurs. - The vapour is heavier than air, spreads along the ground and distant ignition is possible.
5.3. Special protective equipment and percautions for fire fighters	- Wear full protective clothing and self-contained breathing apparatus.
5.4. Further information	- Keep adjacent containers cool by spraying with water.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures	- Avoid contact with spilled or released material. Immediately
6.2. Protective Equipment and EmergencyProcedures	- Remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet.
6.3. Environmental precautions	- Shut off leaks, if possible without personal risks. - Remove all possible sources of ignition in the surrounding area. - Use appropriate containment (of product and fire fighting water) to avoid environmental contamination. - Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. - Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. - Take precautionary measures against static discharge. - Ensure electrical continuity by bonding and grounding (earthing) all equipment.
6.4. Methods and materials for containment and cleaning up	- For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. - Do not flush away residues with water. - Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. - Remove contaminated soil and dispose of safely. - For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. - Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. - Remove contaminated soil and dispose of safely.

7. Handling and storage

7.1. General Precautions	- Avoid breathing vapours or contact with material. Only use in well ventilated areas. - Wash thoroughly after handling. - On guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
7.2. Precautions for Safe Handling	- Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk. - The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable. Extinguish any naked flames. - Do not smoke. Remove ignition sources. Avoid sparks. - Handling Temperature: Ambient
7.3. Conditions for Safe Storage	- Keep away from aerosols, flammables, oxidizing agents, corrosives and from products harmful or toxic to man or to the environment. - Must be stored in a well-ventilated area, away from sunlight, ignition sources and other sources of heat. Storage - Temperature: Ambient.
7.4. Product Transfer	- Keep containers closed when not in use. - Do not use compressed air for filling, discharging or handling. - Refer to guidance under Handling section.
7.5. Recommended Materials	- For container paints, use epoxy paint, zinc silicate paint. - For containers, or container linings use mild steel, stainless steel.
7.6. Unsuitable Materials	- Aluminium if > 50 °C. Most plastics. Neoprene rubber.
7.7. Container Advice	- Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.
7.8. Other Advice	- Ensure that all local regulations regarding handling and storage facilities are followed. - See additional references that provide safe handling practices: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).

8. Exposure controls/personal protection

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

8.1. Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Isopropyl Alcohol	ACGIH	TWA	200 ppm		
m-XYLENE	ACGIH	STEL	400 ppm		
o-XYLENE	KOR OEL	TWA	200 ppm	480 mg/m3	
p-XYLENE	KOR OEL	STEL	400 ppm	980 mg/m3	

8.2. Additional Information

- Wash hands before eating, drinking, smoking and using the toilet.

8.3. Biological Exposure Index (BEI)

Material	Determinant	Sampling time	BEI	Reference
Isopropyl Alcohol	acetone in Urine	Sampling time: End of shift at end of work week.	40 mg/l	ACGIH BEL (2011)

8.4. Appropriate Engineering

- The level of protection and types of controls necessary will vary

8.5. Controls

- depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
- Appropriate measures include: Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
- Local exhaust ventilation is recommended.
- Eye washes and showers for emergency use.
- Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking.
- Routinely wash work clothing and protective equipment to remove contaminants.
- Discard contaminated clothing and footwear that cannot be cleaned.
- Practice good housekeeping. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
- Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation. Drain down system prior to equipment break-in or maintenance Retain drain downs in sealed

8.6. Individual Protection Measures

- Personal protective equipment (PPE) should meet recommended national standards.
- Check with PPE suppliers.

8.7. Respiratory Protection

- If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
- Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
- Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)].

8.8. Hand Protection

- Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739, AS/NZS:2161) made from the following materials may provide suitable chemical protection: Longer term protection: Natural rubber.
- Butyl rubber. Incidental contact/Splash protection: Neoprene rubber. Viton.
- For continuous contact we recommend gloves with breakthrough time of more 240 minutes with preference for > 480 minutes where suitable gloves can be identified.
- For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed.
- Glove thickness is not a B117good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material.
- Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity.
- Always seek advice from glove suppliers.
- Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed

8.9. Eye Protection

- Chemical splash goggles (chemical monogoggles).

