MATERIAL SAFETY DATA SHEET

ETHYL ALCOHOL

RICHARD-ALLAN SCIENTIFIC
4481 Campus Drive
Kalamazoo Michigan 49008 **CHEMTREC (800) 424-9300**
800-522-7270 U.S.A. 8:00 a.m. - 5:00 p.m. EST 24 hours Everyday

1. SUBSTANCE IDENTIFICATION

SUBSTANCE: **Ethyl Alcohol**

CATALOG NUMBER: 9200-1, 9200-5, 9200-55

TRADE NAMES/SYNONYMS: Denatured alcohol; Denatured Ethanol, SDA-1 Alcohol fully denatured, Denatured spirits, Proprietary solvent general-use, Denatured Proprietary Ethanol

CHEMICAL FAMILY: Hydroxyl, aliphatic

2. COMPOSITION AND INGREDIENTS INFORMATION

Ethyl alcohol	CAS# 64-17-5	<92%
Methyl alcohol	CAS# 67-56-1	<4%
Ethyl Acetate	CAS# 141-78-6	<4%
Methyl isobutyl ketone	CAS# 108-10-1	<1%
Heptane	CAS# 142-82-5	<1%

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4):	Health=1	Fire=3	Reactivity=0

Danger:
Poisonous
Vapor Harmful
May be fatal or cause blindness if swallowed
Cannot be made nonpoisonous
Flammable liquid

Ethanol is a clear liquid with a characteristic sweet alcohol odor. It is a flammable liquid with an irritating vapor. It is poisonous by ingestion due to the denaturant. Vapor is harmful and may be fatal or cause blindness if swallowed. It cannot be made non-poisonous. Affects central nervous system. Causes irritation to eyes, skin and respiratory tract. Ethanol is a probable human carcinogen (IARC) with experimental tumorigenic and teratogenic data.

Primary Routes of Exposure: Inhalation, ingestion, skin and eye contact.

Acute Effects: Irritation of mucus membranes, eyes, nose, throat and membranes of the upper respiratory tract. Central nervous system depression resembling intoxication by ethyl alcohol. Excitation is followed by impaired motor coordination, slurred speech, sensory disturbances such as blurred and double vision, drowsiness, loss of appetite, and an inability to concentrate. Irritation to skin results in cracking and flaking due to defatting action of the alcohol. Splashes may cause temporary pain and blurred vision. High exposure can cause gastritis, blindness and death.

Chronic Effects: Irritation of the eyes, nose, throat and mucus membranes of the upper respiratory tract. Central nervous system effects such as dizziness and sleepiness can occur, as can dryness, irritation and inflammation of the skin. The denaturants in this formulation may cause chronic kidney, liver, nervous system and blood cell damage. Continued ingestion of small amounts may result in blindness. Chronic exposure may cause cancer or a change in female fertility index.

Potential Health Effects:

- Inhalation may cause irritation of mucous membranes and respiratory tract.
- Eye contact may cause eye irritation.
- Skin contact may cause irritation, rashes or burning sensation.
- Ingestion may cause gastritis, intoxication, blindness and in acute cases, death.

4. FIRST-AID PROCEDURES

Inhalation: Remove from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. If breathing is difficult give oxygen. Get medical attention immediately.

Eye Contact: Flush eyes immediately with large amounts of water, occasionally lifting upper and lower lids for at least 25-20 minutes. If irritation persists, seek medical attention.

Skin Contact: Remove contaminated clothing and shoes immediately. Wash effected area with soap or mild detergent and large amounts of water. If irritation persists, seek medical attention.

Ingestion: ANTIDOTE: (Ingestion) Unless unconscious or convulsing, give large amounts of water or milk to induce vomiting. NOTE TO PHYSICIAN: When plasma methanol concentrations exceed 20 mg/dl and when there is evidence of acidosis or visual abnormalities, a 10% solution of ethanol in 5% dextrose administered intravenously is a safe, effective antidote.

5. FIRE FIGHTING PROCEDURES

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.
VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.
VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASHPOINT.

