Product Name: Isopropyl Alcohol

MSDS Number: UZC00111

Effective Date: 10/15/2008

Issued By: 008360

Material Safety Data Sheet

Product Name: Isopropanol, Anhydrous  Issue Date: 10/15/2008

1. Product Company Identification
   Isopropanol, Anhydrous

Distributor:
UNIVAR USA, INC.
17425 NE Union Hill Road
Redmond WA 98052
425-889-3400
Chemtrec: 1-800-424-9300

2. Hazards Identification

   Emergency Overview
   Color: Colorless
   Physical State: Liquid
   Odor: Alcohol
   Hazards of product:
   WARNING! Flammable liquid and vapor. Causes eye irritation. Harmful if
   inhaled. May be harmful if swallowed. Aspiration hazard. Can enter lungs and
   cause damage. Vapor explosion hazard. Vapors may travel a long distance;
   ignition and/or flash back may occur. Isolate area. Keep upwind of spill.
   Stay out of low areas. Warn public of downwind explosion hazard. Eliminate
   ignition sources.

   OSHA Hazard Communication Standard
   This product is a "Hazardous Chemical" as defined by the OSHA Hazard

   Potential Health Effects

   Eye Contact: May cause pain disproportionate to the level of irritation to
   eye tissues. May cause moderate eye irritation. May cause moderate corneal
   injury. Vapor may cause eye irritation experienced as mild discomfort and
   redness. Vapor may cause lacrimation (tears).

   Skin Contact: Prolonged exposure not likely to cause significant skin
   irritation. May cause drying and flaking of the skin.

   Skin Absorption: Prolonged skin contact is unlikely to result in absorption
   of harmful amounts.
Inhalation: With good ventilation, single exposure is not likely to be hazardous. In poorly ventilated areas, vapors or mists may accumulate and cause respiratory irritation. Prolonged excessive exposure may cause adverse effects. Excessive exposure (400 ppm) to isopropanol may cause eye, nose and throat irritation. Incoordination, confusion, hypotension, hypothermia, circulatory collapse, respiratory arrest and death may follow a longer duration or higher levels. Observations in animals include middle ear lining damage upon exposure to vapors of isopropanol. However, the relevance of this to humans is unknown.

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. May cause central nervous system depression. May cause nausea and vomiting. Signs and symptoms of excessive exposure may include: Facial flushing, Low blood pressure, Irregular heartbeats.

Aspiration hazard: Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

Effects of Repeated Exposure: In animals, effects have been reported on the following organs: Liver, Kidney. Kidney effects have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans. Observations in animals include: Lethargy.

Birth Defects/Developmental Effects: Isopropanol has been toxic to the fetus in laboratory animals at doses toxic to the mother.

3. Composition Information

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropanol</td>
<td>67-63-0</td>
<td>100.0 %</td>
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</table>

4. First-aid measures

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Skin Contact: Wash skin with plenty of water.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.
Notes to Physician: Maintain adequate ventilation and oxygenation of the patient. The decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Hemodialysis may be of benefit if substantial amounts have been ingested and the patient is showing signs of intoxication. Consider hemodialysis for patients with persistent hypotension or coma unresponsive to standard therapy (isopropanol levels >400 - 500 mg/dl). (Goldfrank 1998, King et al, 1970). No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

Medical Conditions Aggravated by Exposure: Skin contact may aggravate preexisting dermatitis.

Emergency Personnel Protection: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection) If potential for exposure exists refer to Section 8 for specific personal protective equipment.

