1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

<table>
<thead>
<tr>
<th>Product name</th>
<th>2-Mercaptoethanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Number</td>
<td>M6250</td>
</tr>
<tr>
<td>Brand</td>
<td>Aldrich</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>60-24-2</td>
</tr>
</tbody>
</table>

1.2 Relevant identified uses of the substance or mixture and uses advised against

- Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

- Company: Sigma-Aldrich
  3050 Spruce Street
  SAINT LOUIS MO 63103
  USA
- Telephone: +1 800-325-5832
- Fax: +1 800-325-5052

1.4 Emergency telephone number

- Emergency Phone #: (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

- Flammable liquids (Category 4), H227
- Acute toxicity, Oral (Category 3), H301
- Acute toxicity, Inhalation (Category 3), H331
- Acute toxicity, Dermal (Category 2), H310
- Skin irritation (Category 2), H315
- Serious eye damage (Category 1), H318
- Skin sensitisation (Category 1), H317
- Specific target organ toxicity - repeated exposure, Oral (Category 2), Liver, Heart, H373
- Acute aquatic toxicity (Category 1), H400
- Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

- Pictogram
- Signal word: Danger
- Hazard statement(s)
  - H227: Combustible liquid.
  - H301 + H331: Toxic if swallowed or if inhaled
  - H310: Fatal in contact with skin.
  - H315: Causes skin irritation.
  - H317: May cause an allergic skin reaction.
  - H318: Causes serious eye damage.
May cause damage to organs (Liver, Heart) through prolonged or repeated exposure if swallowed.

H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P262 Do not get in eyes, on skin, or on clothing.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P350 + P310 IF ON SKIN: Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/ physician.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P311 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P314 Get medical advice/ attention if you feel unwell.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391 Collect spillage.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
Stench.
Stench., Rapidly absorbed through skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Synonyms:
Thioethylene glycol
2-Hydroxyethylmercaptan
BME
β-Mercaptoethanol

Formula: C₂H₆OS
Molecular weight: 78.13 g/mol
CAS-No.: 60-24-2
EC-No.: 200-464-6

Hazardous components

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Mercaptoethanol</td>
<td>Flam. Liq. 4; Acute Tox. 3; Acute Tox. 2; Skin Irrit. 2; Eye Dam. 1; Skin Sens. 1; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H227, H301 +</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>
For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of 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. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

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

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

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

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, 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.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 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). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.
7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
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.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Mercaptoethanol</td>
<td>60-24-2</td>
<td>TWA</td>
<td>0.200000 ppm</td>
<td>USA. Workplace Environmental Exposure Levels (WEEL)</td>
</tr>
</tbody>
</table>

Remarks: Skin

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin 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.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 30 min
Material tested: Lapren® (KCL 706 / Aldrich Z677558, 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 and safety officer 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.

Body Protection
Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
**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).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

---

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Form: liquid</td>
</tr>
<tr>
<td></td>
<td>Colour: colourless yellow</td>
</tr>
<tr>
<td><strong>Odour</strong></td>
<td>Stench</td>
</tr>
<tr>
<td><strong>Odour Threshold</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>4.5 - 6 at 500 g/l at 20 °C (68 °F)</td>
</tr>
<tr>
<td><strong>Melting point/freezing point</strong></td>
<td>&lt; -49.99 °C (&lt; -57.98 °F)</td>
</tr>
<tr>
<td><strong>Initial boiling point and boiling range</strong></td>
<td>157 °C (315 °F) - lit.</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>74 °C (165 °F) - closed cup</td>
</tr>
<tr>
<td><strong>Evaporation rate</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Upper/lower flammability or explosive limits</strong></td>
<td>Upper explosion limit: 18 % (V)</td>
</tr>
<tr>
<td></td>
<td>Lower explosion limit: 2.3 % (V)</td>
</tr>
<tr>
<td><strong>Vapour pressure</strong></td>
<td>0.76 hPa (0.57 mmHg) at 20 °C (68 °F)</td>
</tr>
<tr>
<td></td>
<td>4.67 hPa (3.50 mmHg) at 40 °C (104 °F)</td>
</tr>
<tr>
<td><strong>Vapour density</strong></td>
<td>2.70 - (Air = 1.0)</td>
</tr>
<tr>
<td><strong>Relative density</strong></td>
<td>1.114 g/cm3 at 25 °C (77 °F)</td>
</tr>
<tr>
<td><strong>Water solubility</strong></td>
<td>Soluble</td>
</tr>
<tr>
<td><strong>Partition coefficient: n-octanol/water</strong></td>
<td>log Pow: -0.326 log Pow: -0.056 at 25 °C (77 °F)</td>
</tr>
<tr>
<td><strong>Auto-ignition temperature</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Decomposition temperature</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Viscosity</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Explosive properties</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Oxidizing properties</strong></td>
<td>No data available</td>
</tr>
</tbody>
</table>

### 9.2 Other safety information

- **Relative vapour density**: 2.70 - (Air = 1.0)

---

## 10. STABILITY AND REACTIVITY

### 10.1 Reactivity
No data available

### 10.2 Chemical stability
Stable under recommended storage conditions.
10.3 **Possibility of hazardous reactions**  
No data available

10.4 **Conditions to avoid**  
Heat, flames and sparks.