8.10. Body Protection

- Skin protection not ordinarily required beyond standard issue work clothes. It is good practice to wear chemical resistant gloves. Wear antistatic and flame retardant clothing.

8.11. Thermal hazards

- Not applicable

8.12. Monitoring Methods

- Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls.
- For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.
- Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods

8.13. Environmental Exposure Controls	- Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour. - Take appropriate measures to fulfill the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Chapter 6. - If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Clear Liquid
Odour	Characteristic
Odour Threshold	Data not available.
pH	Not applicable
Melting / freezing point	-88 °C /-126 °F
Initial Boiling Point and Boiling Range	82 - 83 °C / 180 - 181 °F
Flash point	12 °C / 54°F(Abel)
Explosion / Flammability limits in air	2 - 12 %(V)
Auto-ignition temperature	425 °C / 797 °F(ASTM D-2155)
Flammability (solid, gas)	Yes, in certain circumstances product can ignite due to static electricity.
Vapour pressure	6,020 Pa at 20 °C / 68°F
Relative Density	0.78 - 0.79 at 20 °C / 68 °F
Density	785 - 786 kg/m3 at 20 °C / 68 °F(ASTM D-4052)
Water solubility	Completely miscible.
Solubility in other solvents	Readily soluble in various organic solvents.
n-octanol/water partition coefficient (log Pow)	0.05
Decomposition temperature	Note:: Stable under normal conditions of use., Reacts with strong oxidising agents., Reacts with strong acids.
Dynamic viscosity	2.43 mPa.s
Kinematic viscosity	Data not available.
Vapour density (air=1)	2 at 20 °C / 68°F
Electrical conductivity	Electrical conductivity: > 10 000 pS/m, A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid., This material is not expected to be a static accumulator.
Volatile organic carbon	59.9 % (EC/1999/13)
Evaporation rate (nBuAc=1)	1.5 (ASTM D 3539, nBuAc=1)
Surface tension	22.7 mN/m at 20 °C / 68 °F
Molecular weight	60.1 g/mol
Hygroscopicity	Completelymiscible.

10. Stability and reactivity

10.1. Chemical stability	- Stable under normal conditions of use. - Reacts with strong oxidising agents. - Reacts with strong acids.
10.2. Conditions to avoid	- Avoid heat, sparks, open flames and other ignition sources.
10.3. Incompatible Materials	- Strong oxidising agents. Strong acids.
10.4. Hazardous Decomposition Products	- Thermal decomposition is highly dependent on conditions. - A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.
10.5. Possibility of Hazardous Reactions	- Data not available.
10.6. Sensitivity to Static Discharge	- Yes, in certain circumstances product can ignite due to static electricity.

11. Toxicological information

11.1. Information on the likely routes of exposure

Basis for Assessment	- Information given is based on producttesting.
Likely Routes of Exposure	- Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.
11.2. Acute Toxicity	- Not available
Acute Oral Toxicity	- Low toxicity: LD50 >5000 mg/kg ,Rat
Acute Dermal Toxicity	- Low toxicity: LD50 >5000 mg/kg ,Rabbit
Acute Inhalation Toxicity	- Low toxicity if inhaled.
11.3. Skin Corrosion/Irritation	- Not irritating to skin.
11.4. Serious Eye Damage/Irritation	- Irritating to eyes.
11.5. Respiratory Irritation	- May cause drowsiness and dizziness.
11.6. Respiratory or skin sensitisation	- Not a skin sensitiser.
11.7. Aspiration hazard	- Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
11.8. Germ Cell Mutagenicity	- Not mutagenic.
11.9. Carcinogenicity	- Not a carcinogen.