5. Fire Fighting Measures

Extinguishing Media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. Straight or direct water streams may not be effective to extinguish fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Use caution and test if material is burning before entering area. Material burns with invisible flame.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Unusual Fire and Explosion Hazards: Container may vent and/or rupture due to fire. When product is stored in closed containers, a flammable atmosphere can develop. Electrically ground and bond all equipment. Flammable mixtures of this product are readily ignited even by static discharge. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Flammable mixtures may exist within the vapor space of containers at room temperature. Flammable concentrations of vapor can accumulate at temperatures above flash point; see Section 9.
Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Contain spilled material if possible. Collect in suitable and properly labeled containers. Apply vapor suppression foams until spill can be cleaned up. Ground and bond all containers and handling equipment. Pump with explosion-proof equipment. If available, use foam to smother or suppress. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Isolate area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. Keep upwind of spill. Keep personnel out of low areas. For large spills, warn public of downwind explosion hazard. Keep unnecessary and unprotected personnel from entering the area. No smoking in area. Ventilate area of leak or spill. Vapor explosion hazard. Keep out of sewers. Keep personnel out of confined or poorly ventilated areas. Only trained and properly protected personnel must be involved in clean-up operations. Confined space entry procedures must be followed before entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling, for additional precautionary measures.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Keep away from heat, sparks and flame. Avoid contact with eyes. Avoid breathing vapor. Do not swallow. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Do not enter confined spaces unless adequately ventilated. Never use air pressure for transferring product. No smoking, open flames or sources of ignition in handling and storage area. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Ignition sources can include and are not limited to pilot lights, flames, smoking, sparks, heaters, electrical equipment, and static discharges. Electrically bond and ground all containers and equipment before transfer or use of material. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage

Avoid direct sunlight. Peroxides can form if this product is stored in contact with air. Peroxides can be explosive. Minimize sources of ignition, such as static build-up, heat, spark or flame.

Shelf life: Use within 24 Months
8. Exposure Controls / Personal Protection

Exposure Limits

<table>
<thead>
<tr>
<th>Component</th>
<th>List</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isopropanol</td>
<td>OSHA Table</td>
<td>PEL</td>
<td>980 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Z-1 ACGIH</td>
<td>TWA</td>
<td>200 ppm</td>
</tr>
<tr>
<td></td>
<td>ACGIH</td>
<td>STEL</td>
<td>400 ppm</td>
</tr>
</tbody>
</table>

Personal Protection

Eye/Face Protection: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

Skin Protection: Wear clean, body-covering clothing.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Examples of acceptable glove barrier materials include: Polyvinyl alcohol ("PVA"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply. The following should be effective types of air-purifying respirators: Organic vapor cartridge.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.
9. Physical and Chemical Properties

Physical State                        Liquid
Color                                Colorless
Odor                                 Alcohol
Flash Point - Closed Cup             12 deg C (54 deg F) Tag Closed Cup ASTM D56
Flammable Limits In Air              Lower: 2.0 % (V) Literature
                                     Upper: 12.0 % (V) Literature
Autoignition Temperature             399 deg C (750 deg F)
Vapor Pressure                       33 mmHg @ 20 deg C Literature
Boiling Point (760 mmHg)             82 deg C (180 deg F) Literature.
Vapor Density (air = 1)              2.1 Literature
Specific Gravity (H20 = 1)           0.787 20 deg C/20 deg C Literature
Liquid Density                      0.785 g/cm3 @ 20 deg C Literature
Freezing Point                      -89 deg C (-128 deg F) Literature
Melting Point                       No test data available
Solubility in Water (by weight)     100 % @ 20 deg C Literature
pH                                   No test data available
Decomposition                        No test data available
Temperature                         Dynamic Viscosity
                                    2.4 cPs @ 20 deg C
Kinematic Viscosity                 No test data available

10. Stability and Reactivity

Stability/Instability
Thermally stable at typical use temperatures.
Conditions to Avoid: Exposure to elevated temperatures can cause product to
decompose. Avoid static discharge.

Incompatible Materials: Avoid contact with: Aldehydes. Halogenated organics.

Hazardous Polymerization
Will not occur.

Thermal Decomposition
Decomposition products depend upon temperature, air supply and the presence
of other materials.

11. Toxicological Information

Acute Toxicity

Ingestion
LD50, Rat 4,700 - 5,800 mg/kg
Approximate. Lethal Dose, Human 100 ml

Skin Absorption
LD50, Rabbit 13,000 mg/kg
Inhalation
LC50, 8 h, Vapor, Rat, female 19,000 ppm

Sensitization

Skin
Did not demonstrate the potential for contact allergy in mice.

