

Safety Data Sheet(SDS)

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

- 1) Product identifier : ISOPROPYL ALCOHOL BULK
- 2) Relevant identified uses of the substance or mixture and uses advised against
 - Relevant identified uses
 - 48.Others (Semiconductor/Display Washing and pharmaceutical manufacturing)
 - Uses advised against
- 3) Supplier information
 - Company name [Manufacture]
 - Company : LGC Yeosu (Hwachi)
 - Address : 116-8, Yeosusandan 2-ro, Yeosu-si, Jeollanam-do, Republic of Korea
 - Emergency number : 82-61-680-1333

2. HAZARD IDENTIFICATION

- 1) Hazard classification
 - Flammable liquids Category 2
 - Serious eye damage/eye irritation Category 2
 - Specific target organ toxicity single exposure Category 3(Narcotic effects)
 - Aspiration hazard Category 2

- 2) Allocation label elements

Hazard pictograms



Signal word

- DANGER

Hazard statements

- H225 Highly flammable liquid and vapour
- H305 May be harmful if swallowed and enters airways
- H319 Causes serious eye irritation
- H336 May cause drowsiness or dizziness

Precautionary statements
- Prevention

- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P233 Keep container tightly closed.
- P240 Ground and bond container and receiving equipment.
- P241 Use facilities such as explosion-proof electricity, ventilation and lighting.
- P242 Use nonsparking tools.
- P243 Take action to prevent static discharges.
- P261 Avoid breathing mist/vapours/spray.
- P264 Wash eye thoroughly after handling.
- P271 Use only outdoors or in a wellventilated area.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.

- Response

- P301+P310 If you swallow: immediately receives medical institutions and doctors' consultation.
- P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
- P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P312 If you feel uncomfortable, receive medical institutions and doctors' consultation.
- P331 Do NOT induce vomiting.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P370+P378 In case of fire: Use alcohol foam, carbon dioxide, or water spray to extinguish.

- Storage

- P403+P233 Store in a wellventilated place. Keep container tightly closed.
- P403+P235 Store in a wellventilated place. Keep cool.
- P405 Store locked up.

- Disposal

- P501 Dispose of contents and containers according to the legislation of the waste

3) Other hazards

○ Product NFPA Level

Health	Flammability	Reactivity
1	3	0

(※ 0 = Insufficient , 1 = Slightly , 2 = ordinary , 3 = Highness , 4 = Very high)

3. Composition/Information on ingredients

Components	Common name	CAS No.	PCT(wt%)
2-Propanol	Isopropanol	67-63-0	100

4. FIRST AID MEASURES

1) Following eye contact

- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Seek immediate medical assistance.

2) Following skin contact

- For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.
- For minor skin contact, avoid spreading material on unaffected skin.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Remove and isolate contaminated clothing and shoes.
- Seek immediate medical assistance.
- Wash skin with soap and water.

3) Following inhalation

- Keep victim warm and quiet.
- Give artificial respiration if victim is not breathing.
- Seek immediate medical assistance.
- Move to fresh air.

4) Following ingestion

- Seek immediate medical assistance.

5) Advice to physician

- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media
 - For mixtures containing alcohol or polar solvent: Alcohol-resistant foam.
 - CO₂.

- Water spray.
- Use dry sand or earth to smother fire.
- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.

- Unsuitable extinguishing media

- Direct water.

2) Special hazards arising from the substance or mixture

- Pyrolytic product

- During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

- Risk of fire and explosion

- Vapors may travel to source of ignition and flash back.
 - Vapors may form explosive mixtures with air.
 - Vapor explosion hazard indoors, outdoors or in sewers.
 - Runoff may create fire or explosion hazard.
 - HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
 - When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
 - Containers may explode when heated.
 - Fire may produce irritating and/or toxic gases.
 - Can form explosive mixtures at temperatures at or above the flashpoint.