FLASH POINT: 55°F (13°C) (CC)
UPPER EXPLOSIVE LIMIT: 19%
LOWER EXPLOSIVE LIMIT: 3.3%
AUTOIGNITION TEMP.: 793°F
FLAMMABILITY CLASS (OSHA): IB

FIRE FIGHTING MEDIA: DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL-RESISTANT FOAM (1993 Emergency Response Guidebook, Dot P 5800.5).
FOR LARGER FIRES, USE WATER SPRAY, FOG OR ALCOHOL-RESISTANT FOAM (1993 Emergency Response Guidebook, Dot P 5800.5).

FIRE RESPONSE PROCEDURES: Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Extinguish only if flow can be stopped. Use flooding amounts of water as fog: solid streams may be ineffective. Cool containers with flooding amounts of water from as far a distance as possible. Avoid breathing vapors; keep upwind. Fire fighters should wear full protective clothing and NIOSH approved self-contained breathing apparatus with full-face piece operated in the pressure demand or other positive pressure mode. Water spray can be used to extinguish fires and cool fire-exposed containers. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Dangerous fire hazard when exposed to heat. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. POISONOUS GASES ARE PRODUCED IN THE FIRE. CONTAINERS MAY EXPLODE IN FIRE.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Shut off ignition sources. Do not touch spilled material. Stop leak if you can do it without risk. Ventilate the area of spill or leak. Use water spray to reduce vapors. For small spills, take up with sand or other absorbent material and place into sealed containers for disposal.

LARGE SPILLS: Shut off ignition sources. Dike far ahead of spill for disposal. Use water spray to reduce vapors. No smoking, flames, or flares in spill area! Keep unnecessary people away. Ventilate area. Wear appropriate protective equipment, isolate hazard area and deny entry. Take up spill with vermiculite, dry sand, earth or a similar material and deposit into sealed containers. For very large spills, call fire department immediately.

REPORTABLE QUANTITY (RQ): 5000 POUNDS

The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103, the national response center must be notified immediately at (800) 424-8882 or (202) 426-2675 in the metropolitan Washington, D. C. area
(40 CFR 302.6).

7. HANDLING AND STORAGE

General Handling: Keep away from heat, sparks and flame. Keep container tightly closed and upright to prevent leakage. Use only with adequate ventilation. Prevent buildup of vapors. Extinguish all pilot lights and turn off heater, non explosion-proof electrical equipment and other sources of ignition during use and until all vapors are gone. Avoid contact with eyes. Avoid prolonged or repeated breathing of vapor. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling.

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY. STORE IN ACCORDANCE WITH 29 CFR 1910.126.

Ethanol is a class IB flammable liquid (NFPA). Follow maximum allowed pile heights specified in the BOCA codes or the NFPA manual. Local fire authorities should be notified for storage of this material in any quantity. Local permits are required for storage in warehouse quantities.

Store in a well-ventilated place, away from sources of ignition and direct sunlight. Store at 15°C to 30°C (59°F to 86°F). In laboratory quantities, store away from oxidizing material, mineral acids, and chloroform. In warehouse quantities, follow NFPA and BOCA guidelines for storage of flammable liquids. Store Ethanol in areas equipped with automatic sprinklers or fire extinguishing system. Containers of this material may be hazardous when empty. Since emptied containers retain product residues, assume emptied containers to have the same hazard qualities as full containers.

8. EXPOSURE CONTROL (PERSONAL PROTECTION)

VENTILATION: Provide local exhaust ventilation and/or general dilution ventilation to meet published exposure limits.
RESPIRATION: Where the potential exists for exposures over 1000 ppm, use a NIOSH approved respirator with and organic vapor cartridge/canister. More protection is provided by a full facepiece respirator than by a half-mask respirator, and even greater protection is provided by a powered-air purifying respirator.

