1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Diethyl ether

Product Number : 346136
Brand : Sigma-Aldrich

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Target Organ Effect, Harmful by ingestion., Irritant

Target Organs
Central nervous system, Kidney, Liver, Gastrointestinal tract, Skeletal muscle.

Other hazards which do not result in classification
May form explosive peroxides.

GHS Classification
Flammable liquids (Category 1)
Acute toxicity, Oral (Category 4)
Acute toxicity, Inhalation (Category 5)
Skin irritation (Category 3)
Eye irritation (Category 2A)
Specific target organ toxicity - single exposure (Category 3)

GHS Label elements, including precautionary statements

Pictogram

Hazard statement(s)
H224 Extremely flammable liquid and vapour.
H302 Harmful if swallowed.
H316 Causes mild skin irritation.
H319 Causes serious eye irritation.
H333 May be harmful if inhaled.
H336 May cause drowsiness or dizziness.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Other hazards
May form explosive peroxides. Repeated exposure may cause skin dryness or cracking.

HMIS Classification
- Health hazard: 2
- Chronic Health Hazard: *
- Flammability: 4
- Physical hazards: 2

NFPA Rating
- Health hazard: 2
- Fire: 4
- Reactivity Hazard: 0

Potential Health Effects
- Inhalation: May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.
- Skin: Harmful if absorbed through skin. Causes skin irritation.
- Eyes: Causes eye irritation.
- Ingestion: Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ether</td>
<td></td>
</tr>
<tr>
<td>Ethyl ether</td>
<td></td>
</tr>
<tr>
<td>Ether</td>
<td></td>
</tr>
<tr>
<td>Ethyl ether</td>
<td></td>
</tr>
<tr>
<td><strong>C₄H₁₀O</strong></td>
<td></td>
</tr>
<tr>
<td>Molecular Weight: 74.12 g/mol</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl ether</td>
<td></td>
</tr>
<tr>
<td>CAS-No. 60-29-7</td>
<td></td>
</tr>
<tr>
<td>EC-No. 200-467-2</td>
<td></td>
</tr>
<tr>
<td>Index-No. 603-022-00-4</td>
<td></td>
</tr>
<tr>
<td><strong>2,6-di-tert-Butyl-p-cresol</strong></td>
<td></td>
</tr>
<tr>
<td>CAS-No. 128-37-0</td>
<td>1 - 5 %</td>
</tr>
<tr>
<td>EC-No. 204-881-4</td>
<td></td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

**General advice**
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**If inhaled**
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**
Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed**
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

**Conditions of flammability**
Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

**Suitable extinguishing media**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Special protective equipment for firefighters**
Wear self contained breathing apparatus for fire fighting if necessary.

**Hazardous combustion products**
Hazardous decomposition products formed under fire conditions. - Carbon oxides

**Further information**
Use water spray to cool unopened containers.

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### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions**
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

**Methods and materials for containment and cleaning up**
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

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### 7. HANDLING AND STORAGE

**Precautions for safe handling**
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

**Conditions for safe storage**
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.


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### 8. EXPOSURE CONTROLS/PERSOAL PROTECTION

**Components with workplace control parameters**

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl ether</td>
<td>60-29-7</td>
<td>TWA</td>
<td>400 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Central Nervous System impairment Upper Respiratory Tract irritation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>500 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>400 ppm 1,200 mg/m3</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>500 ppm 1,500 mg/m3</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>400 ppm 1,200 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
</tbody>
</table>

The value in mg/m3 is approximate.

See Appendix D - Substances with No Established RELs
<table>
<thead>
<tr>
<th>2,6-di-tert-Butyl-p-cresol</th>
<th>128-37-0</th>
<th>TWA</th>
<th>10 mg/m³</th>
<th>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWA</td>
<td>2 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**
- Upper Respiratory Tract irritation Not classifiable as a human carcinogen

<table>
<thead>
<tr>
<th>TWA</th>
<th>10 mg/m³</th>
<th>USA. NIOSH Recommended Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td>2 mg/m³</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

**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 AXBEK (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.

**Splash protection**
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 30 min
Material tested: Vitoject® (Aldrich Z677698, Size M)

Data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Eye protection**
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin and body protection**
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**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**
- **Form**: liquid
- **Colour**: colourless

