1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Ethanol Solutions 20 - 100%
Cat No.: SH20492, SV30147
Synonyms: Ethyl alcohol; Absolute ethanol
Recommended Use: In vitro methods

Company: HyClone Laboratories, Inc.
925 West 1800 South
Logan, UT 84321 United States
Tel: (435) 792-8000

Emergency Telephone Number
INFOTRAC - 24 Hour Number: 1-800-535-5053
Outside of the United States, call 24 Hour Number: 001-352-323-3500 (Call Collect)

2. HAZARDS IDENTIFICATION

WARNING!

Emergency Overview
Flammable liquid and vapor. Irritating to eyes and skin. May cause irritation of respiratory tract. May cause central nervous system effects. Aspiration hazard if swallowed - can enter lungs and cause damage. This substance has caused adverse reproductive and fetal effects in humans. Substances known to cause developmental toxicity in humans.

Appearance: Clear
Physical State: Liquid
odor: Alcohol-like

Target Organs: Eyes, Skin, Reproductive System, Central nervous system (CNS), Liver, Kidney, Blood

Potential Health Effects

Acute Effects
Principle Routes of Exposure

- Eyes: Irritating to eyes.
- Skin: Irritating to skin. May be harmful in contact with skin.
- Inhalation: May cause irritation of respiratory tract. May be harmful if inhaled. Inhalation may cause central nervous system effects.
- Ingestion: May be harmful if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Chronic Effects

This substance has caused adverse reproductive and fetal effects in humans. Substances known to cause developmental toxicity in humans. Tumorigenic effects have been reported in experimental animals. May cause adverse liver effects. May cause adverse kidney effects.

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions


3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Haz/Non-haz</th>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute alcohol</td>
<td>64-17-5</td>
<td>20 - 100</td>
</tr>
<tr>
<td></td>
<td>Prostaglandin E2</td>
<td>363-24-6</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact
Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation
Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Obtain medical attention.

Ingestion
Do not induce vomiting. Obtain medical attention.

Notes to Physician
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point
13°C / 55.4°F

Method
Closed cup

Autoignition Temperature
363°C / 685.4°F

Explosion Limits
Upper 19 vol %
Lower 3.3 vol %

Suitable Extinguishing Media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use water spray to cool unopened containers.

Unsuitable Extinguishing Media
Water may be ineffective.

Hazardous Combustion Products
No information available.

Sensitivity to mechanical impact
No information available.

Sensitivity to static discharge
No information available.

Specific Hazards Arising from the Chemical
Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions**
Remove all sources of ignition. Use personal protective equipment. Take precautionary measures against static discharges. Do not get in eyes, on skin, or on clothing.

**Environmental Precautions**
Should not be released into the environment.

**Methods for Containment and Clean Up**
Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable and closed containers for disposal. Take precautionary measures against static discharges.

### 7. HANDLING AND STORAGE

**Handling**
Wear personal protective equipment. Ensure adequate ventilation. Use explosion-proof equipment. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. Do not breathe vapors or spray mist. Do not get in eyes, on skin, or on clothing.

**Storage**
Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition. Flammables area.

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering Measures**
Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

**Exposure Guidelines**

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute alcohol</td>
<td>TWA: 1000 ppm</td>
<td>(Vacated) TWA: 1900 mg/m³</td>
<td>IDLH: 3300 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Vacated) TWA: 1000 ppm</td>
<td>TWA: 1000 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 1900 mg/m³</td>
<td>TWA: 1900 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 1000 ppm</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Quebec</th>
<th>Mexico OEL (TWA)</th>
<th>Ontario TWAEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute alcohol</td>
<td>TWA: 1000 ppm</td>
<td>TWA: 1000 ppm</td>
<td>TWA: 1000 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA: 1880 mg/m³</td>
<td>TWA: 1900 mg/m³</td>
<td>TWA: 1900 mg/m³</td>
</tr>
</tbody>
</table>

**NIOSH IDLH:** Immediately Dangerous to Life or Health

**Personal Protective Equipment**

- **Eye/face Protection**
  Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

- **Skin and body protection**
  Wear appropriate protective gloves and clothing to prevent skin exposure.