- Other

- May cause toxic effects if inhaled or absorbed through skin.
 - Fire may produce irritating, corrosive and/or toxic gases.
 - Some liquids produce vapors that may cause dizziness or suffocation.
 - May cause toxic effects if inhaled.

3) Special protective equipment for firefighters

- Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.
- Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).

- Evacuate area and fight fire from a safe distance.
- Rescuers should put on appropriate protective gear.

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment

- Please note that materials and conditions to be avoided.
- Cover with plastic sheet to prevent spreading.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- All equipment used when handling the product must be grounded.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Clean up spills immediately, observing precautions in Protective Equipment section.

2) Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.
- Runoff may cause pollution.

3) For cleaning up

- Use clean non-sparking tools to collect absorbed material.
- Large Spill: Dike far ahead of liquid spill for later disposal.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Absorb the liquid and scrub the area with detergent and water.
- Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Dike and collect water used to fight fire.

7. HANDLING AND STORAGE

1) Precautions for safe handling

- Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)
- Measure atmospheric oxygen concentration and ventilate the area during the operation since low-closed area can cause oxygen deficiency.
- Caution: Heat.
- Handling refer to engineering control/personal protection section.
- Please note that materials and conditions to be avoided.
- All equipment used when handling the product must be grounded.
- Do not enter storage area unless adequately ventilated.
- Avoid breathing vapors from heated material.
- Loosen closure cautiously before opening.
- Use care in handling/storage.
- Use only in a well-ventilated area.
- DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION;.

2) Conditions for safe storage (including any incompatibilities)

- Store in a cool/low-temperature, well-ventilated {dry} place {away from heat and ignition sources}
- Please note that materials and conditions to be avoided.
- Store in a closed container.
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Chemical exposure limits, Biological exposure standard

Components	Occupational exposure limits	ACGIH	Biological standard
2-Propanol	TWA : 200.0ppm STEL : 400.0ppm	TWA : 200ppm STEL : 400ppm	No data available

2) Appropriate engineering controls

- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

3) Personal protection equipment

- Respiratory protection
 - Wear breathing protection, which needs a confirmation from the Korea Occupational Safety and Health Agency.
 - If high frequency of use or exposure, wear air respirator.
- Eye protection
 - Wear suitable protective goggles and face shields.
- Hand protection
 - Wear suitable protective gloves.
- Body protection
 - Wear suitable protective clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless liquid
Physical state	Liquid
Colour	Colorless
Odour	Very mild alcoholic odor
Odour threshold	22 ppm
pH	No data available
Melting point/freezing point	-89.5 °C

Initial boiling point and boiling range	80°C
Flash point	11.7°C
Evaporation rate	1.7
Flammability(solid, gas)	Flammable liquid
Upper/lower flammability or explosive limits	12 / 2%
Vapour pressure	45.4 mmHg (25 °C)
Solubility(ies)	100 g / 100Mℓ
Vapour density	2.1
Relative density	0.79 (Water = 1)
n-octanol/water partition coefficient	0.05
Auto ignition temperature	456 °C
Decomposition temperature	No data available
Viscosity	2.1mm ² /s
Molecular weight(mass)	60.0952

10. STABILITY AND REACTIVITY

1) Stability and hazardous reactivity

- May cause toxic effects if inhaled or absorbed through skin.
- Fire may produce irritating, corrosive and/or toxic gases.
- Vapors may travel to source of ignition and flash back.
- Vapors may form explosive mixtures with air.
- Vapor explosion hazard indoors, outdoors or in sewers.
- Runoff may create fire or explosion hazard.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.

- Containers may explode when heated.
- Can form explosive mixtures at temperatures at or above the flashpoint.

2) Conditions to avoid

- Ignition source(heat, spark, flame, etc.).

3) Incompatible materials

- Combustibles, reducing material.