Material	Carcinogenicity Classification
Isopropyl Alcohol	ACGIH Group A4: Not classifiable as a human carcinogen.
Isopropyl Alcohol	IARC 3: Not classifiable as to carcinogenicity to humans.
Isopropyl Alcohol	GHS / CLP: No carcinogenicity classification

11.10. Reproductive and Developmental Toxicity	- Does not impair fertility. Not a developmental toxicant.
11.11. Specific target organ toxicity - single exposure	- Vapours may cause drowsiness and dizziness.
11.12. Specific target organ toxicity - repeated exposure	- Kidney: caused kidney effects in male rats which are not considered relevant to humans
11.13. Additional Information	- Exposure may enhance the toxicity of other materials.

12. Ecological information

12.1. Basis for Assessment	- Information given is based on producttesting.
12.2. Acute Toxicity	
Fish	- Practically non toxic: LL/EL/IL50 > 100 mg/l
Aquatic crustacea	- Practically non toxic: LL/EL/IL50 > 100 mg/l
Algae/aquatic plants	- Practically non toxic: LL/EL/IL50 > 100 mg/l
Microorganisms	- Practically non toxic: LL/EL/IL50 > 100 mg/l
12.3. Mobility	- If product enters soil, one or more constituents will be mobile and may contaminate groundwater. - Dissolves in water
12.4. Persistence/degradability	- Oxidises rapidly by photo-chemical reactions in air. - Readily biodegradable.
12.5. Bioaccumulative Potential	- Not expected to bioaccumulate significantly.

13. Disposal considerations

13.1 Material Disposal	- Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. - Do not dispose into the environment, in drains or in water courses. Waste product should not be allowed to contaminate soil or water.
13.2. Container Disposal	- Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. - Residues may cause an explosion hazard. - Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metalreclaimer.
13.3. Local Legislation	- Disposal should be in accordance with applicable regional, national, and local laws and regulations. - Local regulations may be more stringent than regional or national requirements and must be in compliance.

14. Transport information

14.1. Land (as per ADR classification): Regulated	Class : 3 Packing group : II Hazard identification no. : 33 UN number : 1219 Danger label (primary risk) : 3 UN proper shipping name : ISOPROPANOL Environmental hazards : No
14.2. IMDG	Identification number UN 1219 UN proper shipping name ISOPROPANOL Class / Division 3 Packing group II Marine Pollutant: No - Special precautions for user : Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport
14.3. IATA (Country variations may apply)	UN number : 1219 UN proper shipping name : Isopropanol Class / Division : 3 Packing group : II - Special precautions for user : Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
14.4. Additional Information	- This product may be transported under nitrogen blanketing. - Nitrogen is an odourless and invisible gas. Exposure to nitrogen may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.

15. Regulatory information

15.1. Chemical Inventory Status	AICS : Listed. DSL : Listed. INV (CN) : Listed. ENCS (JP) : Listed. (2)-207 ISHL (JP) : Listed. 2-(8)-319 TSCA : Listed. EINECS : Listed. 200-661-7 KECI (KR) : Listed. KE-29363 PICCS (PH) : Listed.

15.2. Local Regulations

INDUSTRY SAFETY
- Prohibited chemicals: Not applicable
HEALTH ACT
-Chemicals subject to approval: Not applicable
- Chemicals subject to control: Applicable - Threshold >=1%
TOXIC CHEMICAL
- Toxic chemicals: Not applicable
CONTROL ACT
- Observation chemicals: Not applicable
- Restricted. Prohibited chemicals: Not applicable
- Priority chemicals for chemical accidents: Not applicable
HAZARDOUS MATERIAL
- Category/Classification of dangerous material: Category 4
ACT
- Dangerous Goods (Flammable Liquids), Alcohols
WASTE MANAGEMENT ACT
- Dispose in compliance with local requirements and regulations as applicable.
Other Information
- regulation under ISHA
- This MSDS is prepared pursuant to the provisions of the Industrial Safety and Health Law.

16. Other information

16.1. Further information

- Always work safely around open hatches on bulk tanks. The low density makes flotation difficult for immersed person.