- **Respiratory Protection**
  Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear</td>
</tr>
<tr>
<td>odor</td>
<td>Alcohol-like</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available.</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>No information available.</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>No information available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No information available.</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>78°C / 172.4°F</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>-114°C / -173.2°F</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flash Point</td>
<td>13°C / 55.4°F</td>
</tr>
<tr>
<td>Method</td>
<td>Closed cup</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No information available.</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>No information available.</td>
</tr>
<tr>
<td>Solubility</td>
<td>No information available.</td>
</tr>
<tr>
<td>log Pow</td>
<td>No data available</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability                          Stable under normal conditions.
Conditions to Avoid                Incompatible products. Heat, flames and sparks.
Incompatible Materials             Strong oxidizing agents, Strong acids, Acid anhydrides, Acid chlorides
Hazardous Decomposition Products   Carbon monoxide (CO), Carbon dioxide (CO₂)
Hazardous Polymerization           Hazardous polymerization does not occur.
Hazardous Reactions                None under normal processing.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute alcohol</td>
<td>7060 mg/kg (Rat)</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>Prostaglandin E2</td>
<td>500 mg/kg (Rat)</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Irritation                       Irritating to eyes and skin
Toxicologically Synergistic      Carbon tetrachloride, Trichloroethylene, Chloroform, Methylene chloride, Acetone, Methyl ethyl ketone, Toluene, Benzene, Mercury, Chromium, Cobalt, Manganese
Products                         
Chronic Toxicity

Carcinogenicity

The table below indicates whether each agency has listed any ingredient as a carcinogen.

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute alcohol</td>
<td>Not listed</td>
<td>Group 1</td>
<td>Not listed</td>
<td>X</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

ACGIH: (American Conference of Governmental Industrial Hygienists)
A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen

OSHA: (Occupational Safety & Health Administration)
X - Present

Mexico - Occupational Exposure Limits - Carcinogens

A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Sensitization
No information available.

Mutagenic Effects
Mutagenic effects have occurred in humans.

Reproductive Effects
Adverse reproductive effects have occurred in humans.

Developmental Effects
Substances known to cause developmental toxicity in humans.

Teratogenicity
Teratogenic effects have occurred in humans.

Other Adverse Effects
Teratogenic effects have been reported in experimental animals. The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

Endocrine Disruptor Information
No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute alcohol</td>
<td>Not listed</td>
<td>Not listed</td>
<td>= 34634 mg/L EC50 Photobacterium phosphoreum 30 min = 35470 mg/L EC50 Photobacterium phosphoreum 5 min</td>
<td>LC50 48 h 9268 mg/L EC50 24 h 10800 mg/L LC50 48 h 9268 mg/L</td>
</tr>
</tbody>
</table>

Persistence and Degradability
No information available

Bioaccumulation/ Accumulation
No information available

Mobility

<table>
<thead>
<tr>
<th>Component</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute alcohol</td>
<td>-0.32</td>
</tr>
</tbody>
</table>
13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods
Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. TRANSPORT INFORMATION

DOT

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN1170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>ETHANOL</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

TDG

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN1170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>ETHANOL</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

IATA

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN1170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>ETHANOL</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

IMDG/IMO

<table>
<thead>
<tr>
<th>UN-No</th>
<th>UN1170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Shipping Name</td>
<td>ETHANOL</td>
</tr>
<tr>
<td>Hazard Class</td>
<td>3</td>
</tr>
<tr>
<td>Packing Group</td>
<td>II</td>
</tr>
</tbody>
</table>

15. REGULATORY INFORMATION

All of the components in the product are on the following Inventory lists:

<table>
<thead>
<tr>
<th>International Inventories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
</tr>
<tr>
<td>Absolute alcohol</td>
</tr>
</tbody>
</table>
Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313
Not applicable

SARA 311/312 Hazardous Categorization
Acute Health Hazard No
Chronic Health Hazard No
Fire Hazard Yes
Sudden Release of Pressure Hazard No
Reactive Hazard No

Clean Water Act
Not applicable

Clean Air Act
Not applicable

OSHA
Not applicable

CERCLA
Not Applicable

California Proposition 65
This product contains the following Proposition 65 chemicals: Ethyl alcohol is only a considered a Proposition 65 developmental hazard when it is ingested as an alcoholic beverage.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>California Prop. 65</th>
<th>Prop 65 NSRL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute alcohol</td>
<td>64-17-5</td>
<td>Developmental</td>
<td>-</td>
</tr>
</tbody>
</table>

State Right-to-Know
<table>
<thead>
<tr>
<th>Component</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Illinois</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute alcohol</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
</tr>
</tbody>
</table>

**U.S. Department of Transportation**

Reportable Quantity (RQ): N
DOT Marine Pollutant: N
DOT Severe Marine Pollutant: N

**U.S. Department of Homeland Security**

This product does not contain any DHS chemicals.

**Other International Regulations**

**Mexico - Grade**

Serious risk, Grade 3

**Canada**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**WHMIS Hazard Class**

B2  Flammable liquid
D2B  Toxic materials

---

**16. OTHER INFORMATION**

**Prepared By**

Regulatory Affairs
Thermo Fisher Scientific
Tel: (412) 490-8929

**Creation Date**

02-Jun-2009

**Print Date**

05-Aug-2010

**Revision Summary**

***", and red text indicates revision

**Disclaimer**

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of MSDS