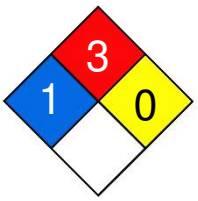


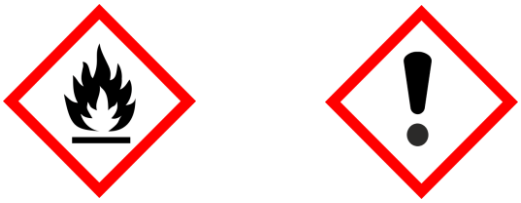
Material Safety Data Sheets

Revision 2

1. IDENTIFICATION

Product Name	**2-Propanol**
Other Names	**Isopropyl Alcoho**; Dimethylcarbinol; Isopropanol; Propan-2-Ol; Sec-Propyl Alcohol
Code No	100-IA-2
Uses	Manufacture of acetone and its derivatives, manufacture of glycerol and isopropyl acetate, solvent for essential and other oils, alkaloids, glue, resins, possible solvents for cellulose derivatives, coating solvent, anti- freeze agent for liquid fuel, enamel, extract processing, dehydrating agent, preservatives, lotion, denaturant.
Chemical Family	No Data Available
Chemical Formula	C_3H_8O
Chemical Name	Isopropyl Alcohol
Product Description	No Data Available
Contact Information	info@armansina.com www.armansina.com

2. HAZARD IDENTIFICATION

Hazard Categories	Highly Flammable Irritate
Risk Phrases	Highly flammable. Irritating to eyes. Vapours may cause drowsiness and dizziness.
Safety Phrases	Keep away from sources of ignition - No smoking. Avoid contact with skin and eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep container tightly closed.
Symbol	

3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
Isopropyl Alcohol	C_3H_8O	67-63-0	100.00 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed	**Rinse mouth with water. Give plenty of water to drink provided victim is conscious. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Seek medical attention immediately.**
Eye	**Immediately flush eyes with plenty of water for at least 20 minutes while holding eyelids open. Take care not to rinse contaminated water into the non-affected eye. Seek immediate medical attention.**
Skin	**Use gentle, running warm water to rinse the injured area for more than 15 minutes as soon as possible. Remove contaminated clothes and shoes when flushing with water. Contaminated clothes must be washed thoroughly before disposal. If irritation persists, seek medical attention immediately.**
Inhaled	**Remove victim from exposure to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth to mouth method. Induce artificial respiration with the aid of a pocket mask equipped with a one way valve or other proper respiratory medical device. Seek medical attention immediately.**
Advice to Doctor	**Treat symptomatically based on judgement of doctor and individual reactions of patient.**
Medical Conditions Aggravated by Exposure	**Exposure to large amounts can cause unconsciousness and death.**

5. FIRE FIGHTING MEASURES

General Measures	**Flame-proof equipment is necessary in all areas where this chemical is being used. Nearby equipment must be earthed.**
Flammability Conditions	**Highly Flammable liquid.**
Extinguishing Media	**In case of fire, use appropriate extinguishing media most suitable for surrounding fire conditions include carbon dioxide, chemical powder and alcoholic foam. If safe to do so, remove containers from path of fire.**
Fire and Explosion Hazard	**Vapors and liquids are flammable. Liquid will accumulate electric charges. Vapor is heavier than air and may float to places far away, and may flashback from ignition sources. High heat will cause this material to decompose and produce toxic gas. The containers in a fire site may rupture and explode.**
Hazardous Products of Combustion	**High heat will cause this material to decompose and produce toxic gas.**
Special Fire Fighting Instructions	**Special Extinguishing Procedure:** **1. Retreat and extinguish the fire from a safe distance or a protected area.** **2. Stay upwind to keep away from hazardous vapor and toxic decomposition.** **3. Any leakage should be stopped before extinguishing the fire. If the leakage cannot be stopped and there is no immediate danger in the surrounding area, allow it to burn away. If the leakage is not stopped before extinguishing the fire, the vapor and the air will form an explosive mixture and ignite afterwards.** **4. Separate materials that are not on fire and protect the personnel.** **5. Move the container away from the fire field under safe conditions.** **6. Use water mist to cool the tanks or containers in exposed the fire field.** **7. Using water fog to extinguish fire may be ineffective without trained fire-fighting personnel.** **8. If the leakage is not ignited, spray water mist to disperse vapor and protect the personnel who try to stop the leakage.** **9. A water spout is ineffective for extinguishing the fire.** **10. For a big fire in a large area, use the unmanned water mist stand or the automatic water fire monitor.** **11. Retreat from the fire field and allow the fire to burn out.** **12. Stay away from the tanks.** **13. When the safety valve alarm of the tank sounds or the color changes due to fire, retreat immediately.** **14. Personnel without special protective equipment should not enter the fire field.**
Personal Protective Equipment	**Fire fighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots and gloves) or chemical splash suit. Please note: Structural fire fighters uniform will provide limited protection.**
Flash Point	**15ºC**
Lower Explosion Limit	**2%**
Upper Explosion Limit	**approx 12 %**
Auto Ignition Temperature	**No Data Available**
Hazchem Code	**YE**

