MATERIAL SAFETY DATA SHEET

ETHYL ALCOHOL (DENATURED)

Section I - IDENTIFICATION

PRODUCT: Ethyl alcohol (denatured)
SYNONYMS: Denatured ethanol
CHEMICAL FORMULA: C₂H₅OH
CHEMICAL ABSTRACT NO.: Mixture

Section II - HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>COMPOSITION</th>
<th>%</th>
<th>CAS #</th>
<th>TLV</th>
<th>HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl alcohol</td>
<td>82.9</td>
<td>000064175</td>
<td>1000 ppm</td>
<td>Flammable</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>0.2</td>
<td>141-78-6</td>
<td>400 ppm</td>
<td>Flammable</td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>16.4</td>
<td>000067561</td>
<td>200 ppm</td>
<td>Flammable, poisonous</td>
</tr>
<tr>
<td>Methyl ethyl ketone</td>
<td>0.5</td>
<td>000078933</td>
<td>200 ppm</td>
<td>Flammable</td>
</tr>
</tbody>
</table>

Section III - HEALTH & FIRST AID INFORMATION

INHALATION: Irritating to upper respiratory tract. Remove patient to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention immediately.

INGESTION: Poisonous, may damage central nervous system and internal organs and cause blindness. DO NOT induce vomiting. Have conscious person drink several glasses of water or milk. Never give anything by mouth to an unconscious person. Lower the head so that vomit will not re-enter the mouth and throat. Seek medical attention immediately.

EYE CONTACT: Irritating, can cause colour blindness. Check for and remove any contact lenses. Rinse eyes for at least 20 minutes with cold water. Seek medical attention immediately.
SKIN CONTACT: Only hazardous with prolonged contact. Wash immediately with plenty of water for at least 20 minutes. Thoroughly clean contaminated clothing and shoes before re-use. Seek medical attention.

OTHER HEALTH INFORMATION:
Potential Acute health effects: Very hazardous in case of eye contact (irritant), ingestion or inhalation. Hazardous in case of skin contact (permeator). Slightly hazardous in case of skin contact (irritant). Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering and itching.

Potential Chronic health effects:
Carcinogenic effects: Classified A4 by ACGIH (for ethyl alcohol) - (Not Classifiable for human or animal)
Mutagenic effects: Not available
Teratogenic effects: Not available
Developmental toxicity: Not available
This substance is toxic to the liver. Repeated or prolonged exposure can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many organs.

LC₅₀/LD₅₀:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Toxicity Type</th>
<th>Route of Exposure</th>
<th>LD₅₀ Value</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl Alcohol</td>
<td>LD₅₀ Acute</td>
<td>Oral</td>
<td>7060 mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dermal</td>
<td>20000 mg/kg</td>
<td>Rabbit</td>
</tr>
<tr>
<td>Methanol</td>
<td>LD₅₀ Acute</td>
<td>Oral</td>
<td>5628 mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dermal</td>
<td>15800 mg/kg</td>
<td>Rabbit</td>
</tr>
<tr>
<td></td>
<td>LC₅₀ Vapour</td>
<td>Vapour</td>
<td>64000 ppm-4 hours</td>
<td>Rat</td>
</tr>
<tr>
<td>Methyl ethyl ketone</td>
<td>LD₅₀ Acute</td>
<td>Oral</td>
<td>2737 mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dermal</td>
<td>6480 mg/kg</td>
<td>Rabbit (RTECS)</td>
</tr>
<tr>
<td></td>
<td>LC₅₀ Vapour</td>
<td>Vapour</td>
<td>13000 mg/kg</td>
<td>Rabbit</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>LD₅₀ Acute</td>
<td>Oral</td>
<td>5620 mg/kg</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vapour</td>
<td>22627 ppm-4 hours</td>
<td>Rat</td>
</tr>
<tr>
<td></td>
<td>LC₅₀ Vapour</td>
<td>Vapour</td>
<td>22627 ppm-4 hours</td>
<td>Rat</td>
</tr>
</tbody>
</table>

OTHER TOXICOLOGICAL INFORMATION:
Routes of entry: Dermal, Eye, Inhalation, Ingestion
Toxicity to Animals: Ethyl alcohol LD₅₀ 3450 mg/kg acute oral (Mouse)
Methanol LD₅₀ 15800 mg/kg acute dermal (Rabbit)
Remarks: Repeated or prolonged exposure may lead to dermatitis, erythema and scaling. Long term repeated exposure to ethanol may result in development of progressive liver injury with fibrosis.