FOR FIRE FIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:
Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode. Any supplied-air respirator that has a full face piece and is operated in a

pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
CLOTHING: Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.
GLOVES: Employee must wear appropriate protective gloves to prevent contact with this substance. ACGIH recommends NITRILE rubber or VITON as good to excellent protective materials.
EYE PROTECTION: Employee must wear splash-proof or dust-resistant goggles to prevent eye contact with this substance.
EMERGENCY EYE WASH: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.
EXPOSURE LIMITS:

100% Ethyl Alcohol (Ethanol):
1000 ppm (1900 mg/m^3) OSHA TWA
1000 ppm (1880 mg/m^3) ACGIH TWA
1000 ppm (1900 mg/m^3) NIOSH RECOMMENDED TWA
1000 ppm (1900 mg/m^3) DFG MAK TWA;
2000 ppm (3760 mg/m^3) DFG MAK 60 MINUTE PEAK, MOMENTARY VALUE, 3 TIMES/SHIFT

100% Methyl Alcohol (Methanol):
200 ppm (260 mg/m^3) OSHA TWA (SKIN); 250 ppm (325 mg/m^3) OSHA STEL
200 ppm (262 mg/m^3) ACGIH TWA (SKIN); 250 ppm (325 mg/m^3) ACGIH STEL
200 ppm (260 mg/m^3) NIOSH RECOMMENDED TWA (SKIN);
250 ppm (325 mg/m^3) NIOSH RECOMMENDED STEL
200 ppm (260 mg/m^3) DFG MAK TWA (SKIN);
400 ppm (520 mg/m^3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

100% Ethyl Acetate:
400 ppm (1400 mg/m^3) OSHA TWA
400 ppm (1400 mg/m^3) ACGIH TWA
400 ppm (1400 mg/m^3) NIOSH RECOMMENDED TWA
400 ppm (1400 mg/m^3) DFG MAK TWA;
800 ppm (2800 mg/m^3) DFG MAK 5 MINUTE PEAK, MOMENTARY VALUE, 8 TIMES/SHIFT
MEASUREMENT METHOD: CHARCOAL TUBE; CARBON DISULFIDE; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION.

9. PHYSICAL DATA

DESCRIPTION: Clear, colorless liquid
MELTING POINT: -172°F (-114°C)
VAPOR PRESSURE: 40 mmHg @ 20°C
FLASH POINT: 13°C(55°F)
VAPOR DENSITY: 1.6
SOLVENT SOLUBILITY: Ether, Chloroform, Water, Alcohol
BOILING POINT: 172°F (78°C)
SPECIFIC GRAVITY: 0.8
SOLUBILITY IN WATER: soluble
DENSITY (20C) = 0.7893g/mL
MOLECULAR WEIGHT = 46.07

10. STABILITY AND REACTIVITY INFORMATION

REACTIVITY: Stable under normal temperatures and pressures (Ethyl alcohol, methyl alcohol, and isopropyl alcohol)

INCOMPATIBILITIES: ETHYL ALCOHOL (ETHANOL):
ACETIC ANHYDRIDE AND SODIUM HYDROGEN SULFATE: Possible explosion.
ACETYL CHLORIDE: Violent reaction.
ACETYL BROMIDE: Violent reaction.
ALKALI METALS: Liberates flammable hydrogen gas.
ALUMINUM HYDROXIDE AND SILVER (I) OXIDE: Formation of explosive silver nitride.
BARIUM PERCHLORATE: Formation of explosive compound.

