

Product Name: ISOPROPYL ALCOHOL

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MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: ISOPROPYL ALCOHOL

Product Description: Oxygenated Hydrocarbon

Intended Use: Solvent

COMPANY IDENTIFICATION

Supplier: HEIDELBERG GRAPHICS (THAILAND) COMPANY LIMITED

163 Ocean Insurance Bldg Surawong Rd

Suriyawong, Bangrak

Bangkok 10500

Supplier General Contact +662 610 6100

SECTION 2 HAZARDS IDENTIFICATION

This material is hazardous according to UN GHS Criteria. Classification includes all GHS hazard classes. For hazard categories with two cut-off/concentration limits, classification was based on the higher limit.

GHS CLASSIFICATION:

Flammable liquid: Category 2.

Eye irritation: Category 2.

Target organ toxicant (central nervous system): Category 3.

Aspiration toxicant: Category 2.

GHS Label Elements:

Pictogram:

Signal Word: Danger

Hazard Statements:

Physical: H225: Highly flammable liquid and vapor.

Health: H305: May be harmful if swallowed and enters airways. H319: Causes serious eye irritation. H336: May cause drowsiness or dizziness.



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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, and lighting equipment.
- P242: Use only non-sparking tools.
- P243: Take precautionary measures against static discharge.
- P261: Avoid breathing mist / vapours.
- P264: Wash skin thoroughly after handling.
- P271: Use only outdoors or in a well-ventilated area.
- P280: Wear protective gloves and eye / face protection.

Response:

- P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- 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 if you feel unwell.
- P331: Do NOT induce vomiting.
- P337 + P313: If eye irritation persists: Get medical advice/attention.
- P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) for extinction.

Storage:

- P403 + P235: Store in a well-ventilated place. Keep cool.
- P405: Store locked up.

Disposal:

- P501: Dispose of contents and container in accordance with local regulations.

Contains: propan-2-ol

Other hazard information:

PHYSICAL / CHEMICAL HAZARDS

Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

HEALTH HAZARDS

May be irritating to the skin, nose, throat and lungs. May cause central nervous system depression. If swallowed, may be aspirated and cause lung damage.

ENVIRONMENTAL HAZARDS

No significant hazards.

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a substance.

Hazardous Substances) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	Symbols/Risk Phrases
propan-2-ol	67-63-0	100 %	H225, H305, H336, H319(2A)

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4 FIRST AID MEASURES**INHALATION**

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

ACUTE AND DELAYED SYMPTOMS/EFFECTS

See Toxicological Section

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

SECTION 5 FIRE FIGHTING MEASURES**EXTINGUISHING MEDIA**

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Highly flammable. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger.

Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: 15°C (59°F) [ASTM D-56] Flammable Limits (Approximate volume % in air): LEL: 2.0 UEL: 13

Autoignition Temperature: >350°C (662°F) [Technical literature]

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SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. **Large Spills:** Water spray may reduce vapour, but may not prevent ignition in enclosed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with eyes. Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Potentially toxic/irritating fumes/vapour may be evolved from heated or agitated material. Use only with adequate ventilation. Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation. Peroxides may form upon prolonged storage. Exposure to light, heat or air significantly increases peroxide formation. If evaporated to a residue, the mixture of peroxides residue and material vapor may explode when exposed to heat or shock. Prevent small spills and leakage to avoid slip hazard.

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Loading/Unloading Temperature: [Ambient]

Transport Temperature: [Ambient]

Transport Pressure: [Ambient]

Static Accumulator: This material is not a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

Storage Temperature: [Ambient]

Storage Pressure: [Ambient]

Suitable Containers/Packing: Drums; Tank Cars; Tank Trucks; Tankers; Barges

Suitable Materials and Coatings (Chemical Compatibility): Carbon Steel; Stainless Steel; Polyester; Teflon; Polyethylene; Polypropylene; Copper Bronze; Epoxy Phenolic; Zinc; Vinyls

Unsuitable Materials and Coatings: Aluminium; Cast iron; Polystyrene; Ethylene-propylene-diene monomer (EPDM); Monel; Butyl Rubber; Natural Rubber

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters/Exposure limits:

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit/Standard			Note	Standard	Year
propan-2-ol		STEL	400 ppm			ACGIH	2011
propan-2-ol		TWA	200 ppm			ACGIH	2011

Biological limits:

Substance Name	Specimen	Sampling Time	Limit	Determinant	Source
propan-2-ol	Urine	End of shift at end of work wk	40 mg/l	Acetone	ACGIH BELs (BELs)

No biological limits allocated.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

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PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include: Half-face filter respirator Type A filter material

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include: If prolonged or repeated contact is likely, chemical-resistant gloves are recommended. If contact with forearms is likely, wear gauntlet-style gloves. Nitrile

Eye Protection: Chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include: If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing 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.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid

Form: Clear

Colour: Colourless

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Odour: Alcohol

Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION**Relative Density** (at 20 °C): 0.786 [With respect to water] [Calculated]**Density** (at 20 °C): 785 kg/m³ (6.55 lbs/gal, 0.79 kg/dm³) [ISO 12185]**Flammability** (Solid, Gas): N/D**Flash Point** [Method]: 15°C (59°F) [ASTM D-56]**Flammable Limits** (Approximate volume % in air): LEL: 2.0 UEL: 13**Autoignition Temperature**: >350°C (662°F) [Technical literature]**Boiling Point / Range**: 82°C (180°F) - 83°C (181°F) [ASTM D1078]**Decomposition Temperature**: N/D**Vapour Density** (Air = 1): > 1 at 101 kPa [Calculated]**Vapour Pressure**: 4.3 kPa (32.25 mm Hg) at 20 °C [Calculated]

