


Number: 002

Section 1. Product and Company Identification

Product name: n-Propyl alcohol
Synonyms: -
Recommended use and Restrictions on use: Solvent among organic synthesis and chemicals (Used in cured, natural and synthetic resin, cellulosic ester and ether), light pharmaceutical composition, brake fluid, fatless solvent, antiseptic.
Manufacturer, Importer, or Supplier: Shiny Chemical Industrial Co., Ltd. Address: No.5, Yeong Gong 1 st Rd, Yeong An Dist., Kaohsiung 82841, Taiwan, R.O.C. Telephone: +886-7-8619171 ext. 711~714
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Section 2. Hazards Identification

Classification: <ol style="list-style-type: none">1. Flammable liquid, Category 22. Acute toxicity: oral, Category 43. Specific target organ systemic toxicity (single exposure), Category 34. Toxic for reproduction, Category 25. Serious eye damage/eye irritation, Category 1
Label elements:  Hazard pictograms: Flame, Corrosion, Exclamation mark, Health Hazard Signal word: Warning Hazard Statements: <ol style="list-style-type: none">1. Highly Flammable liquid and vapour.2. Harmful if swallowed.3. May cause drowsiness or dizziness.4. Suspected of damaging fertility or the unborn child.5. Causes serious eye damage. Precautionary statements: <ol style="list-style-type: none">1. If contacted with eyes, flush with plenty of water before seek for medical attention.2. Wear eye protect or face protect equipment.

3. Don't to lead vomiting.
4. Keep container tightly closed.
5. Keep away from sources of ignition - No Smoking.
6. Avoid contact with skin.

Other Hazards: -

Section 3. Composition/Information on Ingredients

Pure substance

Chemical Name: n-Propyl alcohol

Synonyms: Propanol、n-Propanol、Propyl alcohol、1-Propyl alcohol、1-Propanol、Ethyl carbinol、1-Hydroxypropane

CAS NO. : 71-23-8

Weight: 100%

Section 4. First Aid Procedures

Description of first aid measures:

- Inhalation:
 1. Remove affected person away from source of exposure and into fresh air.
 2. If breathing has stopped give artificial respiration.
 3. If breathing difficulties develop, oxygen should be administered by qualified personnel.
 4. If breathing has stopped give artificial respiration. Seek immediate medical attention.
- Skin contact:
 1. Remove contaminated clothing. Wash affected area thoroughly with soap and water at least 15 minutes.
 2. Seek medical attention if irritation or redness develops and persists.
 3. Cleaning and dry polluted clothing and shoes before use again.
- Eye contact:
 1. In case of direct contact, flush eyes with clean water for at least 15 minutes.
 2. Seek medical attention if irritation or redness develops and persists.
- Ingestion:
 1. Taking a huge amount of swallow.
 2. Immediately hospitalize.

The most Important Symptoms and Hazardous Effects:

1. The respiratory tract stimulate.
2. Skin irritation.
3. Eyes irritation.
4. The central nervous system to restrain.

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: If patients inhaled the substances, they should be provided oxygen.

Section 5. Firefighting Measures

Suitable extinguishing media: Extinguish with a multipurpose firefighting foam, water spray, dry chemical or carbon dioxide.

Special hazards during firefighting:

1. If the fire takes place, endanger by the serious fire.
2. When vapour is heavier than the air, it will be transmitted to the distant place; it will produce the flash back phenomenon while there is igniting source.
3. The vapour/air mixture temperature is higher than flashing point, it will cause explosible.

Firefighting procedures:

1. Move the container away the scene of a fire under the safe situation.
2. Discard handling with after dike.
3. Don't disperse escape materials use the high-pressure water column.
4. Keep away from both ends of the tank.
5. Tank safety valve had alarmed or changed color because of catching fire, should withdraw immediately.
6. If the tank, transport motor-trolley or tank car take place a fire accident, must to evacuate 800 meters.
7. Unless can stop overflowing and leak, otherwise make sure not to try to put out a fire.
8. Use the water-fog spray the way to put out a fire.
9. In the safety distance or protected areas sprayed in large amount water.
10. Avoid inhalation this material or its burning accessory substance.
11. Personnel need to stay up the wind, and keep away from the low-lying place.
12. Water fog puts out a fire may be no avail.

