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1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

- 1) Product identifier: IPA (Isopropyl alcohol)
- 2) Relevant identified uses of the substance or mixture and uses advised against:
 - Relevant identified uses: Cleaning/washing agents, Solvents, Reaction Intermediate, Process Speed Regulator, Viscosity Regulator
 - Uses advised against: No data available
- 3) Manufacture/Supplier/Distributor information:
 - Manufacture information:
 - Company name: ISU CHEMICAL CO., LTD
 - Address: 8, Seokdang-gil, Onsan-eup, Ulju-gun, Ulsan, Korea
 - Emergency telephone number: Tel. +82 52 231 5587 Fax. +82 52 231 5699

2. HAZARD IDENTIFICATION

- 1) Hazard classification: Flammable Liquids Cat.2
 Serious eye damage/eye irritation Cat.2B
 Specific Target Organ Toxicity Single Exposure Cat.3
- 2) Allocation label elements including precautionary statements
 - Hazard pictograms:



 - Signal word: Danger
 - Hazard statements
 - H225: Highly Flammable liquid and vapour.
 - H320: Causes eye irritation
 - H336: May cause drowsiness or dizziness.
 - 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.
 - P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
 - P264: Wash thoroughly after handling.
 - P271: Use only outdoors or in a well-ventilated area.
 - P280: Wear protective gloves/protective clothing/eye protection/face protection.
 - Response:

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- P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
 - P304+P340: IF INHALED : Remove victim to fresh air and keep at rest in a position 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: Call a POISON CENTER or doctor/physician you feel unwell.
 - P337+P313: If eye irritation persists: Get medical advice/attention.
 - P370+P378: In case of fire: Use suitable extinguishing media to extinguish.
 - Storage:
 - P403+P233: Store in a well-ventilated place. Keep container tightly closed.
 - P403+P235: Store in a well-ventilated place. Keep cool.
 - P405: Store locked up.
 - Disposal:
 - P501: Dispose of contents/container to (in accordance with local/regional/national/International regulations.)
- 3) Other hazards: No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS


Components	Common name	CAS No.	Concentration(wt%)
2-Propanol	Propan-2-ol	67-63-0	100

* EC No. 200-611-7

* EU REACH Registration No.: 01-2119457558-25-****

4. FIRST AID MEASURES

- 1) Following eye contact:
 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 - If eye irritation persists: Get medical advice/attention.
 - Even if you don't have symptoms such as erythema or irritation, wash your eyes and immediately transfer the victim to a hospital.
- 2) Following skin contact:
 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
 - Call 911 or emergency medical service.
 - Remove and isolate contaminated clothing and shoes.
 - In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
 - Wash skin with soap and water.


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- 3) Following inhalation:
- Call 911 or emergency medical service.
 - Give artificial respiration if victim is not breathing.
 - Administer oxygen if breathing is difficult.
- 4) Following ingestion:
- Potential for aspiration if swallowed.
 - Get medical aid immediately.
 - Do not induce vomiting unless directed to do so by medical personnel.
 - Never give anything by mouth to an unconscious person.
 - If vomiting occurs naturally, have victim lean forward.
- 5) Advice to physician:
- 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:
- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
 - Use dry sand or earth to smother fire.
 - Direct water (Unsuitable extinguishing media)
- 2) Special hazards arising from the substance or mixture:
- During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
 - Highly Flammable liquid and vapour.
 - Violent reaction may cause fire and explosion.
 - Containers may explode when heated.
 - Runoff may create fire or explosion hazard.
 - Vapor explosion hazard indoors, outdoors or in sewers.
- 3) Special protective equipment for firefighters:
- Rescuers should put on appropriate protective gear.
 - Evacuate area and fight fire from a safe distance.
 - Move containers from fire area if you can do it without risk.
 - Fire involving Tanks: Do not spray directly exposure and safety equipment because of freezing.
 - Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
 - Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.
 - Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
 - Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.

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- Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

6. ACCIDENTAL RELEASE MEASURES

- 1) Health considerations and protective equipment:
 - Do not breathe dust/fume/gas/mist/vapours/spray.
 - Remove all ignition sources because microscopic particles can cause fire or explosion.
 - Clean up spills immediately, observing precautions in Protective Equipment section.
 - Do not touch or walk through spilled material.
 - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
 - All equipment used when handling the product must be grounded.
 - Stop leak if you can do it without risk.
 - Please note that materials and conditions to be avoided.
- 2) Environmental precautions:
 - Runoff may cause pollution.
 - Prevent entry into waterways, sewers, basements of confined areas.
- 3) For cleaning up:
 - Build a dike and collect the water for the fire extinguishing.
 - Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.
 - Absorb the liquid and scrub the area with detergent and water.
 - Large Spill: Dike far ahead of liquid spill for later disposal.
 - Use clean non-sparking tools to collect absorbed material.