BROMINE PENTAFLUORIDE: Ignition and explosions are possible.
CALCIUM HYPOCHLORITE: Possible explosion.
CHLORINE TRIOXIDE: Violent reaction.
CHLORYL PERCHLORATE: Possible ignition.
CHRONIC ANHYDRIDE: Ignition.
CHROMIUM TRIOXIDE: Possible ignition.
CHROMYL CHLORIDE: Ignition.
DIOXYGEN DIFLUORIDE: Possible explosion.
DISULFURIC ACID AND NITRIC ACID: Possible ignition.
DISULFURYL DIFLUORIDE: Violent reaction.
FLUORINE NITRATE: Explosion.
HYDROGEN PEROXIDE: Formation of highly explosive shock-sensitive compound.
HYDROGEN PEROXIDE-SULFURIC ACID MIXTURE: Explosion.
IODINE HEPTAFLUORIDE: Ignition
IODINE-MERCURIC OXIDE-METHYL ALCOHOL MIXTURE: Possible explosion.
IODINE AND PHOSPHORUS: Formation of explosive ethane iodide.
MANGANESE PERCHLORATE AND 2,2-DIMETHOXY PROPANE: Possible explosion.
MERCURIC NITRATE: Formation of explosive compound.
NITRIC ACID: Violent reaction.
NITROSYL PERCHLORATE: Possible explosion.
OXIDIZERS (STRONG): Fire and explosion hazard.
PERCHLORATES: May form explosive compound when mixed.
PERCHLORIC ACID: Explosion.
PERMANGANIC ACID: Ignition or explosion.
PERMANGANATES AND SULFURIC ACID: Explosion.
PEROXYDISULFURIC ACID: Possible explosion.
PHOSPHORUS(III) OXIDE: Ignition.
PLATINUM: Ignition.
POTASSIUM: Violent reaction.
POTASSIUM DIOXIDE: Violent reaction, possible explosion.
POTASSIUM PERCHLORATE: Possible explosion.
POTASSIUM PERMANGANATE: Possible explosion.
POTASSIUM TERT-BUTOXIDE: Ignition.
RUTHENIUM(VIII) OXIDE: Formation of explosive compound.
SILVER AND NITRIC ACID: Formation of explosive compound.
SILVER NITRATE: Formation of explosive compound.
SILVER PERCHLORATE: May form explosive compound when mixed.
SODIUM-AIR: Possible explosion.
SODIUM HYDRAZIDE: May cause violent explosion on contact.
SODIUM PEROXIDE: Violent reaction.
SULFURIC ACID AND SODIUM DICHROMATE: Possible explosion.
TETRACHLOROSILANE: Violent reaction.
URANIUM HEXAFLUORIDE: Violent reaction.
URANYL PERCHLORATE: May form explosive compound when mixed.
See also alcohols.

METHYL ALCOHOL (METHANOL):
ACETYL BROMIDE: Violent reaction with formation of hydrogen bromide.
ALKYLALUMINUM SOLUTIONS: Violent reaction.
ALUMINUM: Corrodes.
BARIUM PERCHLORATE: Distillation yields highly explosive alkyl perchlorate.
BERYLLIUM HYDROXIDE: Violent reaction, even at -196 C.
BROMINE: Vigorously exothermic reaction.
CALCIUM CARBIDE: Violent reaction.
CHLORINE: Possible ignition and explosion hazard.
CHLOROFORM AND SODIUM HYDROXIDE: Explosive reaction.
CHROMIUM TRIOXIDE (CHRONIC ANHYDRIDE): Possible ignition.
CYANURIC CHLORIDE: Violent reaction.
DICHLOROMETHANE: Possible ignition and explosion.

DIETHYL ZINC: Possible ignition and explosion.
HYDROGEN PEROXIDE + WATER: Explosion hazard.
IODINE + ETHANOL + MERCURIC OXIDE: Explosion hazard.
LEAD: Corrodes.
LEAD PERCHLORATE: Explosion hazard.
MAGNESIUM: Violent reaction.
MAGNESIUM (POWDERED): Mixtures are capable of detonation.
METALS: Incompatible.
NICKEL: Possible ignition in the presence of nickel catalyst.
NITRIC ACID (CONCENTRATED): Mixtures of greater than 25% acid may decompose violently.
OXIDIZERS (STRONG): Fire and explosion hazard.
PERCHLORIC ACID: Explosion hazard.
PHOSPHOROUS TRIOXIDE: Possible violent reaction and ignition.
PLASTICS, RUBBER, COATINGS: May be attacked.
POTASSIUM: Possible dangerous reaction.
POTASSIUM HYDROXIDE + CHLOROFORM: Exothermic reaction.
POTASSIUM TERT-BUTOXIDE: Fire and explosion hazard.
SODIUM + CHLOROFORM: Possible explosion.
SODIUM HYPOCHLORITE: Explosion hazard.
Hazardous polymerization has not been found to occur under normal temperatures and pressures. SODIUM METHOXIDE + CHLOROFORM: Violent reaction.
SULFURIC ACID: Fire and explosion hazard.
ZINC: Explosion hazard.

DECOMPOSITION: Thermal decomposition products may include toxic and hazardous fumes by formaldehyde and oxides of carbon.

