MATERIAL SAFETY DATA SHEET

Ethyl Alcohol 190 Proof
USP/ACS/Grain/Synthetic/Kosher/Organic/Cane/Wood

1. IDENTIFICATION OF SUBSTANCE / MIXTURE AND OF SUPPLIER

Product Identifier: Ethanol
Synonyms: Ethyl Alcohol 95%; Ethanol
Other means of identification: CAS No. 64-17-5
                               EINECS No. 200-578-6

Recommended use of the chemical and restrictions on use:
General purpose organic solvent

Supplier Details:
Pharmco Products, Inc.
1101 Isaac Shelby Drive, Shelbyville,
KY 40065, USA.
Tel: 502.232.7600
Fax: 502.633.6100
CCN17213

Pharmco Products, Inc.
58 Vale Road, Brookfield,
CT 06804, USA.
Tel: 203.740.3471
Fax: 203.740.3481
CCN17213

Emergency Contact: CHEMTREC: 1.800.424.9300 (USA) / +1.703.527.3887 (International)

2. HAZARDS IDENTIFICATION

Emergency Overview:
This material is HAZARDOUS by OSHA Hazard Communication definition. Flammable Liquid. Material can burn with little or no visible flame.

OSHA Hazards:
Flammable liquid, Target Organ Effect, Irritant

Target Organs:
Central nervous system, Heart, Liver
NFPA

GHS label elements, including precautionary statements

**Signal Word:**
DANGER!

**Hazard statement(s)**

- H225: Highly flammable liquid and vapor.
- H315 + H320: Causes skin and eye irritation
- H335: May cause respiratory irritation.

**Precautionary statement(s)**

- P501: Dispose of contents and container to an approved waste disposal plant.
- P240: Ground/bond container and receiving equipment.
- P337 + P313: If eye irritation persists: Get medical attention.
- P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Seek medical attention.
- P303 + P361 + P353: IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water.
- P370 + P378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
- P210: Keep away from heat, sparks, open flames, and hot surfaces. No smoking.
- P233: Keep container tightly closed.
- P403 + P235: Store in a well-ventilated place. Keep cool.
- P243: Take precautionary measures against static discharge.
Product Information: 203.740.3471 Emergency Assistance (CHEMTREC): 1.800.424.9300 (USA) +1.703.527.3887 (INT)

P241 Use explosion-proof electrical, ventilating, and lighting equipment.
P242 Use only non-sparking tools.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves and eye and face protection.

GHS Classification(s)
Eye irritation (Category 2B)
Flammable Liquids (Category 2)
Skin irritation (Category 2)
Specific target organ toxicity - single exposure (Category 3)

Other hazards which do not result in classification:

Potential health effects:

<table>
<thead>
<tr>
<th>Organ</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>Causes irritation to the eyes. Can cause painful sensitization to light. Can cause a form of chemical conjunctivitis and cause corneal damage.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>Can cause gastrointestinal irritation with nausea, vomiting and diarrhea. Systemic toxicity and acidosis can occur. Advanced stages can lead to respiratory failure, kidney failure, coma, and death.</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Causes respiratory tract irritation. Can cause narcotic effects in high concentration. Vapors may cause dizziness or suffocation. Systemic toxicity and acidosis can occur. Advanced stages can lead to respiratory failure, kidney failure, coma, and death.</td>
</tr>
<tr>
<td>Skin</td>
<td>Causes moderate skin irritation. Can cause dermatitis by de-fatting the skin from prolonged or repeated contact.</td>
</tr>
</tbody>
</table>

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Chemical identity: Ethyl Alcohol 190 Proof
Common name / Synonym: Ethyl Alcohol 95%; Ethanol
CAS number: 64-17-5
EINECS number: 200-578-6
ICSC number: 0044
RTECS #: KQ6300000
UN #: 1170
EC #: 603-002-00-5

<table>
<thead>
<tr>
<th>% Volume</th>
<th>Material</th>
<th>CAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>95.0 - 96.0</td>
<td>Ethyl Alcohol</td>
<td>64-17-5</td>
</tr>
<tr>
<td>4.0 - 5.0</td>
<td>Water</td>
<td>7732-18-5</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

General advice
Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**Skin**

Immediately flush affected area with plenty of water while removing contaminated clothing. Wash contaminated clothing before reuse. Contact a doctor. If irritation persists, get medical attention.

