Number: 003

Section 1. Product and Company Identification

Product name: Isopropyl alcohol
Synonyms: -
Recommended use and Restrictions on use: Manufacture of propanone and derivatives; manufacture of glycerin and iso-propylaceate acetate; solvents of essential oil and other oils, biological alkali, glue, the resin, etc.; possible solvents of cellulosic derivatives; painting solvents; antifreeze of liquid fuel; enamel paint; extracting process; dehydrated agents; preservative; lotion; denaturing agents.
Manufacturer, Importer, or Supplier: Shiny Chemical Industrial Co., Ltd. Address: No.5, Yeong Gong 1st Rd, Yeong An Dist., Kaohsiung 82841, Taiwan, R.O.C. Telephone: +886-7-8619171 ext. 711~714
Emergency telephone number: +886-7-8619171 ext. 711~714 Fax: +886-7-6222620

Section 2. Hazards Identification

Classification:

1. Flammable Liquids, Category 2
2. Acute Toxicity: Oral, Category 5
3. Serious Eye Damage/Eye Irritation, Category 2A
4. Reproductive Toxicity Class 2
5. Specific target organ system toxicants ~ repeated exposure level 1
6. Specific target organ system toxicants ~ single exposure level 1
7. Specific target organ system toxicants ~ single exposure level 3

Label elements:

Hazard pictograms: Flame, Exclamation mark, Health hazards

Signal word: Danger

Hazard Statements:

1. Highly Flammable liquid and vapour.
2. Harmful if swallowed.
3. May cause respiratory irritation.
4. Causes serious eye irritation.

Precautionary statements:

1. Avoid contact with eyes. 2. Keep away from sources of ignition - No Smoking. 3. Keep containers in a well-ventilated place. 4. Don't flush to the drainage. 5. Prevent the static.
Other Hazards: -

Section 3. Composition/Information on Ingredients

Pure substance

Chemical Name: Isopropyl alcohol
Synonyms: 2-Propanol, Dimethylcarbinol, sec-Propyl alcohol, Isopropanol
CAS NO. : 67-63-0
Weight: 100%

Section 4. First Aid Procedures

Description of first aid measures: • Inhalation: 1. Remove contamination sources or move victims to fresh air. 2. If breathing stops, administer artificial respiration. 3. Get medical attention immediately. • Skin contact: 1. Wash skin with warm water for at least 15 minutes. 2. Remove contaminated clothing or shoes when washing, and clean them thoroughly before reuse or abandon. 3. Get medical attention if irritation develops or persists. • Eye contact: 1. Immediately lift eyelids, flushing eyes with plenty of warm water for at least 20 minutes. 2. Get medical attention immediately. • Ingestion: 1. Administer plenty of water to induce vomiting if victims don't lose consciousness or with the convulsion. 2. Get medical attention immediately.
The most Important Symptoms and Hazardous Effects: 1. Irritation. 2. A large exposure will lead to conscious loss and death.
Protection for emergency personnel: Use appropriate personal protective equipment such as class C clothing to take first aid in a safety area.
Notes to Physicians: -

Section 5. Firefighting Measures

Suitable extinguishing media: Carbon dioxide, dry chemical, alcohol foam.
Special hazards during firefighting: 1. Vapors and liquids are flammable. Liquids will accumulate electric charges. Vapors heavier than air will propagate to distant places. It may cause flash back when meeting fire sources. 2. It may decompose and produce toxic gas at a high temperature. Containers may break and explode in a fire scene.
Firefighting procedures: 1. Evacuate and extinguish fire from safe distance or protected areas. 2. Place in windward areas to avoid dangerous vapor and poisonous decomposing materials. 3. Stop the leak first before extinguishing fire. Let it burn if leaks cannot be stopped and have on harm in surroundings. If extinguishing fire in advance without stopping leaks, vapors with the air will form explosive mixtures and ignite again. 4. Isolate unfired materials and protect personnel. 5. Move containers away from the fire scene in safe condition. 6. Cool exposed storage tanks or containers with water mist. 7. It may be invalid to extinguish fire with water mist but can dilute leaks and flush ignition sources away. 8. If leaks have not ignited, spray water mist to disperse vapors and protect the personnel stop spill. 9. It is invalid to extinguish fire with spouts. 10. Large fire of large-scale area, use auto-operated control shelf of water mist or auto-waved extinguishing water aims. 11. Evacuate from a fire scene as possible and let the fire burn thoroughly. 12. Keep away from storage tanks. 13. When safety valves of storage tanks alarm or change color, evacuate immediately. 14. Forbid personnel without special protective apparatus entering.
Protective equipment for firefighters: Extinguishing staffs should wear an approved/certified respirator, splash goggles, and firefighting coats.