**Safety data**
- **pH**: no data available
- Melting point/range: -116 °C (-177 °F) - lit.
- **Boiling point**: 34.6 °C (94.3 °F) - lit.
Flash point -40 °C (-40 °F)
Ignition temperature 180 °C (356 °F) - Auto-flammability
Autoignition temperature no data available
Lower explosion limit 1.8 %(V)
Upper explosion limit 48 %(V)
Vapour pressure 189 hPa (142 mmHg) at 0 °C (32 °F)
389 hPa (292 mmHg) at 10 °C (50 °F)
563 hPa (422 mmHg) at 20 °C (68 °F)
863 hPa (647 mmHg) at 30 °C (86 °F)
1,228 hPa (921 mmHg) at 40 °C (104 °F)
2,311 hPa (1,733 mmHg) at 60 °C (140 °F)
Density 0.706 g/mL at 25 °C (77 °F)
Water solubility 65 g/l at 20 °C (68 °F)
Partition coefficient: n-octanol/water no data available
Relative vapour density 2.56 - (Air = 1.0)
Odour no data available
Odour Threshold no data available
Evaporation rate no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Vapours may form explosive mixture with air.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

Materials to avoid
Oxidizing agents, Strong acids

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

Contains the following stabiliser(s):
BHT (<=1 %)

11. TOXICOLOGICAL INFORMATION

Acute toxicity
Oral LD50
LD50 Oral - rat - 1,215 mg/kg

Inhalation LC50
LC50 Inhalation - mouse - 30 min - 31000 ppm
Remarks: Behavioral:Convulsions or effect on seizure threshold.

Dermal LD50
LD50 Dermal - rabbit - > 14.2 g/kg

Other information on acute toxicity
no data available
Skin corrosion/irritation
no data available

**Serious eye damage/eye irritation**
Eyes - rabbit - Eye irritation - 24 h - Draize Test

**Respiratory or skin sensitization**
no data available

**Germ cell mutagenicity**
Genotoxicity in vitro - mouse - Embryo
DNA inhibition

Genotoxicity in vitro - mouse - Embryo
DNA inhibition

Genotoxicity in vitro - Hamster - fibroblast

**Other mutation test systems**

**Carcinogenicity**
IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (2,6-di-tert-Butyl-p-cresol)

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.

**Reproductive toxicity**

no data available

**Teratogenicity**

no data available

**Specific target organ toxicity - single exposure (Globally Harmonized System)**
May cause drowsiness or dizziness.

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**
no data available

**Aspiration hazard**
no data available

**Potential health effects**

<table>
<thead>
<tr>
<th>Inhalation</th>
<th>May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.</th>
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<tbody>
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<td>Ingestion</td>
<td>Harmful if swallowed.</td>
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<tr>
<td>Skin</td>
<td>Harmful if absorbed through skin. Causes skin irritation.</td>
</tr>
<tr>
<td>Eyes</td>
<td>Causes eye irritation.</td>
</tr>
</tbody>
</table>

**Signs and Symptoms of Exposure**
Cough, chest pain, Difficulty in breathing, Dizziness, Drowsiness, Contact with eyes can cause:, Redness, Provokes tears, Blurred vision, Prolonged or repeated exposure to skin causes defatting and dermatitis., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

**Synergistic effects**
no data available

**Additional Information**
RTECS: KI5775000

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**12. ECOLOGICAL INFORMATION**

**Toxicity**
Toxicity to fish  
LC50 - Pimephales promelas (fathead minnow) - 2,560 mg/l - 96 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1155  Class: 3  Packing group: I
Proper shipping name: Diethyl ether
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1155  Class: 3  Packing group: I  EMS-No: F-E, S-D
Proper shipping name: DIETHYL ETHER
Marine pollutant: No

IATA
UN number: 1155  Class: 3  Packing group: I
Proper shipping name: Diethyl ether

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Target Organ Effect, Harmful by ingestion., Irritant

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: 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
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>CAS-No.</th>
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<tr>
<td>128-37-0</td>
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Pennsylvania Right To Know Components

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2,6-di-tert-Butyl-p-cresol
Diethyl ether
2,6-di-tert-Butyl-p-cresol 128-37-0 2007-03-01
Diethyl ether 60-29-7 2007-03-01

**New Jersey Right To Know Components**

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**California Prop. 65 Components**

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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**16. OTHER INFORMATION**

**Further Information**

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.