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	**Shut off all possible sources of ignition. Use clean, non-sparking tools and equipment. Avoid accidents, clean up immediately. Increase ventilation. Avoid walking through spilled product as it is slippery when spilt. Before the polluted area is cleaned up completely, access to the area should be restricted. Make sure the cleaning work is performed by trained personnel. The personnel should wear appropriate personal protective equipment.**
Clean Up Procedures	**Do not come in contact with the released chemical. Avoid the released chemical from entering the sewers or sealed spaces. Stop or reduce the leakage under safe conditions if possible. Use soil, sand or similar inert non-combustible substances that will not react with the spill to surround the spill. For small spills, absorb using an absorbent that will not react with the spill. The polluted absorbent becomes as harmful as the released chemical and should be placed in the appropriate container that is capped and labeled. Use water to clean up the leakage area. For large spills, contact the fire department, emergency rescue units and supplier for assistance.**
Containment	**Stop leak if safe to do so.**
Environmental Precautionary Measures	**Do NOT let product reach drains or waterways. If product does enter a waterway, advise the Environmental Protection Authority or your local Waste Management.**
Evacuation Criteria	**Evacuate all unnecessary personnel.**

Personal Precautionary Measures Personnel involved in the clean up should wear full protective clothing as listed in section 8.

7. HANDLING AND STORAGE

Handling	**This substance is a highly flammable and toxic liquid. Therefore, personal protective equipment should be operative and utilized during disposal. The staff should receive relevant trainings on the risk and safe handling of this substance. All flammable sources should be removed and kept away from heat and incompatible substances. The Smoking Prohibited sign should be present in the work area. The liquid will accumulate an electric charge. Therefore, a design to increase the conductivity should be taken into consideration. For example, all tanks, transfer containers, and lines should be grounded. Any naked metal should be connected for grounding. During the operation, the flow rate should be reduced to increase the operation time the duration of the liquid retained in the lines should be increased, and the operation should be performed under low temperature. When the operation is not conducted in the sealed system, the connections between the operation container and the receiving transmission equipment should be at the equivalent electric potential. The empty tanks, containers, and lines may contain harmful residues. Therefore, there should be no welding, cutting, drilling, or heating before they are cleaned. The ventilation system or equipment that does not produce sparks used in the work area should be explosion-proof. The formation of mist or vapor during the operation should be avoided. The operation should be conducted in a well-ventilated area in the smallest quantity possible. The operation area should be separated from the storage area. Wear appropriate personal protective equipment when necessary to avoid contact with this chemical substance or the polluted equipment. Do not use with incompatible chemicals (such as strong oxidants) in order to decrease the risks of fire and explosi**
Storage	**Store in a cool, dry, well-ventilated, fire-proof area (or refrigerated tank). Keep containers tightly sealed when not in use. Inspect regularly for deficiencies such as damage or leaks. Protect against physical damage. Ground and bond storage containers. Store away from incompatible materials as listed in section 10. Make sure that the passageways and exits are clear and unobstructed. Consider the installation of leakage and fire detection systems, auto fire extinguishing system or enough usable emergency handling equipment in the storage area and operation area for large amounts. Use containers made of compatible materials. Be careful to avoid spills during repacking. Do not try to send out the material by adding pressure using air or inert gases. Do not mix the material in the storage area unless this area is isolated with fireproof structure. Use approved container and mixing equipment for flammable liquids. . Do not pour contaminated liquid back to the original storage tank. Containers must be labeled, tightly sealed and kept from damages when not in use.The chemical should be stored in cool, dry, and well-ventilated area away from direct sunlight. Keep away from heat sources, flammable sources, and incompatibles. Storage equipment should be constructed with fire-resistant materials. The floor should be constructed with impermeable material to avoid absorption by the floor. Set up slopes, door sills or furrows at doorways so that leaking substances are discharged to a safe place. The storage area should have clear signs and be free from impediments. Only designated or trained personnel are allowed to enter. The storage area and the work area should be separated. The chemical should be stored away from lifts, buildings, room entrances, or major accesses. Appropriate fire extinguishers and leak clean-up equipment should be available near the storage area. Containers should be checked for damages or leakage regularly. All new containers should be checked for the appropriate labels and any damage. The quantity of chemical to be stored should be limited. The containers make from compatible materials should be used to store the released chemical. The storage tanks should be grounded and connected to other equipment at equivalent electric potential. Tanks used for storing inflammable liquids must be installed with relief valve and vacuum relief valve. The chemical should be stored at the temperature suggested by the chemical manufacturer or supplier. If necessary, the temperature detection alarm should be installed to alert if the temperature is too high or too low. The storage of large quantities should be avoided. The chemical should be stored in the isolated fireproof building. The exhaust pipes of tanks should be installed with flame arresters. The storage tanks should be built on the ground level with the entire bottom sealed to prevent leakage. The liquid control dam able to hold the entire volume should be present in the surrounding area. This product has a UN Classification of 1219 and a Dangerous Goods Class 3 (flammable) according to The Australian Code for the Transport of Dangerous Goods By Road and Rail.**
Container	**Container type/packaging must comply with all applicable local legislation. Store in original packaging as approved by manufacturer.**