Section 6. Accidental Release Measures

Personal precautions: 1. Restrain personnel from close to spilled areas before totally cleaning out. 2. Confirm the cleaning work be responsible by trained staffs. 3. Wear appropriate personal protective equipments.
Environmental precautions:

1. Ventilate this area.
2. Remove all sources of ignition.
3. Report to governmental safety and hygiene institutes and related units.

Methods for cleaning up:

1. Do not touch spilled material.
2. Avoid leaks flushing to sewers or confined areas.
3. Try to stop or reduce leaks in safety condition.
4. Use sand, soil, and inert absorbing agents to block leaks.
5. Small spill: Use the material, not react with spill, to absorb. Contaminated absorbing agents have same risk as spill. Place in covered and labeled containers. Spray water on spilled areas. Use plenty of water to dilute small spill.
6. Large spill: Contact fire control, urgent handling units and suppliers to seek aid.

Section 7. Handling and Storage

Handling:

1. This material is flammable and toxic liquid. Engineering control should be applied and make the best use of personal protective equipments when handling. Educate risk of this material and use of safety.
2. Remove all ignition sources away from heat and incompatible substances.
3. There should be a "No smoking" sign in workspace.
4. The liquids will accumulate the electric charge. Consider extra design to increase electric conductance. All barrels, containers, and pipelines must have earth connection and contact with naked metal. While transporting and operating, reduce velocity of flow, increase operating time to elevate the time that the liquids stays in pipeline, or operate at low temperature.
5. When the operation of allocation is not in the airtight system, insure allocating containers, received-transporting apparatus and containers connected with same electric potential.
6. Empty tanks, containers, and pipelines may have risk residuals. Don't weld, cut, hole or do other heat work before clearing up.
7. Use spark-resistant ventilation system in workplace. Apparatus should be the explosion-proof type.
8. Avoid mist or vapors. Operate in well-ventilated assigned place and adopt the minimum consumption. Separate operation and storage areas.
9. Wear appropriate personal protective equipment to avoid contacting with this chemical or contaminated apparatus if necessary.
10. Don't use with incompatible substances (such as strong oxidants) to avoid increasing risk of fire and explosion.

Storage:

1. Keep sidewalks and exports unimpeded.
2. Storage and large operating areas are considered to install fire and spill detection system, and appropriate automatic fire-fighting system or enough and useful emergency apparatus.
3. Use storage containers made of compatible substances. Package carefully to avoid spray out.
4. Don't use air or inert gas to pressurize and transport liquids from containers.
5. Unless allocating areas isolated with the fire-resistant structure, don't allocate and work in storage areas.
6. Use approved storage containers of flammable liquids and allocating apparatus.
7. Don't pour contaminated liquids back to original storage containers.
8. Containers should be labeled, confined and prevented from damage while not using.
9. Store in shady, cool, dry, and well-ventilated place that sunshine cannot directly illuminate, and keep away from heat, ignition sources, and incompatible substances.
10. Storage apparatus should be constructed with the refractory materials.
11. The floor should be constructed with the impermeable materials to avoid absorbing from the floor.
12. Set slope, doorsill or dig grooves in an entrance to discharge spill to safe places.
13. Storage areas should be labeled clearly with no barriers. Permit assigned or trained personnel to enter.
14. Keep storage areas away from workspace, lifts, building, room exits, and main passages.
15. Have appropriate fire extinguisher and leak cleaning apparatus near storage areas.
16. Check containers regularly whether damage or leak.
17. Check all new containers whether appropriately labeled and no damage.
18. Limit storage.
19. Store spill in containers made of compatible substances.
20. Storage tanks have earth connection and connected with other apparatus by using same electric potential.
21. Install depressurizing and vacuum releasing valves in all barrels stored flammable liquids.
22. Store in accordance with the storage temperature suggested by chemical manufacturers or suppliers. Install warm-detecting sirens if necessary to alarm temperature is too high or too low.
23. Avoid storing large amount in room. Store in fireproofing isolating building as