[In-house method]

Evaporation Rate (n-butyl acetate = 1): 2.2 [In-house method]**pH**: N/D**Log Pow** (n-Octanol/Water Partition Coefficient): 0.05 [Technical literature]**Solubility in Water**: Complete**Viscosity**: [N/D at 40°C] | 2.66 cSt (2.66 mm²/sec) at 25°C [ASTM D7042]**Oxidizing Properties**: See Hazards Identification Section.**OTHER INFORMATION****Freezing Point**: N/D**Melting Point**: -89°C (-128°F) [Technical literature]**Molecular Weight**: 60 G/MOLE [Calculated]**Hygroscopic**: Yes**Coefficient of Thermal Expansion**: 0.00117 V/V/DEG C [In-house method]**SECTION 10 STABILITY AND REACTIVITY**

STABILITY: Material is stable under normal conditions. Under normal storage conditions peroxides may accumulate and explode when subjected to heat or shock. Distillation or evaporation increases peroxide formation and increases the explosion hazard.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Aldehydes, Amines, Strong oxidisers, Caustics, Chlorinated Compounds, Alkanolamines

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION**ACUTE TOXICITY**

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<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
Inhalation	
Toxicity (Rat): LC50 > 25000 mg/m3	Minimally Toxic. Based on test data for the material.
Irritation: No end point data	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Toxicity (Rat): LD 50 5840 mg/kg	Minimally Toxic. Based on test data for the material.
Skin	
Toxicity (Rabbit): LD 50 13900 mg/kg	Minimally Toxic. Based on test data for the material.
Irritation: Data available.	May dry the skin leading to discomfort and dermatitis. Based on test data for the material.
Eye	
Irritation: Data available.	Irritating and will injure eye tissue. Based on test data for the material.

OTHER HEALTH EFFECTS FROM SHORT AND LONG TERM EXPOSURE

Anticipated health effects from sub-chronic, chronic, respiratory or skin sensitization, mutagenicity, reproductive toxicity, carcinogenicity, target organ toxicity (single exposure or repeated exposure), aspiration toxicity and other effects based on human experience and/or experimental data.

For the product itself:

Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Prolonged and/or repeated skin contact with low viscosity materials may defat the skin resulting in possible irritation and dermatitis. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Additional information is available by request.

IARC Classification:

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = IARC 1

2 = IARC 2A

3 = IARC 2B

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

Material -- Not expected to demonstrate chronic toxicity to aquatic organisms

MOBILITY

Material -- Expected to remain in water or migrate through soil.

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PERSISTENCE AND DEGRADABILITY

Biodegradation: Material -- Expected to be readily biodegradable.
Hydrolysis: Material -- Transformation due to hydrolysis not expected to be significant.
Photolysis: Material -- Transformation due to photolysis not expected to be significant.
Atmospheric Oxidation: Material -- Expected to degrade at a moderate rate in air

OTHER ECOLOGICAL INFORMATION

VOC: Yes

ECOLOGICAL DATA**Ecotoxicity**

Test	Duration	Organism Type	Test results
Aquatic - Acute Toxicity	96 hour(s)	Pimephales promelas	LC50 9640 mg/l: data for the material
Aquatic - Acute Toxicity	24 hour(s)	Daphnia magna	LC50 9714 mg/l: data for the material
Aquatic - Acute Toxicity	8 day(s)	Alga	LOEC 1000 mg/l: data for the material

Persistence, Degradability and Bioaccumulation Potential

Media	Test Type	Duration	Test Results
Octanol-Water	Calculated		log Kow 0.05 : material
Water	Ready Biodegradability	5 day(s)	Percent Degraded 53 : material

SECTION 13 DISPOSAL CONSIDERATIONS**DISPOSAL METHODS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

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SECTION 14 TRANSPORT INFORMATION**LAND**

Proper Shipping Name: ISOPROPANOL

Hazard Class: 3

Hazchem Code: 2YE

UN Number: 1219

Packing Group: II

Label(s) / Mark(s): 3

SEA (IMDG)

Proper Shipping Name: ISOPROPANOL

Hazard Class & Division: 3

EMS Number: F-E, S-D

UN Number: 1219

Packing Group: II

Marine Pollutant: No

Label(s): 3

Transport Document Name: UN1219, ISOPROPANOL, 3, PG II, (12oC c.c.)

AIR (IATA)

Proper Shipping Name: ISOPROPYL ALCOHOL

Hazard Class & Division: 3

UN Number: 1219

Packing Group: II

Label(s) / Mark(s): 3

Transport Document Name: UN1219, ISOPROPYL ALCOHOL, 3, PG II

SECTION 15 REGULATORY INFORMATION

Material is hazardous as defined by the EU Dangerous Substances/Preparations Directives.

EU CLASSIFICATION: Highly flammable.

Irritant. The classification of this product is based all or in part on test data.

EU LABELING:

Symbol: F, Xi



Highly flammable.



Irritant.

Nature of Special Risk: R11; Highly flammable. R36; Irritating to eyes. R67; Vapours may cause drowsiness and dizziness. Safety Advice: S7; Keep container tightly closed. S16; Keep away from sources of ignition - No smoking.