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	**Isopropyl alcohol CAS number: 67-63-0** **TWA =400 ppm (983 mg/m3)** **STEL = 500 ppm (1230 mg/m3)** **NOTE: The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. Peak limitation is a ceiling concentration which should not be exceeded over a measurement period which should be as short as possible but not exceeding 15 minutes.** **These exposure standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.**
Exposure Limits	**No Data Available**
Biological Limits	**No information available on biological limit values for this product.**
Engineering Measures	**A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Use an explosion proof exhaust ventilation system. Provide enough fresh air to supplement the air exhausted by the exhaust system. Complete gas exchange or partial exhaust devices. Will not produce sparks if used alone and grounded to the ventilation system. Exhaust opening is connected directly outside the window. Provide enough fresh air to supplement the air exhausted by the exhaust system.**
Personal Protection Equipment	**RESPIRATOR: Below 2000 ppm: Fixed amount air supplied type respirator, respiratory respirator with organic vapor filter cartridge powered for air purification or full chemical filter cartridge respirator with organic vapor filter cartridge, full self-contained or air supplied respirator. Unknown Concentration: positive-pressure self- contained respiratory apparatus (full air supply). Escape: Gas mask with organic vapor filter cartridge, life escape self-contained breathing apparatus (AS1715/1716).** **EYES: Anti chemical splashing safety goggles, full face masks (AS1336/1337).** **HANDS: Impermeable gloves made of butyl rubber, rubber-like, Viton, 4H, CPF 3, Responder (AS2161).** **CLOTHING: Chemical-resistant coveralls, splash apron and safety footwear (AS3765/2210).**
Work Hygienic Practices	**Polluted clothes should be removed as soon as the work is completed. The clothes should be discarded only after being washed. The washing staff should be informed of the harmful effects of the pollution. Eating,drinking, and smoking are strictly prohibited in the work area. Wash hands thoroughly after handling the substance. Keep the work area clean.**

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	**Liquid**
Appearance	**Liquid**
Odour	**Rubbery alcohol odour**
Colour	**Colourless**
pH	**No Data Available**
Vapour Pressure	**19 hpa**
Relative Vapour Density	**2.07**
Boiling Point	**96ºC**
Melting Point	**-127ºC**
Freezing Point	**No Data Available**
Solubility	**Completely Soluble**
Specific Gravity	**0.785**
Flash Point	
Auto Ignition Temp	**No Data Available**
Evaporation Rate	**No Data Available**
Bulk Density	**No Data Available**
Corrosion Rate	**No Data Available**
Decomposition Temperature	**No Data Available**