possible.
24. Install flame-extinguishing devices in storage exhaust pipes.
25. Storage tanks should be ground tanks. Seal whole area on the bottom to avoid leak surrounded with dikes, which can block the whole capacity.

Section 8. Exposure controls

Engineering controls:
1. Local exhaust or general ventilation systems.
2. Use spark-resistant and earth-connection ventilation system separately.
3. Direct outside exhaust vents.
4. Supply adequate fresh air to replenish the exhausted air.

Control parameters			
TWA	STEL	CEILING	BEIs
400 ppm	500 ppm	-	-

Personal protective equipment:
• Respiratory protection:
1. < 2000 ppm: Stable flow air-feed type respiratory protective equipments, dynamical air purifying type or chemical full-type with organic vapor cartridges respiratory protective equipments, portable full-type or air-feed respiratory protective equipments.
2. Unknown: Portable positive-pressure type respiratory protective equipments, positive-pressure full type and air-feed type respirator.
3. Escape: Mask with organic vapor cartridges, portable escape-type respiratory protective equipments.

• Hand protection: Leak-proof glove materials of Butyl rubber, rubber-like, Viton, 4H, CPF 3, and Responder.
• Eye protection: Chemical safety goggles, full-type masks.
• Skin and physical protection: Leak-proof gloves of Butyl rubber, rubber-like, Viton, 4H.

Hygiene measures:
1. Remove contaminated clothing quickly as possible after work. Clean clothing before reuse or abandon. Tell cleaning staffs the harmfulness.
2. Forbid smoking or eating in workplace.
3. After handling this material, wash hands thoroughly.
4. Keep workplace clean.

Section 9. Physical and Chemical Properties

Appearance: Colorless liquid	Odor: Rubber alcohol smell
Odor threshold:	Melting point: 88.5°C

1. 3.3 ~ 610 ppm (monitor) 2. 7.6 ~ 49 ppm (censor)	
pH： -	Boiling point/Boiling range: 82.3°C
Flammability (solid, gas): -	Flash point: 12.5°C Test method: close cup
Decomposition temperature: -	
Auto-ignition temperature: 399°C	Explosion limits: 2.0% ~ 12%
Vapor pressure: 33 mmHg (20°C)	Vapor density: 2.07 (air=1)
Density: 0.785 (g/cm^3)(Water = 1) (20°C)	Solubility: Totally soluble in water
Partition coefficient (n-octanol/water, log K_{ow}): 0.05	Volatility rate: 1.5 (N-butyl acetate=1)

Section 10. Stability and Reactivity

Chemical stability: 1. Stable under ordinary conditions. 2. May produce peroxides very slowly.
Possibility of hazardous reactions: 1. Oxidizing agents (nitrate, perchlorate, peroxidative substances): Increase fire and explosion risk. 2. Phosgene: produce isopropyl chlorocarbonate and hydrochloric acid. 3. Molysite: explosive heat decomposition reaction. 4. Hydrogen-Palladium: mixing in the air may catch fire. 5. Strong acid: Possible vigorous reaction. 6. Alkaline metal or alkaline earth metal: May release flammable toxic gas.
Conditions to avoid: Heat, spark, static, ignition sources, light.
Materials to avoid: Molysite, Hydrogen-Palladium, strong oxidant, phosgene.
Hazardous decomposition products: -

Section 11. Toxicological Information

Exposure Route: Skin, inhalation, ingestion, eye.
Symptoms: Irritation, dizziness, anesthesia, nausea, vomiting, diarrhea.
Acute toxicity: • Inhalation: 1. 400 ppm will irritate upper respiratory tracts slightly. 2. High concentrations will cause dizziness, in coordination (coordination function loss) and deeply conscious loss. • Skin: Short-term exposures don't irritate skin. • Eyes: 1. 400 ppm will cause slight irritation. 2. It will cause serious irritation if contacting with liquids directly.