7. HANDLING AND STORAGE

- 1) Precautions for safe handling:
 - Do not expose the ignition source, heat, static electricity.
 - Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
 - Please note that materials and conditions to be avoided.
 - Handling refer to engineering control/personal protection section.
 - Loosen closure cautiously before opening.
 - Use care in handling/storage.
 - All equipment used when handling the product must be grounded.
 - Avoid breathing dust/fume/gas/mist/vapors/spray.
 - Use only outdoors or in a well-ventilated area.
- 2) Conditions for safe storage (including any incompatibilities):
 - Empty drums should be completely drained, properly bunged, and promptly returned to the drum reconditioners or properly placed.

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- Please note that materials and conditions to be avoided.
- Avoid Ignition source(heat, spark, flame)
- Store in a dry place. Store in a closed container.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Chemical exposure limits, Biological exposure standard:

Components	Occupational exposure limits (Domestic)	ACGIH	Biological limit values
2-Propanol	TWA - 200ppm, 480mg/m ³ STEL - 400ppm, 980mg/m ³	TWA - 200ppm, STEL - 400ppm	No data available


2) Appropriate engineering controls:

- Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
- Install the equipment for shower and safety showers.
- Facilities that store or use this substance should be equipped with a washing facility and a safety shower.

3) Personal protection equipment

- Respiratory protection:
 - Under conditions of frequent use or heavy exposure, respiratory protection may be needed.
 - Wear breathing protection, which needs a confirmation from the Korea Occupational Safety and Health Agency.
 - Wear an air mask or self-contained respirator if oxygen is insufficient (<19.6%).
- Eye protection:
 - Wear suitable protective goggles and face shields..
 - Provide emergency showers and eyewash.
 - Wear safety goggles that can be used with safety goggles that are protected against non-product and harmful liquids
- Hand protection:
 - Wear suitable protective gloves.
 - Wear insulating gloves.
- Body protection:
 - Wear suitable protective clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

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- 1) Appearance(Physical state, color, etc): Clear colorless liquid
- 2) Odor: Alcohol odor(2)
- 3) Odor threshold: 90mg/m³
- 4) pH: No data available
- 5) Melting point/freezing point: -87.9℃
- 6) Initial boiling point and boiling range: 82~83℃
- 7) Flash point: 12℃
- 8) Evaporation rate: 1.7(Butyl acetate=1)
- 9) Flammability(solid, gas): No data available
- 10) Upper/lower flammability or explosive limits: 2% / 12%
- 11) Vapour pressure: 4,400Pa 25℃
- 12) Solubility(ies): Miscible
- 13) Vapour density: 2.1 (Air=1)
- 14) Relative density: 0.78509 at 25℃
- 15) n-octanol/water partition coefficient: 0.05 at 25℃
- 16) Auto ignition temperature: 456℃
- 17) Decomposition temperature: No data available
- 18) Viscosity: 2.038mPa.s at 25℃, 1.028mPa.s at 50℃
- 19) Molecular weight(mass): 60.095

10. STABILITY AND REACTIVITY

- 1) Stability and hazardous reactivity:
 - Explosive mixture may be formed in flash point or more.
 - Flammable liquid and vapour
 - Violent reaction may cause fire and explosion.
 - Containers may explode when heated.
 - Runoff may create fire or explosion hazard.
 - HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames
 - Fire may produce irritating, corrosive and/or toxic gases.
- 2) Conditions to avoid:
 - Ignition source(heat, spark, flame)
- 3) Incompatible materials:
 - No data available
- 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