**Inhalation**

Remove person to fresh air. If signs/symptoms continue, get medical attention. Give oxygen or artificial respiration as needed.

**Eyes**

Thoroughly flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation persists, seek medical attention.

**Ingestion**

DO NOT induce vomiting. If vomiting does occur, have victim lean forward to prevent aspiration. Rinse mouth with water. Seek medical attention. Never give anything by mouth to an unconscious individual.

**Note to Physician**

Symptoms will vary with alcohol level of the blood. Mild alcohol intoxication occurs at blood levels between 0.05-0.15%. Approximately 25% of individuals show signs of intoxication at these levels. Above 0.15% the person is definitely under the influence of ethanol; 50-95% of individuals are clinically intoxicated at these levels. Severe poisoning occurs when the blood is ethanol level is 0.3-0.5%. Above 0.5% the individual will be comatose and death can occur. The unabsorbed ethanol should be removed by gastric lavage after intubating the patient to prevent aspiration. Avoid the use of depressant drugs and administering excessive amounts of fluids.

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**5. FIRE FIGHTING MEASURES**

**Suitable (and unsuitable) extinguishing media:**

- SMALL FIRE: Use dry chemicals, CO2, water spray or alcohol-resistant foam.
- LARGE FIRE: Use water spray, water fog or alcohol-resistant foam. Cool all affected containers with flooding quantities of water.

**Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products):**

Carbon monoxide is expected to be the primary hazard.

**Special protective equipment and precautions for firefighters:**

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Keep unopened containers cool by spraying with water.

**Unusual Fire and Explosion Hazards:**

- May produce a floating fire hazard.
- Static ignition hazard can result from handling and use.
- Vapors may travel to source of ignition and flash back.

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**MSDS: 003**  **Revision Date: 11.07.13**  **Revision Number: 3.1**  **Initials: EF**
Vapors may settle in low or confined spaces.

Alcohols burn with a pale blue flame which may be extremely hard to see under normal lighting conditions. Personnel may only be able to feel the heat of the fire without seeing flames. Extreme caution must be exercised in fighting alcohol fires. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from tanks engulfed in fire.

**Flammable Properties**

**Classification**
OSHA/NFPA Class IB Flammable Liquid.

**Flash point**
17 °C (63°F) - closed cup

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### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, protective equipment and emergency procedures:**
Do not inhale vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

**Environmental precautions:**
Stop leak. Contain spill if possible and safe to do so. Prevent product from entering drains.

**Methods and materials for containment and cleaning up:**
Highly flammable liquid. Eliminate all sources of ignition. All equipment used when handling this product must be grounded. A vapor suppressing foam may be used to reduce vapors. Do not touch or walk through spilled material. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations. Use clean non-sparking tools to collect absorbed material.

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### 7. HANDLING AND STORAGE

**Precautions for safe handling:**
Do not get on skin or in eyes. Do not inhale vapor or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the buildup of electrostatic charge. Open and handle container with care. Metal containers involved in the transfer of this material should be grounded and bonded.

**Conditions for safe storage, including any incompatibilities:**
Keep container tightly closed in a cool, dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Consult local fire codes for additional storage information.
8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters, e.g., occupational exposure limit values or biological limit values:

### Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Component</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl alcohol</td>
<td>US (ACGIH)</td>
<td>STEL</td>
<td>1000 ppm</td>
<td>Upper Respiratory Tract irritation Confirmed animal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>carcinogen with unknown relevance to humans</td>
</tr>
<tr>
<td>Ethyl alcohol</td>
<td>US (OSHA)</td>
<td>TWA</td>
<td>1000 ppm / 1,900</td>
<td>29 CFR 1910.1000 Table Z-1 Limits for Air</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>mg/m3</td>
<td>Contaminants.</td>
</tr>
<tr>
<td>Ethyl alcohol</td>
<td>US (OSHA)</td>
<td>IDHL</td>
<td>3300 ppm</td>
<td>None</td>
</tr>
</tbody>
</table>

Appropriate engineering controls:
General room or local exhaust ventilation is usually required to meet exposure limit(s). Electrical equipment should be grounded and conform to applicable electrical code.

Individual protection measures, such as personal protective equipment:

#### Respiratory protection:
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

#### Hand protection:
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

#### Eye protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Use equipment approved by appropriate government standards, such as NIOSH (US) or EN166 (EU) Maintain eye wash fountain and quick-drench facilities in work area.