Repeated Dose Toxicity
In animals, effects have been reported on the following organs: Liver. Kidney. Kidney effects have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans. Observations in animals include: Lethargy.

Chronic Toxicity and Carcinogenicity
Did not cause cancer in laboratory animals.

Developmental Toxicity
Isopropanol has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive Toxicity
In animal studies, did not interfere with reproduction.

Genetic Toxicology
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. Ecological Information

ENVIRONMENTAL FATE
Data for Component: Isopropanol
Movement & Partitioning
Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).

Henry's Law Constant (H): 3.38E-6 - 8.07E-6 atm*m3/mole; 25 deg C Estimated
Partition coefficient, n-octanol/water (log Pow): 0.05 Measured
Partition coefficient, soil organic carbon/water (Koc): 1.1 Estimated

Persistence and Degradability
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

Indirect Photodegradation with OH Radicals
Rate Constant 7.26E-12 cm3/s
Atmospheric Half-life 1.472 d
Method Estimated

OECD Biodegradation Tests:
Biodegradation 95 % Exposure Time 21 d Method OECD 301E Test
Biological oxygen demand (BOD):
BOD 5 100 % OECD 10 BOD 20 BOD 28
20 % 78 - 86 %
Chemical Oxygen Demand: 2.09 mg/mg
Theoretical Oxygen Demand: 2.40 mg/mg
ECOTOXICITY
Data for Component: Isopropanol
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, fathead minnow (Pimephales promelas), flow-through, 96 h: 9,640 – 10,400 mg/L

Aquatic Invertebrate Acute Toxicity
EC50, water flea Daphnia magna, 48 h, immobilization: 7,550 – 13,299 mg/L

Aquatic Plant Toxicity
EC50, alga Scenedesmus sp., Growth rate inhibition, 72 h: > 1,000 mg/L

Toxicity to Micro-organisms
EC50; activated sludge, respiration inhibition: > 1,000 mg/L

13. Disposal Considerations
DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

14. Transport Information
DOT Non-Bulk
Proper Shipping Name: ISOPROpanol
Hazard Class: 3 ID Number: UN1219 Packing Group: PG II

DOT Bulk
Proper Shipping Name: ISOPROpanol
Hazard Class: 3 ID Number: UN1219 Packing Group: PG II

IMDG
Proper Shipping Name: ISOPROpanol
Hazard Class: 3 ID Number: UN1219 Packing Group: PG II
EMS Number: F-E,S-D
Marine pollutant.: No

ICAO/IATA
Proper Shipping Name: ISOPROpanol
Hazard Class: 3 ID Number: UN1219 Packing Group: PG II
Cargo Packing Instruction: 307
Passenger Packing Instruction: 305
This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
Immediate (Acute) Health Hazard            Yes
Delayed (Chronic) Health Hazard            Yes
Fire Hazard                                Yes
Reactive Hazard                            No
Sudden Release of Pressure Hazard          No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Component                                 CAS #        Amount
Isopropanol                               67-63-0      <= 99.99 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:
The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component                                 CAS #        Amount
Isopropanol                               67-63-0      <= 99.99 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:
To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103
This product contains the following substances which are subject to CERCLA Section 103 reporting requirements and which are listed in 40 CFR 302.4.

Component                                 CAS #        Amount
Isopropanol                               67-63-0      <= 99.99 %
Propanol                                  71-23-8      <= 0.015 %
Isopropyl ether                           108-20-3     <= 0.002 %
California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)
This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

Toxic Substances Control Act (TSCA)
All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)
All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. Other Information

Hazard Rating System

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Recommended Uses and Restrictions
Industrial solvent for cleaner and coating formulations. Chemical additive.

Legend
N/A Not available
W/W Weight/Weight
OEL Occupational Exposure Limit
STEL Short Term Exposure Limit
TWA Time Weighted Average
ACGIH American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG Dow Industrial Hygiene Guideline
WEEL Workplace Environmental Exposure Level
HAZ DES Hazard Designation
Action Level A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.
Notice

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Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a product specification sheet and/or a certificate of analysis. These can be obtained from your local Univar sales office.

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This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.