Protective equipment for firefighters: Use a proved/certified respirators or equivalent gloves.

Section 6. Accidental Release Measures

Personal precautions:

1. Keep unnecessary personnel away from spill area.
2. Keep ventilates area of spill and away from low-lying ands.

Environmental precautions:

1. Keep away from heat, flames, sparks and other sources of ignition.

2. To move all sources of ignition.

Methods for cleaning up:

1. Eliminate all sources of ignition.
2. Make use of water smoke to reduce the vapour.
3. Small spill: Absorb with dry earth, sand or other non-combustible material, and handing to throw away in container.
4. Large spill: Discard handing with after dike.

Section 7. Handling and Storage

Handling:

1. Prevent all individuals from keeping in touch, including inhalation way.
2. When there is risk of exposing, should be wear the personal protection clothing.
3. Use this product with adequate ventilation.
4. Prevent the material from accumulating in the depression and sewage hole.
5. Don't enter limitation space.
6. Avoid smoking , exposing in naked light , heat source or sources of ignition.
7. Forbid the diet or smoking while operating.
8. The vapour may contact the static and break out a fire while pressurizing or pouring into.
9. Don't use the plastic barrel.
10. In the course of allocating or pouring into, the metal container must be grounded and fixed.
11. Use the spark-resistant tool.
12. Avoid contacting the incompatible material.
13. Keep the container closing.
14. Avoid the physics damage of the container.
15. Must wash hands with water and soap after handling.
16. The work clothes should be washed separately.
17. Maintain the good working habits.
18. Detect and examine air quality regularly, make sure to maintain the security of the working environment .

Storage:

1. Use the metal container or the round barrel to store.
2. Check whether there is a clear sign and avoid overflowing and leaking in the container.
3. Avoid storing with the oxidant, acid, chlorine acid, and acid anhydride together.
4. Store it in the original container, and put in the qualified flammable storing area.
5. No smoking, expose in the naked light, heat source or igniting in the source.
6. It is unable to escape in the scattered area, not to store in the lowland,

- depression, basement or vapour.
7. Keep containers tightly closed.
 8. Keep containers cool, dry, local exhaust ventilation place and away from all sources of ignition.
 9. Avoid the physics damage of the container and leak hunting regularly.

Section 8. Exposure controls

Engineering controls:

1. If the concentration of material exceeds the lower limit of explodes, the ventilation facilities must be the explosion-proof type.
2. Offering the local exhaust ventilating system.

Control parameters

TWA	STEL	CEILING	BEIs
-	-	-	-

Personal protective equipment:

- Respiratory protection:
 1. 800 ppm: Using any chemistry containing respiratory protection of organic vapor filter container. Or any motive force type air clean respiratory protection of organic vapor filter container. Or any overall type motive force air clean respiratory protection of organic vapor filter container. Or any air supply type breathed and protected. Or any overall type portable organic vapor container.
 2. Flee for one's life: Using any full-type chemistry cleaning respiratory protection of organic vapor filter container. Or any fleeing for one's life type portable respiratory protection.
 3. Under unknown concentration or IDLH concentration: Use any to press stress demand type or other positive press overall air supply type to help flee for one's life.
- Hand protection: Use chemical resistant gloves to prevent hand contact.
- Eye protection:
 1. Defend and spatter the safe goggles.
 2. Face protecting equipment.
 3. Offer eyes emergency wash device or takes a fast shower device.
- Skin and physical protection: Use chemical resistant clothing if splash hazard exists.

Hygiene measures:

1. Take off the clothes of pollution as quickly as possible after the work, can just dress or abandon after cleaning, and must tell the washing person about harmfulness of pollution.
2. Forbid smoking or diet in the workplace.
3. After dealing with this thing, must wash hands completely.