#### Skin and body protection:
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

#### Hygiene measures:
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

| Appearance (physical state, color, etc.) | Liquid. Colorless liquid / invisible vapor. |
| Odor                                   | Sweet. Alcohol-like                        |
| Odor threshold                         | Specific data not available                |
| pH                                     | Specific data not available                |

MSDS: 003 | Revision Date: 11.07.13 | Revision Number: 3.1 | Initials: EF
### Freezing point
-114 °C (-173 °F)

### Initial boiling point and boiling range
80°C (176°F) (for 100% ethanol)

### Flash point
17 °C (63°F) - closed cup

### Evaporation rate
Specific data not available - expected to be rapid.

### Flammability (solid, gas)
Flammable

### Upper / Lower flammability or explosive limits
19%(V) / 3.3% (V) (for 100% ethanol)

### Vapor pressure
59.5 hPa (44.6 mmHg) at 20 °C (68 °F) (for 100% ethanol)

### Vapor Density
1.6

### Relative Density
0.816 g/mL at 25 °C (77 °F)

### Solubility(ies)
Miscible

### Partition coefficient n-octanol/water(ies)
Specific data not available

### Auto-ignition temperature
363 °C (685 °F) (for 100% ethanol)

### Decomposition temperature
Specific data not available

### Formula (ETHANOL)
C2H6O

### Formula (WATER)
H2O

### Molecular Weight (ETHANOL)
46.07 g/mol

### Molecular Weight (WATER)
18.02 g/mol

## 10. STABILITY AND REACTIVITY

### Chemical Stability
Stable under recommended storage conditions.

### Possibility of hazardous reactions
Vapors may form explosive mixture with air.

### Conditions to avoid (e.g., static discharge, shock or vibration)
Heat, flames, and sparks. Extreme temperatures and direct sunlight.

### Incompatible materials
Alkali metals, Ammonia, Oxidizing agents, Peroxides, Strong Inorganic Acids

### Hazardous decomposition products
Carbon oxides are expected to be, under fire conditions, the primary hazardous decomposition products.

## 11. TOXICOLOGICAL INFORMATION

- Ethyl Alcohol 64-17-5

### Signs and Symptoms of Exposure
Central nervous system depression, narcosis, damage to the heart. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

### Product Summary:
Ethanol is not toxic by OSHA standards. Coingestion of sedative hypnotics or tranquilizers can increase the toxic affects of ethanol. No data available to designate the product as causing specific target organ toxicity through repeated exposure. No data available to designate product as an aspiration hazard.

### Acute Toxicity:
LC50 Inhalation | Rat | 20000 ppm | 10 hrs.
LC50 Oral | Rat | 7060mg/Kg BWT
LDLo Oral | Human | 1400 mg/Kg BWT

Irritation:

**Eyes (ETHANOL)**
Eye exposure to Ethanol generally causes transient pain, irritation, and reflex lid closure. A foreign-body sensation may persist for one to two days. Vapors produce transient stinging and tearing, but no apparent adverse effects. Transiently impaired perception of color may occur with acute ingestion or chronic alcoholism. Standard Draize eye test (rabbit) - Dose: 500 mg Reaction: Severe Dose: 500 mg/24 hrs Reaction: Mild

**Respiratory or Skin Sensitization**
No data available

**Skin**
Standard Draize skin test (rabbit) - Dose: 20 mg/24 hrs Reaction: Moderate Repeated exposure may cause skin dryness or cracking.

**Reproductive Toxicity**
Reproductive toxicity - Human - female - Oral. Effects on Newborns - measured low apgar scores and showed signs of alcohol dependence.

**Specific target organ toxicity - single exposure (Globally Harmonized System)**
Inhalation - May cause respiratory irritation. - Lungs

**Carcinogenicity**
IARC: Not classifiable as a human carcinogen.
ACGIH: Not classifiable as a human carcinogen.
NTP: Not classifiable as a human carcinogen.
OSHA: Not classifiable as a human carcinogen.

Carcinogenicity - Mouse - Oral. Tumorigenic. Tumors found in liver and formation of lymphomas in blood.

**Other Hazards**

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</table>
Chronic Prolonged exposure can cause liver, kidney, and heart damage. Long term exposure can cause loss of appetite, weight loss, nervousness, memory loss, mental retardation.