Density	**No Data Available**
Specific Heat	**No Data Available**
Molecular Weight	**No Data Available**
Net Propellant Weight	**No Data Available**
Octanol Water Coefficient	**Log Kow: 0.05**
Particle Size	**No Data Available**
Partition Coefficient	**No Data Available**
Saturated Vapour Concentration	**No Data Available**
Vapour Temperature	**No Data Available**
Viscosity	**No Data Available**
Volatile Percent	**1.5 (n - Butyl Acetate = 1)**
VOC Volume	**No Data Available**
Additional Characteristics	**Spontaneous temperature: 399 Deg C.** **Odor threshold: 3.3-610 ppm (detected), 7.6-49ppm (sensed)**
Potential for Dust Explosion	**Product is a liquid.**
Fast or Intensely Burning Characteristics	**No Data Available**
Flame Propagation or Burning Rate of Solid Materials	**No Data Available**
Non-Flammables That Could Contribute Unusual Hazards to a Fire	**No Data Available**
Properties That May Initiate or Contribute to Fire Intensity	**No Data Available**
Reactions That Release Gases or Vapours	**No Data Available**
Release of Invisible Flammable Vapours and Gases	**No Data Available**

10. STABILITY AND REACTIVITY

Chemical Stability	**Product is stable under directed conditions of use, storage and temperature.** **Highly flammable liquid and vapour. May slowly form into peroxides.**
Conditions to Avoid	**Avoid Heat, sparks, static electricity, ignition sources, light.**
Materials to Avoid	**Strong oxidants (such as nitrates, perchlorates and peroxides): increased risks of fire and explosion. Phosgene: produces isopropyl chlorocarbonate and hydrochloric acid. Ferric salt: causes explosive heat decomposition reaction. Hydrogen Palladium: may catch fire if mixed in the air. Strong acid: May cause violent reaction. Alkali metals or alkali earth metals: may release flammable toxic gases.**
Hazardous Decomposition Products	**Phosgene: produces isopropyl chlorocarbonate and hydrochloric acid. Ferric salt: causes explosive heat decomposition reaction. Hydrogen Palladium: may catch fire if mixed in the air. Strong acid: May cause violent reaction. Alkali metals or alkali earth metals: may release flammable toxic gases.**
Hazardous Polymerisation	**No Data Available**

11. TOXICOLOGICAL INFORMATION

General Information	**Acute Toxicity:** **Skin: Short period of exposure will not irritate skin.** **Inhalation: Concentration of below 400 ppm will cause light irritation of the upper respiratory tract. High concentration will cause dizziness, loss of motor functions (loss of coordination), and deep coma.** **Ingestion: May cause dizziness, stomachache, painful cramps, nausea, vomiting and diarrhea. Exposure to large amount will cause unconsciousness and death. Estimated fatal dosage is about 131g.** **Eye: Concentration of below 400 ppm will cause light irritation. Direct contact of liquid with the eyes will cause acute irritation.** **Oral LD50 Rat: 5045 mg/kg** **Inhalation LC50 Rat: 16000 ppm/8h**

	Skin: Prolonged or frequent skin contact may cause dryness and peeling. Ingestion: After daily ingestion of 6.4 mg/Kg isopropyl alcohol for 6 weeks, the blood and urine show no special changes in the chemical or cellular compositions. 3500 ppm/7H (Female rats pregnant for 1-19 days, ingestion) causes incomplete development of the embryo. Cannot be determined as carcinogenic in humans.
Eyelrritant	Concentration of below 400 ppm will cause light irritation. Direct contact of liquid with the eyes will cause acute irritation.
Ingestion	May cause dizziness, stomachache, painful cramps, nausea, vomiting and diarrhoea. Exposure to large amount will cause unconsciousness and death. Estimated fatal dosage is about 131g. Chronic: After daily ingestion of 6.4mg/Kg isopropyl alcohol for 6 weeks, the blood and urine show no special changes in the chemical or cellular compositions. 3500ppm/7H (Female rats pregnant for 1-19 days, ingestion) causes incomplete development of the embryo.
Inhalation	Concentration of below 400 ppm will cause light irritation of the upper respiratory tract. High concentration will cause dizziness, loss of motor functions (loss of coordination), and deep coma.
SkinIrritant	Short period of exposure will not irritate skin. Chronic: Prolonged or frequent skin contact may cause dryness and peeling. Prolonged or frequent skin contact may cause dryness and peeling.
Carcinogen Category	No Data Available