4. Keep the homework place clean.

Section 9. Physical and Chemical Properties

Appearance: Colorless liquid	Odor: Alcohol like
Odor threshold: 30 ppm	Melting point: -127°C
pH : -	Boiling point/Boiling range: 97°C
Flammability (solid, gas): -	Flash point: 23°C
Decomposition temperature: -	Test method: close cup
Auto-ignition temperature: 412°C	Explosion limits: 2.2% ~ 13.7%
Vapor pressure: 14 mmHg (20°C)	Vapor density: 2.1 (air=1)
Density: 0.8053 (Water = 1)	Solubility: Easily soluble in cold water, methanol, ether, acetone, benzene, solvent.
Partition coefficient (n-octanol/water, log K _{ow}): -	Volatility rate: -

Section 10. Stability and Reactivity

Chemical stability: Stable.
Possibility of hazardous reactions: 1. The alkali and alkali metal: The fierce response produced the highly flammable hydrogen. 2. Apply the membrane, plastics, rubber: Erosion. 3. Oxidant (strong): May make fire and explode. 4. Potassium tert-butoxide: May burn fiercely. 5. Aldehyde: The severe compress reaction. 6. Barium chlorate: Adverse current will form the high explosive high chlorine ester. 7. Chloric acid , hypochlorite: Will form the chloric acid salt alkyl of highly explode. 8. Ethylene oxide, Hydrogen peroxide + Sulfuric acid, Nitrogen dioxide, Dinitrogen tetroxide: May explode. 9. Hexamethylene Diisocyanate 、 Methyl isocyanate: May cause the explosion without solvent. 10. Lithium aluminum hydride: Fierce response. 11. perchloric acid (hot): Dangerous reciprocation. 12. Persulfurous Acid: It may cause the explosion to expose to one grade or the second alcohol.
Conditions to avoid: 1. Avoid heat, flame, Mars and other ignite in the source. 2. If exposing under the heat source may cause the container to break.
Materials to avoid: Metal, Oxidizing agents, Flammable material, Alkali, Metal salt.

Hazardous decomposition products: Hot resolving will produce the Carbon dioxide.

Section 11. Toxicological Information

Exposure Route: Skin, inhalation, ingestion, eye.

Symptoms: May cause irritation, cough, respiratory hurried, dizziness, tired, sports dislocation, incongruous, headache, senseless, nausea, vomiting, reflex disappears, spit blood, breathe stop, tired, fall out conscious, incoordination, inflammation, swelling, blain, scales, skin to increase depth, the cornea opaque and canker, to pull out a tendon, diarrhoea, blood pressure to reduce.

Acute toxicity:

• Inhalation:

1. It may cause the upper respiratory tract mild irritation to suck this vapour, cause the cough and short of breath.
2. It may cause the slight central nervous system to suppress to expose the high concentration, feeling dizzy, sleepy, ataxia, loss of coordination, headache, coma, nausea continuously, vomit.
3. May lead to the reflex disappear, spit blood, little urine, liver damage, breath stop, tired and lose consciousness.
4. Breathing stop may cause the death.
5. Small rat will cause ataxia to exposure in 90-120 minutes under vapour of 3,250 ppm; can cause the depth gangrene to exposure in 240 minutes under 4,100 ppm and 60 minutes under 24,500 ppm.
6. This vapour will cause the upper respiratory tract to be uncomfortable.
7. Will aggravate inhalation danger under the high temperature.
8. It may cause the lung irritating, cough, nausea and headache, feel dizzy, react slowly, tired and discordant.
9. If expose in the air which includes the high concentration solvent for a long time, may cause anesthesia function and lose consciousness, even may cause going into a coma and death.

• Skin:

1. May cause stimulate skin to be redness.
2. The animal's experiment points out that this material may be absorbed via the skin.
3. This liquid will cause the skin to be uncomfortable, and may cause the skin to be dry, and then cause the skin inflammation.
4. This material may cause toxicity after the skin absorbed.
5. Avoid contact the material if does not wear protect clothing, it will aggravate the already existing skin disease.
6. Long-term repeated to expose this material can lead to the skin irritate, and

might cause the skin to be redness , swelling , a blain, scales and increases with the skin thick.

• Eyes:

1. This vapour may cause transient eyes stimulate, redness and pain.
2. Instil 0.1 mL N-propyl alcohol in rabbit will cause obvious serious conjunctivitis, iritis , corneal opacity and ulcer; also cause blood vessel conceal forming and taper cornea.
3. This liquid will cause eyes to be uncomfortable, and may cause temporary eyesight damaging and/or transient eyes inflammation and ulcer.
4. It will cause eyes uncomfortable to expose vapour for a long time.
5. This material will cause eyes to stimulate seriously, and cause the inflammation.
6. Repeat or long term to expose the material will cause the conjunctivitis.