4) Hazardous decomposition products

- During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

11. TOXICOLOGICAL INFORMATION

1) Exposure route information

- Inhalation
 - Gases can be exposed through the respiratory tract, eyes and skin.
- Skin Contact
 - Vapors/mist can be exposed through the respiratory tract, eyes and skin.
 - Liquids can be exposed through the eyes, skin and oral.
- Eye Contact
 - Causes serious eye irritation
- Ingestion
 - May be harmful if swallowed and enters airways

2) Health hazard information

- Acute toxicity
 - Acute toxicity(Oral)
LD50 5840 mg / kg experimental species: Rat (OECD TG 401), Source: ECHA
 - Acute toxicity(Dermal)
LD50 12800 mg / kg experimental species: Rabbit (OECD TG402), Source: ECHA
 - Acute toxicity(Inhalation:Gases)
No data available
 - Acute toxicity(Inhalation:Vapours)
LC50 12800 ppm 3 hr experiment species: Rat (OECE TG 403, GLP), Source: ECHA
 - Acute toxicity(Inhalation:Dust/mist)
No data available
- Skin corrosion/irritation
Skin irritation test using rabbits, mild irritation to rabbits.
- Serious eye damage/eye irritation
Serious eye damage / irritation test with rabbits being observed irritation is not fully recovered in the OECD TG 405, 14 days. The stimulus is fully Restored Within 21 days. Cause severe irritation should Maximum mean total score MMTS1day = 8-25 / 110, Maximum mean total score MMTS14day = 0-2 / 110, Source: ECHA
- Respiratory sensitization
No data available
- Skin sensitization
Skin sensitization test results OECD TG 406, GLP, non irritable using guinea pigs, Source: ECHA
- Carcinogenicity
3 (IARC)

A4 (ACGHI), Source: IARC, ACGHI

○ Germ cell mutagenicity

Regardless of the in vitro gene using my mammalian cell culture mutagenicity tests results OECD TG 476, GLP, irrespective of metabolic activation system whether voice, returns using in vitro microbial mutagenesis test results OECD TG 471, metabolic activation system whether your audio / bio mammalian erythrocyte micronucleus test results using the OECD TG 474, GLP, voice, Source: ECHA

○ Reproductive toxicity

Epoetjiman is teratogenic in the teratogenicity test of test mice, weight gain, decrease of the test animals showed a toxicity of such anesthetic effect, lowering of pregnancy, targeting the rat there was a reproductive toxicity, such as an increase in fetal deaths first-generation reproductive toxicity test (OECD TG 415, GLP), pre-implantation losses increase, kitten average weight reduction show (NOAEL (P) = 853 mg / kg bw / day) targeting rat fetal developmental toxicity test (OECD TG 414, GLP), maternal weight reduction occurs. Teratogenicity is not negative (NOAEL (maternal toxicity) = 400 mg / kg bw / day (actual dose received), NOAEL (developmental toxicity) = 400 mg / kg bw / day (actual dose received)), Source: ECHA

○ Specific target organ toxicity single exposure

The decrease in activity appears by inhalation in the rat. Irritation of the digestive tract, acute poisoning in humans, such as lowering blood pressure, body temperature, symptoms of central nervous system, kidney failure appear. Acute inhalation toxicity tests using rats OECD TG 403, GLP, exhausted from 10,000ppm, severe movement disorders, agitation decreased, slowed or difficulty breathing, decreased neuromuscular resilient, search hypothermia, loss of reflexes observed. Of temporary concentration associated with transient concentration-related narcosis and coma loyalists boundaries truly visible impact TARGET ORGANS: central nervous system, Source: ECHA

○ Specific target organ toxicity repeated exposure

Has been reported that the effect on the blood vessels, liver, spleen 4 months inhalation exposure experiment testing rat, 90 ilah chronic inhalation toxicity test results using the influence and acting anesthetic that the recognized rats and mice on the kidney OECD TG 413, GLP, ataxia, reflecting astonishment defects, visible toxic central nervous system, including activity decreases. Weight gain, and observed changes in various blood and serum clinical chemistry index, increased liver weight absolute., Source: ECHA