12. ECOLOGICAL INFORMATION

Ecotoxicity	Bio-concentration Factor (BCF): 0.5 LC50(Fish) :9640mg/l/96h EC50(Bacterial):Photobacterium 22000 mg/l/15 EC50(Daphnia):Daphnia magna 13299 mg/l/48h IC50 (Alga):>1000 mg/l/72h
Persistence/Degradability	Results from 4 experiments showed that after 5 days (20) in the sewage, isopropyl alcohol can decompose 58% of the BOD theoretical value. When released into water, it is expected to evaporate (estimated half-life is 5.4 days) and can be biodegraded (although it decomposed quickly in the laboratory but there is no relevant data in natural water sources). When released into the air, it is expected to undergo photolysis (half-life is 1 to several days). Since it is water-soluble, it may be washed down by the rain. Half-life (air): 62-72hr Half-life (water surface): 24-168hr Half-life (underground water): 48-336hr Half-life (soil): 24-168hr
Mobility	When released into the soil, its high vapor pressure, faced with low adsorption from the soil, will cause it to evaporate quickly and seep into the ground.
Environmental Fate	Do NOT let product reach drains, sewers or waterways.
Bioaccumulation Potential	Will not accumulate inside the body.
Environmental Impact	No Data Available

13. DISPOSAL CONSIDERATIONS

General Information	Dispose of in accordance with all local, state and federal regulations. All empty packaging should be disposed of in accordance with Local, State, and Federal Regulations or recycled/reconditioned at an approved facility. If small amounts flow into drainage or gutters, wash with large amounts of water to prevent the accumulation of flammable gases. For large amounts report to the environmental protection unit.
Special Precautions for Land Fill	Contact a specialist disposal company or the local waste regulator for advice. Bury in specified landfills or incinerate in approved solvent incinerators.

14. TRANSPORT INFORMATION

Land Transport

Proper Shipping Name	ISOPROPANOL (ISOPROPYL ALCOHOL)
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
ERG	129 Flammable Liquids (Polar / Water-Miscible / Noxious)
UN Number	1219
Hazchem	2YE
Pack Group	II
Special Provision	No Data Available

Sea Transport
IMDG

Proper Shipping Name	ISOPROPANOL (ISOPROPYL ALCOHOL)
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
UN Number	1219
Hazchem	2YE
Pack Group	II
Special Provision	No Data Available
EMS	FE,SD
Marine Pollutant	No

Air Transport
IATA

Proper Shipping Name	ISOPROPANOL (ISOPROPYL ALCOHOL)
Class	3 Flammable Liquids
Subsidiary Risk(s)	No Data Available
UN Number	1219
Hazchem	2YE
Pack Group	II
Special Provision	No Data Available

15. OTHER INFORMATION

Revision	2
Key/Legend	< Less Than > Greater Than atm Atmosphere CAS Chemical Abstracts Service (Registry Number) cm Square Centimetres CO2 Carbon Dioxide COD Chemical Oxygen Demand Degrees Celcius Degrees Farenheit g Grams g/cm Grams per Cubic Centimetre g/l Grams per Litre HSNO Hazardous Substance and New Organism IDLH Immediately Dangerous to Life and Health immiscible Liquids are insoluable in each other. inHg Inch of Mercury inH2O Inch of Water K Kelvin

kg Kilogram
kg/m Kilograms per Cubic Metre
lb Pound
LC50 LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50% (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours.
LD50 LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one half) of a group of test animals.
ltr or L Litre
m Cubic Metre
mbar Millibar
mg Milligram
mg/24H Milligrams per 24 Hours
mg/kg Milligrams per Kilogram
mg/m Milligrams per Cubic Metre
Misc or Miscible Liquids form one homogeneous liquid phase regardless of the amount of either component present.
mm Millimetre
mmH2O Millimetres of Water
mPa.s Millipascals per Second
N/A Not Applicable
NIOSH National Institute for Occupational Safety and Health
NOHSC National Occupational Heath and Safety Commission
OECD Organisation for Economic Co-operation and Development
Oz Ounce
PEL Permissible Exposure Limit
Pa Pascal
ppb Parts per Billion
ppm Parts per Million
ppm/2h Parts per Million per 2 Hours
ppm/6h Parts per Million per 6 Hours
psi Pounds per Square Inch
R Rankine
RCP Reciprocal Calculation Procedure
STEL Short Term Exposure Limit
TLV Threshold Limit Value
tne Tonne
TWA Time Weighted Average
ug/24H Micrograms per 24 Hours
UN United Nations
wt Weight