10.5 **Incompatible materials**  
Metals, Oxidizing agents

10.6 **Hazardous decomposition products**  
Other decomposition products - No data available  
In the event of fire: see section 5

11. **TOXICOLOGICAL INFORMATION**

11.1 **Information on toxicological effects**

**Acute toxicity**  
LD50 Oral - Rat - 98 - 162 mg/kg  
(OECD Test Guideline 401)  
LC50 Inhalation - Rat - 4 h - 2 mg/l  
LC50 Inhalation - Rat - 4 h - 625 ppm  
LD50 Dermal - Rabbit - 112 mg/kg  
No data available

**Skin corrosion/irritation**  
Skin - Rabbit  
Result: Irritating to skin.  
(Draize Test)

**Serious eye damage/eye irritation**  
Eyes - Rabbit  
Result: Risk of serious damage to eyes.

**Respiratory or skin sensitisation**  
Maximisation Test (GPMT) - Guinea pig  
May cause sensitisation by skin contact.  
(OECD Test Guideline 406)

**Germ cell mutagenicity**  
Experiments showed mutagenic effects in cultured bacterial cells.

**Carcinogenicity**

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible 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.

**Reproductive toxicity**  
No data available

No data available

**Specific target organ toxicity - single exposure**  
No data available

**Specific target organ toxicity - repeated exposure**  
Ingestion - May cause damage to organs through prolonged or repeated exposure. - Liver, Heart
Aspiration hazard
No data available

Additional Information
RTECS: KL5600000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Weakness, Unconsciousness, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish 
LC50 - Leuciscus idus (Golden orfe) - 46 - 100 mg/l - 96.0 h

Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia (water flea) - 0.89 mg/l - 48 h

(OECD Test Guideline 202)

Toxicity to algae
EC50 - Desmodesmus subspicatus (green algae) - 12 mg/l - 72 h

Toxicity to bacteria
LC50 - Bacteria - 125 mg/l - 17 h

12.2 Persistence and degradability

Biodegradability
Result: < 30.0 % - Not readily biodegradable.
Result: 6 % - Not readily biodegradable.
aerobic - Exposure time 28 d
Result: < 10 % - Not readily biodegradable.

Biochemical Oxygen Demand (BOD)
105 mg/g

Chemical Oxygen Demand (COD)
1.894 mg/g

12.3 Bioaccumulative potential
Does not accumulate in organisms.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. 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: 2966 Class: 6.1 Packing group: II
Proper shipping name: Thioglycol
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG
UN number: 2966  Class: 6.1  Packing group: II  EMS-No: F-A, S-A
Proper shipping name: THIOGLYCOL
Marine pollutant: yes

IATA
UN number: 2966  Class: 6.1  Packing group: II
Proper shipping name: Thioglycol

15. REGULATORY INFORMATION

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
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Mercaptoethanol</td>
<td>60-24-2</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

Pennsylvania Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Mercaptoethanol</td>
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<td>1993-04-24</td>
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</tbody>
</table>

New Jersey Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Mercaptoethanol</td>
<td>60-24-2</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

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.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

- Acute Tox.  Acute toxicity
- Aquatic Acute  Acute aquatic toxicity
- Aquatic Chronic  Chronic aquatic toxicity
- Eye Dam.  Serious eye damage
- Flam. Liq.  Flammable liquids
- H227  Combustible liquid.
- H301  Toxic if swallowed.
- H301 + H331  Toxic if swallowed or if inhaled
- H310  Fatal in contact with skin.
- H315  Causes skin irritation.
- H317  May cause an allergic skin reaction.
- H318  Causes serious eye damage.
- H331  Toxic if inhaled.
- H373  May cause damage to organs through prolonged or repeated exposure if swallowed.
- H400  Very toxic to aquatic life.

HMIS Rating

- Health hazard:  4
- Chronic Health Hazard:  *
Flammability: 2
Physical Hazard: 0

**NFPA Rating**
Health hazard: 3
Fire Hazard: 2
Reactivity Hazard: 0

**Further information**
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**Preparation Information**
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

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