Section IV - PHYSICAL DATA

BOILING POINT: 75°C (167°F)
VAPOUR DENSITY (AIR=1): Ethyl alcohol: 1.6; Methyl alcohol: 1.1. Weighted average 1.51

SOLUBILITY IN WATER: partially to completely miscible

APPEARANCE AND COLOUR: colourless liquid, alcohol with an alcohol-like odour

SPECIFIC GRAVITY (WATER=1): 0.79

VAPOUR PRESSURE (@20°C): 12.9 kPa

ODOUR THRESHOLD: Highest known value is 2000 ppm (methanol). Weighted average = 413.8 ppm

Section V - FIRE AND EXPLOSION HAZARDS

FLASH POINT & METHODS USED: 12°C (53.6°F) - closed cup

FLAMMABLE LIMITS IN AIR; % BY VOL. LOWER: Ethyl alcohol: 4.3%; Methyl alcohol: 6%

FLAMMABLE LIMITS IN AIR; % BY VOL. UPPER: Ethyl alcohol: 19%; Methyl alcohol: 36.5%

SPECIAL FIRE FIGHTING PROCEDURES & PRECAUTIONS: Flammable liquid soluble or dispersed in water. For Small Fire - use dry chemical powder. For Large Fire - use alcohol foam, water spray or foam. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Vapours from this product may travel or be moved by air currents and ignited by pilot lights or other flames, sparks, heaters, electrical equipment, static discharges or other ignition sources.

FIRE HAZARD: Flammable in presence of open flames and sparks. Slightly flammable to flammable in the presence of oxidizing materials.

EXPLOSION HAZARDS: Explosive in presence of open flames and sparks.

UNUSUAL FIRE & EXPLOSION HAZARDS: none

AUTO-IGNITION TEMPERATURE: Lowest known value is 363°C (685.4°F) - Ethyl alcohol

Section VI - REACTIVITY

STABILITY: stable

HAZARDOUS POLYMERIZATION: will not occur

CONDITIONS & MATERIALS TO AVOID: heat, sparks, other sources of ignition

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide

Section VII - EMPLOYEE PROTECTION

CONTROL MEASURES: In case of spill, shut off all sources of ignition. Small spills may be run to waste with plenty of water. Large spills should be transferred to a salvage
container. Seek the advice of a professional chemical disposal service. Contact local authorities if spill has entered surface drains or sewers.

**RESPIRATORY PROTECTION:** Use organic vapour cartridge or self contained breathing apparatus if handling large quantities (use self contained breathing apparatus if concentration is above 1000 ppm).

**PROTECTIVE CLOTHING:** Wear protective gloves (neoprene, rubber or butyl gloves are recommended).

**EYE PROTECTION:** Wear approved safety goggles if splashing is likely. Ensure that eyewash station and safety showers are available.

**EXPOSURE LIMITS:**

<table>
<thead>
<tr>
<th>Substance</th>
<th>TWA ppm from ACGIH (TLV) (US)</th>
<th>TWA ppm from OSHA (PEL) (US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl Acetate</td>
<td>400</td>
<td>1440</td>
</tr>
<tr>
<td>Ethyl Alcohol</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Methanol</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Methyl Ethyl Ketone</td>
<td>590 STEL 885 mg/m³ from ACGIH (TLV) (US)</td>
<td>200 STEL 300 ppm from ACGIH (TLV) (US)</td>
</tr>
</tbody>
</table>

Consult local authorities for acceptable exposure limits.

**Section VIII - ENVIRONMENTAL PROTECTION**

**ENVIRONMENTAL PRECAUTIONS:** Use with adequate ventilation, local exhaust is acceptable. When transferring between metal containers, ground both vessels.

**SPILL OR LEAK PRECAUTIONS:** Shut off all possible sources of ignition. Wear protective gloves, use respirator if large quantities are involved or if working in a poorly ventilated area.

**WASTE DISPOSAL:** Small amounts can be run to waste with plenty of water. Large amounts should be disposed of in an incineration facility equipped with an afterburner and scrubber. Consult local, provincial and federal regulations.

**Section IX - REGULATORY CONTROLS**

**DEPT. OF TRANSPORTATION:** Regulated under Transport of Dangerous Goods

**DOT CLASSIFICATION:** Class 3.2 (6.1) UN: 1986

**DOT PROPER SHIPPING NAME:** Alcohols, Toxic NOS (Ethanol solutions)

**OTHER DOT INFORMATION:** Packing group II

**WHMIS CLASSIFICATION:** B2, D1A, D2B

**OTHER REGULATORY REQUIREMENT:** none

**Section X - PRECAUTIONS: HANDLING, STORAGE & USAGE**
Store in a cool place away from any possible source of ignition, use only in adequately ventilated areas and ensure against static electricity.

PREPARED BY: MSDS Department

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Syndel Laboratories Ltd.
968 Chatworth Road
Qualicum Beach, BC
Canada V9K 1V6
Tel: (250) 752-5186 or (800) 663-2282
FAX: (260) 752-5188
e-mail: info@syndel.com

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