○ Aspiration hazard

Within 24 hours of administration of the test rats spectacle has been recognized by the death from cardiopulmonary arrest, tying the viscosity can be sucked back and forth during the respiratory hazards of about 1.6 mm² / s

12. ECOLOGICAL INFORMATION

1) Aquatic toxicity

● Fish

LC50 9640 mg / ℓ 96 hr Pimephales promelas (OECD Guideline 203), Source: ECHA

● Crustacea

LC50 5102 mg / ℓ 24 hr Daphnia magna (OECD TG 202), Source: ECHA

- Aquatic algae

EC50 1800 mg / ℓ 7 day other (*Scenedesmus quadricauda*, reliability: 2), Source: ECHA

2) Persistence and degradation

- n-octanol water partition coefficient

0.05 log Kow (), Source: ICSC

- Degradation

(BOD5 / COD ratio \geq 0.5, should immediately biodegradable, EU Method C.5), Source: ECHA

- Biodegradation

(Soon also biodegradable EU Method C.5), Source: ECHA

3) Bioaccumulative potential

No data available

4) Mobility in soil

(Log = 0.03 blanket), Source: SIDS

5) Other adverse effects

Bird: 7d-other: Toxicity threshold *Scenedesmus quadricauda* = 1 800 mg / L, Source: ECHA

13. DISPOSAL CONSIDERATIONS

1) Disposal methods

- Every commercial waste producer shall either treat wastes generated from his/her place of business by him/herself or commission the treatment of such wastes to a person who has license for a waste treatment business under Article 26(3), a person who recycles of such wastes under Article 44(2), a person who has installed and operates a waste disposal facility under Article 4 or 5, a person who has completed the registration of a business of discharging wastes into the sea under Article 18 of the Marine Environment Management Act.

2) Precautions (including disposal of contaminated container of package)

- Do not allow spill material to enter sewers, storm water drains, soil, etc.

14. TRANSPORT INFORMATION

1) UN No. : 1219

2) Proper shipping name : ISOPROPANOL (ISOPROPYL ALCOHOL)

3) Class or division : 3

4) Packing group : II

5) Marine pollutant : Not applicable

6) Special safety response for transportation or transportation measure :

Emergency measures in case of fire : F-E

Emergency measures in the effluent : S-D

- ADR

- Tunnel restriction code : D/E
- IMDG
 - Marine pollutant : Not applicable
- Air transport(IATA)
 - UN No. : 1219
 - Proper shipping name : ISOPROPANOL (ISOPROPYL ALCOHOL)
 - Class or division : 3
 - Packing group : II

15. REGULATORY INFORMATION

1) Occupational Safety and Health Act in Korea

- Environment measure substance(more than 1%), Hazardous Substances Requiring Management(more than 1%), Special medical examination material(more than 1%), Substance exposure limits

2) Toxic Chemical Control Act in Korea

- Pollutant release and transfer register substances

3) Safety Control of Dangerous Substances Act in Korea

- Class 4) Alcohols(Designated quantity:400ℓ)

4) Wastes Control Act in Korea

- Designated waste (Waste organic solvent)
- In case of disposal, it must be disposed of in accordance with Article 13 of the Waste Management Act.

5) Other regulations in KOREA and Abroad regulations

- ETC regulation
 - EU. GHS Classification. CLP Reg. No 1272/2008 of 16 Dec 2008, Annex VI, Table 3.1, List of harmonized classification & labelling
 - OSHA Hazard Communication Standard: On One of the Floor Lists of the OSHA HCS (29 CFR 1910.1200)
- PERSISTENT ORGANIC POLLUTANTS CONTROL ACT
 - Not applicable
- Act on the registration and evaluation of chemicals
 - Existing Commercial Chemical Substances

16. OTHER INFORMATION

1) Reference

- ChemIDPlus
- ECHA

- HSDB
- ICSC
- Ministry of Employment and Labor
- Ministry of Environment
- SIDS

2) Print date : 2022-05-18

3) Revision date

- Revised date count : 0
- Last revised date : 2022-05-18
- Last revised history :

4) Other