• Ingestion:

1. May cause stomach pain, continuing nausea and vomit, spit blood, spasm, diarrhoea and blood pressure reduced.
2. May cause the central nervous system to restrain , cause sleepy, senseless, discodant, ataxia, headache, feeling dizzy, reflex disappear, breathe to stop, tired and lose consciousness; It may cause little urine and liver damaged.
3. There is risk of inhaling lung inflammation.
4. Once there are reports that pointed out that will cause the death after the human ingest 400-500 mL, checked and found hydrocephalus and pulmonary edema.
5. Liquid will cause uncomfortable, it is harmful if swallowed.
6. May cause disgusting, vomit, belly stimulus and pain.
7. Can lead to headache, muscle weak and discordant, dizzy, puzzled, mentally deranged and go into a coma and nausea, vomitting and diarrhoea.
8. Inhaling risk is higher than swallowing, because may cause the lung damage and this material will be absorbed in the body.
9. The cricoids structure alcohol, secondary and tertiary alcohol may cause more serious disease as alike heavy quality alcohol.

• LD₅₀ (animal test, entry):

1. 1,870 mg/kg (rat, swallow)
2. 5,040 mg/kg (rabbit, skin)

• LC₅₀ (animal test, entry): 48 gm/m³ (mouse, inhalation)

• 500 mg (rabbit,skin): Cause slight irritating.

• 20 mg/24 Hour(s) (rabbit, eyes): Cause middle irritating.

Chronic / Long-term toxicity:

1. Once studied pointed out that will cause animal's breeding effective.

2. Repeat or expose for a long time may cause the skin degrease, the skin dry, cracked, skin inflammation, even corrode.
3. If sensitive for isopropanol there will be cause crisscross effective expose to n-propyl alcohol.
4. To smear rabbit skin 38 mL/kg every day, 30 days, will cause 1/3 of the test animal death after 6 weeks.
5. Repeat or long-term eyes contact may cause the conjunctivitis.
6. Research points out that it will cause serious liver damaging, hematopoiesis tissue hyperplasia, malignant liver tumour and leukaemia to test the big mouse for a long time.

Section 12. Ecological Information

Ecological toxicity:

1. LC₅₀ (fish): 3,000,000-4,000,000 μ g/L/96 hour(s) (Alburnus alburnus)
2. EC₅₀ (aquatic invertebrates): 3,644,000 μ g/L/48 hour(s) (Daphnia magna)
3. Bioconcentration factor (BCF): 3 (estimation)

Persistence and degradability:

1. Release it to the soil, it is the important mechanism volatilizes from wet soil surface, but may volatilize from dry soil surface.
2. Release to water, material can not be absorb with suspension or precipitate, it is a important mechanism volatilize from water surface, it is about 62 hours and 31 days respectively in the half-life the river and lake water.
3. Releasing it to the air, this material will exist in the atmosphere, the vapour will react with the oxyhydrogen free radical, the half-life is 2.9 days.
 - Half-life (Air): -
 - Half-life (Water surface): -
 - Half-life (Groundwater): -
 - Half-life (Soil): -

Bioaccumulative potential: It is expected that the organism compress of organism in water is low.

Mobility in soil: It is expected that highly moving in the soil.

Other adverse effects: -

Section 13. Disposal Considerations

Waste disposal:

1. Consult the relevant regulation to deal with.
2. Retrieve as much as possible or consult manufacturers.
3. Incinerate the leftovers in the qualified place.
4. Retrieve container if possible, or discard in the qualified field.

Section 14. Transport Information

United Nations Number (UN No.): 1274
UN Proper Shipping Name: n-Propyl alcohol
Transport Hazard classes: 3
Packaging Group: III
Marine pollutant (Yes/No): No
Specific Transport Measures and Precautionary Conditions: -

Section 15. Regulatory Information

Applicable Regulations:
1. Labor Safety and Health Law.
2. Dangerous Chemical Material Symbol Act.
3. Fire Services Act.

Section 16. Other Information

References	<ol style="list-style-type: none"> 1. RTECS Data base, TOMES CPSVol.71, 2007. 2. ChemWatch Data base, 2007-1. 3. OHS MSDS Data base, 2007. 4. HSDB Data base, TOMES CPSVol.71, 2007.
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Notes	The symbol " - " in this sheet indicates no available information; the symbol " / " indicates the information is not applicable to the substance.