Water 7732-18-5

Product Summary:
No data available for the teratogenic, mutagenic, or reproductive toxicity effects of this product. No data available to designate the product as causing specific target organ toxicity through single or repeated exposure. No data available to designate product as an aspiration hazard or as a respiratory or skin sensitizer.

Acute Toxicity:

<table>
<thead>
<tr>
<th></th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Irritation:
- **Eyes**
  - No data available.
- **Skin**
  - No data available

Carcinogenicity
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable or confirmed human carcinogen by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Other Hazards

<table>
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<tr>
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<tbody>
<tr>
<td>Eyes</td>
<td>No known hazards.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>No known hazards.</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Can be harmful if inhaled. Can cause irritation to upper respiratory tract.</td>
</tr>
<tr>
<td>Skin</td>
<td>No known hazards.</td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION
Ethyl Alcohol 64-17-5

Ecotoxicity (aquatic and terrestrial, where available):

Acute Fish toxicity (ETHANOL)
LC50 / 96 HOUR Oncorhynchus mykiss (rainbow trout) > 10,000 mg/l
LC50 / 96 HOUR Pimephales promelas (fathead minnow) > 13,400 mg/l

Toxicity to aquatic plants (ETHANOL)
Growth inhibition / 96 HOURS Chlorella vulgaris (Fresh water algae) 1,000 mg/l

Toxicity to microorganisms (ETHANOL)
Toxicity Threshold / Pseudomonas putida 6,500 mg/l
Summary: Inhibition of cell multiplication begins.

Persistence and degradability:
Biodegradation is expected.

Bioaccumulative potential:
Biaccumulation is unlikely

Other adverse effects:
No data available

Water 7732-18-5

Ecotoxicity (aquatic and terrestrial, where available):

Ecotoxicity
Not Applicable

Persistence and degradability:
No data available

Bioaccumulative potential:
No data available

Other adverse effects:
No data available

13. DISPOSAL CONSIDERATIONS
Product Information: 203.740.3471 Emergency Assistance (CHEMTREC): 1.800.424.9300 (USA) 
+1.703.527.3887 (INT)

Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging:

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

14. TRANSPORT INFORMATION

Description of waste residues and information on their safe handling and methods of disposal:

| UN number | 1170 |
| UN proper shipping name | Ethanol Solutions |
| Transport hazard class(es) | 3 |
| Packing group (if applicable) | II |

IMDG
UN-Number: 1170 Class: 3 Packing Group: II
EMS-No: F-E, S-D
Proper shipping name: Ethanol Solutions
Marine pollutant: No

IATA
UN-Number: 1170 Class: 3 Packing Group: II
Proper shipping name: Ethanol Solutions

15. REGULATORY INFORMATION

Safety, health and environmental regulations specific for the product in question:

OSHA Hazards
Flammable liquid, Target Organ Effect, Irritant

All ingredients are on the following inventories or are exempted from listing

<table>
<thead>
<tr>
<th>Country</th>
<th>Notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>AICS</td>
</tr>
<tr>
<td>Canada</td>
<td>DSL</td>
</tr>
<tr>
<td>China</td>
<td>IECS</td>
</tr>
<tr>
<td>European Union</td>
<td>EINECS</td>
</tr>
<tr>
<td>Japan</td>
<td>ENCS/ISHL</td>
</tr>
<tr>
<td>Korea</td>
<td>ECL</td>
</tr>
<tr>
<td>New Zealand</td>
<td>NZIoC</td>
</tr>
<tr>
<td>Philippines</td>
<td>PICCS</td>
</tr>
<tr>
<td>United States of America</td>
<td>TSCA</td>
</tr>
</tbody>
</table>

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard
Chronic Health Hazard
Fire Hazard

CERCLA
No chemicals in this material with known CAS numbers are subject to the reporting requirements of CERCLA

Massachusetts Right To Know Components
Ethanol CAS-No.64-17-5 Revision Date 2007-03-01

Pennsylvania Right To Know Components
Ethanol CAS-No.64-17-5 Revision Date 2007-03-01

New Jersey Right To Know Components
Ethanol CAS-No.64-17-5 Revision Date 2007-03-01

California Prop 65 Components
WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm (ETHYL ALCOHOL) CAS No. 64-17-5 Revision Date: December 11, 2009

16. OTHER INFORMATION:
INCLUDING INFORMATION ON PREPARATION AND REVISION OF THE SDS

Disclaimer
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