1. Identification

Product Name  Ethyl ether
Cat No. :  E138-1; E138-20; E138-4; E138-4LC; E138-500; E138RS-19; E138RS-28; E138RS-50
CAS-No  60-29-7
Synonyms  Ethyl ether; Ether
Recommended Use  Laboratory chemicals.
Uses advised against  Food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company  Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Flammable liquids</th>
<th>Category 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>Category 4</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Category 3</td>
</tr>
<tr>
<td>Target Organs - Respiratory system, Central nervous system (CNS).</td>
<td></td>
</tr>
<tr>
<td>Specific target organ toxicity - (repeated exposure)</td>
<td>Category 2</td>
</tr>
<tr>
<td>Target Organs - Liver.</td>
<td></td>
</tr>
<tr>
<td>Aspiration Toxicity</td>
<td>Category 1</td>
</tr>
</tbody>
</table>

Label Elements

Signal Word  Danger

Hazard Statements
Extremely flammable liquid and vapor
Harmful if swallowed
May cause respiratory irritation
May cause drowsiness or dizziness
May be harmful if swallowed and enters airways
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Wear protective gloves/protective clothing/eye protection/face protection
Keep cool
Response
Get medical attention/advice if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
May form explosive peroxides
Repeated exposure may cause skin dryness or cracking

3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether</td>
<td>60-29-7</td>
<td>&gt;95</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. Get 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 method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Obtain medical attention.

Ingestion  Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms and effects  Breathing difficulties. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician  Treat symptomatically

**5. Fire-fighting measures**

**Suitable Extinguishing Media**  CO₂, dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.

**Unsuitable Extinguishing Media**  Water may be ineffective

**Flash Point**  -45 °C / -49 °F

**Method**  No information available

**Autoignition Temperature**  160 °C / 320 °F

**Explosion Limits**

<table>
<thead>
<tr>
<th></th>
<th>Upper</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36.0 vol %</td>
<td>1.9 vol %</td>
</tr>
</tbody>
</table>

**Sensitivity to Mechanical Impact**  No information available

**Sensitivity to Static Discharge**  No information available

**Specific Hazards Arising from the Chemical**  Extremely flammable. Risk of ignition. Vapors may travel to source of ignition and flash back. Vapors may form explosive mixtures with air. Containers may explode when heated. May form explosive peroxides. Vapors may form explosive mixtures with air.

**Hazardous Combustion Products**  Carbon monoxide (CO) Carbon dioxide (CO₂) peroxides

**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.

**NFPA**

<table>
<thead>
<tr>
<th></th>
<th>Health</th>
<th>Flammability</th>
<th>Instability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**6. Accidental release measures**

**Personal Precautions**  Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes and clothing.

**Environmental Precautions**  Should not be released into the environment. See Section 12 for additional ecological information.

**Methods for Containment and Clean Up**  Remove all sources of ignition. Soak up with inert absorbent material. Take precautionary measures against static discharges. Keep in suitable, closed containers for disposal. Use spark-proof tools and explosion-proof equipment.

**7. Handling and storage**

**Handling**  Wear personal protective equipment. Handle under an inert atmosphere. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Do not breathe vapors or spray mist.
Ethyl ether

Keep away from open flames, hot surfaces and sources of ignition. If peroxide formation is suspected, do not open or move container. Use only non-sparking tools. Use explosion-proof equipment. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage
Flammables area. Store under an inert atmosphere. Keep away from open flames, hot surfaces and sources of ignition. May form explosive peroxides. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. Keep away from heat and sources of ignition. Keep container tightly closed in a dry and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
<th>Mexico OEL (TWA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether</td>
<td>TWA: 400 ppm STEL: 500 ppm</td>
<td>(Vacated) TWA: 400 ppm (Vacated) STEL: 500 ppm (Vacated) STEL: 1500 mg/m³ TWA: 400 ppm TWA: 1200 mg/m³</td>
<td>IDLH: 1900 ppm TWA: 400 ppm STEL: 500 ppm STEL: 1500 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

Legend
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

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

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.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice.