• Ingestion: 1. May cause dizziness, gastrointestinal pain, aching convulsion, nausea, vomiting, and diarrhea. 2. Large exposures may cause conscious loss and death. 3. Human lethal dose is estimated 131 g. • LD_{50} (animal test, entry): 4,710 mg/kg (rat, oral) • LC_{50} (animal test, entry): 16,000 ppm/8 hour(s) (rat, ingestion)
Chronic / Long-term toxicity: 1. Skin: long-term or frequent exposure may cause skin dry and peeling. 2. Ingestion: After six weeks of 6.4 mg/kg/day isopropyl alcohol ingestion, there are no special changes in blood, urine, chemical or cell components among exposed people. 3. 3,500 ppm/7 hour(s) (pregnant rats of 1 ~ 19 days, inhalation) cause embryo hyperplasia. 4. This material is classified by the IARC as Group 3: not classifiable as to its carcinogenicity to humans.

Section 12. Ecological Information

Ecological toxicity: 1. LC_{50} (fish): - 2. EC_{50} (aquatic invertebrates): - 3. Bioconcentration factor (BCF): -
Persistence and degradability: 1. Four experimental results reveal is isopropyl alcohol in the sewage for 5 days (20°C) may decompose 58% of BOD theoretical value. 2. When released into the water, this material is expected to evaporate (an estimated half-life of 5.4 days) and biodegrade (Though it will be decomposed in the lab, but there are still no relevant data in natural water sources). 3. When released into the air, this material is expected to process photolysis (about 1 to several days in half-life). Because of solubility in water, it may be eroded by the rainwater. • Half-life (Air): 6.2 ~ 72 hours • Half-life (Water surface): 24 ~ 168 hours • Half-life (Groundwater): 48 ~ 336 hours • Half-life (Soil): 24 ~ 168 hours
Bioaccumulative potential: Not accumulate in the body.
Mobility in soil: When released into the soil, this material is expected to evaporate and permeate through soil due to high vapor pressure and low absorption of soil.
Other adverse effects: Highly toxic to aquatic organism.

Section 13. Disposal Considerations

Waste disposal:
1. Bury in a specific landfill or incinerate in an approved solvent incinerator.
2. If a small amount flows into sewers or drains, wash with a large amount of water to avoid flammable vapors accumulating.
3. If fluxing, report to the environmental protection agency.

Section 14. Transport Information

United Nations Number (UN No.): 1219
UN Proper Shipping Name: Isopropyl alcohol
Transport Hazard classes: 3
Packaging Group: II
Marine pollutant (Yes/No): No
Specific Transport Measures and Precautionary Conditions: -

Section 15. Regulatory Information

Applicable Regulations:
1. Occupational Safety and Health Act.
2. Regulations for the Labeling and Hazard Communication of Hazardous Chemicals.
3. Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste.
4. Standards of Permissible Exposure Limits at Job Site.
5. Public Hazardous Substances & Flammable Pressurized Gases Establishment Standards & Safety Control Regulations.
6. Regulations Governing Designating and Handling of Priority Management Chemicals.

Section 16. Other Information

References	1. HSDB database, 2017. 2. ChemWatch database, 2017. 3. European Chemicals Agency (ECHA) 4. National Institute of Technology and Evaluation.
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Revision Date	2024/03/06
Notes	The symbol " - " in this sheet indicates no available information; the symbol " / " indicates the information is not applicable to the substance.