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- No data available
- 2) Health hazard information
 - Acute toxicity:
 - Oral: LD50 > 2,000 mg/kg bw (Rat, OECD TG 423)
 - Dermal: LD50 > 2,000 mg/kg (Rat, OECD TG 402)
 - Inhalation(Gas): No data available
 - Inhalation(Vapor): No data available
 - Inhalation(Dust, mist): No data available
 - Skin corrosion/Irritation:
 - Not irritating (Rabbit, OECD TG 404)
 - Serious eye damage/irritation:
 - mild eye irritation (Rabbit, OECD TG 405)
 - Respiratory sensitization:
 - No data available
 - Skin sensitization:
 - Not sensitising (Guinea pig, OECD TG 406)
 - Carcinogenicity:
 - Non-cancerous(Mouse/Rat, OECD TG 451)
 - Germ cell mutagenicity:
 - In vivo - *Mouse*: Negative (Micronucleus assay, OECD TG 474, GLP)
 - In vitro - Chromosomal aberration test :Negative (OECD TG 473)
 - Return mutation: negative (equivalent to or similar to OECD TG 471)
 - Reproductive toxicity:
 - NOAEL = 3500ppm (Teratogenicity of N-propanol and Isopropanol administered at high inhalation concentrations to rats, 1988)
 - Second Generation Reproductive Toxicity : NOEL = 500mg/kg/day (Two-generation Reproduction Toxicity Study with Isopropanol in Rats, 1995)
 - Specific target organ toxicity (single exposure):
 - Acute Oral Toxicity: Temporary decrease in voluntary movement in test animals was observed (OECD TG 423, rats)
 - Specific target organ toxicity (repeated exposure):
 - 90-day repeat toxicity (inhalation): Inhalation exposure to test animals, effects of liver weight increases and kidneys that are not considered biologically important in high doses are observed (OECD TG 413, rats and mice)
 - Aspiration hazard:
 - Aspiration pneumonia: generally kidney and liver dysfunction can be observed temporarily, cause serious kidney disorder. (Human)

12. ECOLOGICAL INFORMATION

- 1) Aquatic toxicity:
 - Fish: LC50 (96h) > 100 mg/L (OECD TG 203)

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- Crustacean: EC50 (48h) > 1,000 mg/L (OECD TG 202)
- Algae: EC50 (ErC50, EbC50) (72h) > 1,000 mg/L, NOEC ≥ 1,000mg/L (OECD TG 201)
- 2) Persistence and degradation: log Kow= 0.05 (Calculated),
BOD=86%(14d, OECD TG 301 F, GLP)
- 3) Bioaccumulative potential: BCF= 3(Calculated)
- 4) Mobility in soil: Koc= 1.5(Calculated)
- 5) Other adverse effects: No data available

13. DISPOSAL CONSIDERATIONS


- 1) Disposal methods:
 - Dispose of contents/container to the waste control act.
- 2) Precautions (including disposal of contaminated container of package):
 - Regulations precautions indicated in Waste Management Act should be considered.

14. TRANSPORT INFORMATION

- 1) UN No.: UN 1219
- 2) Proper shipping name: ISOPROPANOL(Isopropyl alcohol)
- 3) Class or division: Class 3
- 4) Packing group: II
- 5) Marine pollutant: Not listed
- 6) Special safety response for transportation or transportation measure:
 - Emergency measures in case of fire : F-E
 - Emergency measures in the effluent : S-D

15. REGULATORY INFORMATION

- 1) Occupational Safety and Health Act in Korea:
 - Work environment monitoring substance(measurement period:6month)
 - Substance for administration
 - Special medical examination substance(examination period:12month)
 - Exposure standard established
 - Process Safety Report (PSM) Substances subject to submission
- 2) Chemicals Control Act in Korea: Not applicable
- 3) Safety Control of Dangerous Substances Act in Korea: Class 4 alcohol (400ℓ)
- 4) Wastes Control Act in Korea: Designated waste
- 5) Other regulations in KOREA and Abroad regulations:
 - Other regulation (Domestic):
 - Persistent Organic Pollutants (POPs) Control Act: Not applicable
 - National regulations:

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- U.S.A. management information(OSHA regulation): Not applicable
- U.S.A. management information(CERCLA regulation): Not applicable
- U.S.A. management information(EPCRA 302 regulation): Not applicable
- U.S.A. management information(EPCRA 304 regulation): Not applicable
- U.S.A. management information(EPCRA 313 regulation): Not applicable
- U.S.A. management information(Rotterdam Convention on Substances): Not applicable
- U.S.A. management information(Stockholm Convention on Substances): Not applicable
- U.S.A. management information(Montreal Protocol on Substances): Not applicable
- EU Classification (Classification): F; R11 Xi; R36 R67
- EU Classification (Risk Phrases): H225, H305, H319
- EU Classification (Safety Phrases): S2, S7, S16, S24, S25, S26

16. OTHER INFORMATION

1) Reference:

- Korea Occupational Safety & Health Agency MSDS
- OECD SIDS
- ChemWATCH
- IUCLID
- HSDB
- IARC
- ECOTOX
- NITE
- Recommendations on the transport of dangerous goods
- NCIS
- Emergency response guide book
- ECOSAR
- QSAR
- EU RAR
- The Chemical Database
- ICSC
- RTECS
- NIOSH Pocket guide
- ESIS
- ECHA CHEM
- HPVIS

2) Print date: 2007. 12. 12

3) Number of revised/Date of last revision: 7 /2022. 02. 24

4) Other: No data available