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>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>aromatic</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>No information available</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>-116 °C / -176.8 °F</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>34.6 °C / 94.3 °F</td>
</tr>
<tr>
<td>Flash Point</td>
<td>-45 °C / -49 °F</td>
</tr>
</tbody>
</table>
Evaporation Rate 37.5
Flammability (solid, gas) Not applicable
Flammability or explosive limits
  Upper 36.0 vol %
  Lower 1.9 vol %
Vapor Pressure 587 mbar @ 20 °C
Vapor Density 2.55
Specific Gravity 0.714
Solubility Slightly soluble in water
Partition coefficient; n-octanol/water No data available
Autoignition Temperature 160 °C / 320 °F
Decomposition Temperature No information available
Vapor Pressure 587 mbar @ 20 °C
Viscosity 0.2448 cP at 20 °C
Molecular Formula C4 H10 O
Molecular Weight 74.12

10. Stability and reactivity

Reactive Hazard Yes
Incompatible Materials Strong oxidizing agents, Strong acids
Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO₂), peroxides
Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions May form explosive peroxides.

11. Toxicological information

Acute Toxicity

<table>
<thead>
<tr>
<th>Component</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether</td>
<td>1215 mg/kg (Rat)</td>
<td>20 mL/kg (Rabbit)</td>
<td>LC50 = 32000 ppm (Rat) 4h</td>
</tr>
</tbody>
</table>

Toxicologically Synergistic Products No information available
Delayed and immediate effects as well as chronic effects from short and long-term exposure
Irritation No information available
Sensitization No information available

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

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>OSHA</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether</td>
<td>60-29-7</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Mutagenic Effects Mutagenic effects have occurred in experimental animals.
Reproductive Effects No information available.
Developmental Effects No information available.
Teratogenicity No information available.
STOT - single exposure  Respiratory system Central nervous system (CNS)
STOT - repeated exposure  Liver
Aspiration hazard  No information available
Symptoms / effects, both acute and delayed  Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Endocrine Disruptor Information  No information available
Other Adverse Effects  See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity
Do not empty into drains.

<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>Ethyl ether</td>
<td>Not listed</td>
<td>LC50: &gt; 10000 mg/L, 96h static (Lepomis macrochirus)</td>
<td>EC50 = 5600 mg/L 15 min</td>
<td>EC50 = 185 mg/L/24h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LC50: = 2560 mg/L, 96h flow-through (Pimephales promelas)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Persistence and Degradability  Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation  No information available.
Mobility  Will likely be mobile in the environment due to its volatility.

<table>
<thead>
<tr>
<th>Component</th>
<th>log Pow</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether</td>
<td>0.82</td>
<td></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.

<table>
<thead>
<tr>
<th>Component</th>
<th>RCRA - U Series Wastes</th>
<th>RCRA - P Series Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether - 60-29-7</td>
<td>U117</td>
<td>-</td>
</tr>
</tbody>
</table>

14. Transport information

DOT
- UN-No  UN1155
- Proper Shipping Name  Diethyl ether
- Hazard Class  3
- Packing Group  I

TDG
- UN-No  UN1155
- Proper Shipping Name  Diethyl ether
- Hazard Class  3
- Packing Group  I

IATA
- UN-No  UN1155
- Proper Shipping Name  Diethyl ether
- Hazard Class  3
- Packing Group  I

IMDG/IMO
- UN-No  UN1155
15. Regulatory information

United States of America Inventory

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>TSCA</th>
<th>TSCA Inventory notification - Active/Inactive</th>
<th>TSCA - EPA Regulatory Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether</td>
<td>60-29-7</td>
<td>X</td>
<td>ACTIVE</td>
<td></td>
</tr>
</tbody>
</table>

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
 '-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>IECSC</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether</td>
<td>60-29-7</td>
<td>X</td>
<td>-</td>
<td>200-467-2</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>KE-27690</td>
<td></td>
</tr>
</tbody>
</table>

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

<table>
<thead>
<tr>
<th>Component</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA EHS RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl ether</td>
<td>100 lb</td>
<td>-</td>
</tr>
</tbody>
</table>

California Proposition 65 This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

<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>Ethyl ether</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): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product contains the following DHS chemicals:

<table>
<thead>
<tr>
<th>Component</th>
<th>DHS Chemical Facility Anti-Terrorism Standard</th>
</tr>
</thead>
</table>

Legend - STQs = Screening Threshold Quantities, APA = A placarded amount
**16. Other information**

Prepared By  
Regulatory Affairs  
Thermo Fisher Scientific  
Email: EMSDS.RA@thermofisher.com

Creation Date  
15-Apr-2009

Revision Date  
25-Apr-2019

Print Date  
25-Apr-2019

Revision Summary  
This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer  
The information provided in 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 guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered 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 materials or in any process, unless specified in the text.

End of SDS