POLYMERIZATION: Hazardous polymerization has not been found to occur under normal temperatures and pressures.

11. TOXICOLOGICAL INFORMATION

100% ETHYL ALCOHOL (ETHANOL):	skn-rbt 400mg open MLD
	skn-rbt 500mg/24H SEV
	eye-rbt 100mg/24H MOD
	orl-rat LD50:7060mg/kg
	inh-rat LC50:20000ppm/10H
	orl-hmn LDLo:1400mg/kg

Mutagenic data (RTECS); reproductive effects data (RTECS); tumorigenic data (RTECS).

100% METHYL ALCOHOL (METHANOL):	skn-rbt 500mg/24H MOD
	eye-rbt 40mg MOD
	orl-rat LD50:5627mg/kg
	inh-rat LC50:64000ppm/4H
	orl-man TDLo:3429mg/kg: EYE
	orl-hmn LDLo:428mg/kg: EYE,PUL
	orl-hmn LDLo:4g/kg: EYE, PUL, GIT
	inh-hmn TCLo:300ppm: EYE, CNS, PUL

Mutagenic data (RTECS); reproductive effects data (RTECS).

100% ETHYL ACETATE:	eye-hmn 400ppm
	ihl-hmn TCLo: 400 ppm: NOSE, EYE, PUL
	orl-rat LD50: 5620 mg/kg
	ihl-rat LC50: 1066 ppm/8H
	orl-rbt LD50: 4935 mg/kg

12. ECOLOGICAL INFORMATION

Acute toxic effects of Ethanol may include death of animals, birds, or fish and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come into contact with a toxic chemical substance. Chronic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical. Ethanol has slightly acute and chronic toxic effects to aquatic life. It has caused germination and size decrease and other injury to agricultural and ornamental crops

13. DISPOSAL GUIDELINES

Ethanol is a toxic mixture of ethyl & methyl alcohol, with ethyl acetate and very small amounts of methyl isobutyl ketone, and heptane.
RCRA: The unused product is a RCRA hazardous waste if discarded. The RCRA ID number is: D001 or the appropriate spent solvent code.
DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262

OTHER DISPOSAL CONSIDERATIONS: The waste material should be treated and/or disposed of at site authorized to handle hazardous chemical waste. Appropriate Federal, State and Local Regulatory Authorities should be contacted before discharge, treatment or disposal of waste material.
The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

Proper shipping name: Ethyl alcohol solutions
Hazard class or Division: 3
Identification Numbers: UN1170
Packing Group: II
Label(s) required (if not excepted): Flammable Liquid
Special Provisions: T1 refers to transportation of IM portable tanks
Packaging authorizations: Exceptions:None
Non-bulk packaging: 173.202: for liquid hazardous material in packing group II
Bulk-packaging: 173.242: for liquid hazardous material
Quantity Limitations: Passenger aircraft or railcar: 5L
Cargo aircraft only: 60 L

15. REGULATORY INFORMATION

SARA TITLE III (Superfund Amendment and Reauthorization Act)
SECTION 302 AND 304: Extremely Hazardous Substance List (40 CFR 355)- Not Listed
SECTION 311: Hazard Categorization (40 CFR 370)- Acute, Chronic, and Fire
SECTION 313: Toxic Chemicals Listing (40 CFR 372.65)- Listed as a toxic chemical

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act)
SECTION 102(A) Hazardous Substances (40 CFR 302.4)- Listed
Reportable Quantity - 5,000 pounds.
SECTION 101(14) Reportable Quantity: 5,000 lbs

RCRA (Resource Conservation and Recovery Act.)
40 CFR 261.21 Hazardous Waste Number: D001 or appropriate Spent Solvent Number.

NJ-RTK (New Jersey- State Right To Know)
Environmental Hazardous Substance List: Listed, Substance # 0844

ATF (Alcohol Tobacco and Firearms)

General Use Formula

TSCA (Toxic Substance Control Act)
This is a listed substance; CAS # 64-17-5

16. OTHER INFORMATION:

Ethyl Alcohol as manufactured by Richard-Allan Scientific, is intended for legal use in laboratories and manufacturing environments.