SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name: 2-Mercaptoethanol
Product Number: M3148
Brand: Sigma
CAS-No.: 60-24-2

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

Identified uses: Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO  63103
UNITED STATES
Telephone: +1 314 771-5765
Fax: +1 800 325-5052

1.4 Emergency telephone

Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 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 sensitization (Sub-category 1A), H317
- Reproductive toxicity (Category 2), H361
- Specific target organ toxicity - repeated exposure, Oral (Category 2), Liver, Heart, H373
- Short-term (acute) aquatic hazard (Category 1), H400
- Long-term (chronic) aquatic hazard (Category 2), H411
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.
H361 Suspected of damaging fertility or the unborn child.
H373 May cause damage to organs (Liver, Heart) through prolonged or repeated exposure if swallowed.
H400 Very toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P260 Do not breathe mist or vapors.
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 must 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/ doctor. 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/ doctor.
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/ doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
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.

### SECTION 3: Composition/information on ingredients

#### 3.1 Substances

| Synonyms                  | 2-Hydroxyethylmercaptan  
|                          | β-Mercaptoethanol  
|                          | beta mercaptoethanol  
|                          | Thioethylene glycol  
|                          | BME                  |
| Formula                  | C2H6OS                |
| Molecular weight         | 78.13 g/mol           |
| CAS-No.                  | 60-24-2               |
| EC-No.                   | 200-464-6             |

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercaptoethanol</td>
<td>Flam. Liq. 4; Acute Tox. 3; Acute Tox. 2; Skin Irrit. 2; Eye Dam. 1; Skin Sens. 1A; Repr. 2; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 2; H227, H301, H331, H310, H315, H318, H317, H361, H373, H400, H411 M-Factor - Aquatic Acute: 1</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

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

### SECTION 4: First aid measures

#### 4.1 Description of first-aid measures

**General advice**
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

**If inhaled**
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.
In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

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

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Sulfur oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
   Advice on safe handling
   Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.
   
   Advice on protection against fire and explosion
   Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.
   
   Hygiene measures
   Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
   For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
   Storage conditions
   Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.
   
   Storage class
   Storage class (TRGS 510): 6.1A: 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

SECTION 8: Exposure controls/personal protection

8.1 Control parameters
   Ingredients with workplace control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
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</thead>
<tbody>
<tr>
<td>Mercaptoethanol</td>
<td>60-24-2</td>
<td>TWA</td>
<td>0.2 ppm</td>
<td>USA. Workplace Environmental Exposure Levels (WEEL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks Skin</td>
</tr>
</tbody>
</table>

Sigma - M3148

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada
8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

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

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Eye protection
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Butoject® (KCL 898)

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Eye protection
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 120 min
Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance
   Form: liquid
   Color: colorless

b) Odor
   characteristic
c) Odor Threshold                  5.7 ppm

d) pH                             4.5 - 6 at 500 g/l at 20 °C (68 °F)

e) Melting point/freezing point   Melting point: < -50 °C (< -58 °F)

f) Initial boiling point and boiling range   157 °C 315 °F

g) Flash point                  68 °C (154 °F) - closed cup

h) Evaporation rate              No data available

i) Flammability (solid, gas)    No data available

j) Upper/lower flammability or explosive limits
   Upper explosion limit: 18 %(V)
   Lower explosion limit: 2.3 %(V)

k) Vapor pressure               0.76 hPa at 20 °C (68 °F)

l) Vapor density                2.70 - (Air = 1.0)

m) Density                      1.114 g/mL at 25 °C (77 °F)
   Relative density             No data available

n) Water solubility             soluble

o) Partition coefficient: n-octanol/water
   log Pow: -0.056 at 25 °C (77 °F) - Bioaccumulation is not expected.

p) Autoignition temperature     No data available

q) Decomposition temperature   No data available

r) Viscosity                    No data available

s) Explosive properties         No data available

t) Oxidizing properties         none

9.2 Other safety information
   Relative vapor density        2.70 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
   Forms explosive mixtures with air on intense heating.
   A range from approx. 15 Kelvin below the flash point is to be rated as critical.

10.2 Chemical stability
   The product is chemically stable under standard ambient conditions (room temperature).

10.3 Possibility of hazardous reactions
   Violent reactions possible with:
   Relative vapor density 2.70 - (Air = 1.0)
Strong oxidizing agents
A risk of explosion and/or of toxic gas formation exists with the following substances: Acids

10.4 Conditions to avoid
Strong heating.

10.5 Incompatible materials
Metals, Oxidizing agents, Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

**Acute toxicity**
LD50 Oral - Mouse - 190 mg/kg
Remarks: (RTECS)
Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.
LC50 Inhalation - Rat - male - 4 h - 2.05 mg/l - vapor
Remarks: (ECHA)
Symptoms: Possible damages:, mucosal irritations, Cough, Shortness of breath
LD50 Dermal - Rabbit - male and female - 112 - 224 mg/kg
Remarks: (ECHA)
No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: Irritations
(OECD Test Guideline 404)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Severe irritations
(Draize Test)
Remarks: (External MSDS)
Remarks: Risk of corneal clouding.

**Respiratory or skin sensitization**
Maximization Test - Guinea pig
Result: positive
(OECD Test Guideline 406)

**Germ cell mutagenicity**
Test Type: Chromosome aberration test
Species: Mouse
Cell type: Bone marrow
Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: negative

**Carcinogenicity**

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient 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 on OSHA’s list of regulated carcinogens.

**Reproductive toxicity**

Suspected of damaging the unborn child.

Suspected of damaging fertility.

**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

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 49 d - NOAEL (No observed adverse effect level) - 15 mg/kg - LOAEL (Lowest observed adverse effect level) - 50 mg/kg

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.

Systemic effects:

CNS disorders
Nausea
Vomiting
Convulsions
narcosis

The following applies to mercaptans in general: offensive odour.

Other dangerous properties can not be excluded.

This substance should be handled with particular care.
12.1 Toxicity

Toxicity to fish: static test LC50 - Leuciscus idus (Golden orfe) - 37 mg/l - 96 h (DIN 38412 T15)

Toxicity to daphnia and other aquatic invertebrates: static test EC50 - Daphnia magna (Water flea) - 0.4 mg/l - 48 h (OECD Test Guideline 202)

Toxicity to algae: static test ErC50 - Desmodesmus subspicatus (green algae) - 19 mg/l - 72 h (OECD Test Guideline 201)

Toxicity to bacteria: static test EC50 - Pseudomonas putida - 125 mg/l - 17 h (DIN 38 412 Part 8)

Toxicity to daphnia and other aquatic invertebrates (chronic toxicity): semi-static test NOEC - Daphnia magna (Water flea) - > 0.0632 mg/l - 21 d (OECD Test Guideline 211)

12.2 Persistence and degradability

Biodegradability: Result: > 70 % - rapidly biodegradable
Remarks: (ECHA)

Biochemical Oxygen Demand (BOD): 105 mg/g
Remarks: (IUCLID)

Chemical Oxygen Demand (COD): 1.894 mg/g
Remarks: (IUCLID)

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 Endocrine disrupting properties

No data available

12.7 Other adverse effects
SECTION 13: Disposal considerations

13.1 Waste treatment methods

**Product**
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 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

SECTION 15: Regulatory information

**SARA 302 Components**
This material does not contain any components with a section 302 EHS TPQ.

**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

**Massachusetts Right To Know Components**

<table>
<thead>
<tr>
<th>Mercaptoethanol</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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<tbody>
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<td>60-24-2</td>
<td>2007-03-01</td>
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**Pennsylvania Right To Know Components**

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<tbody>
<tr>
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<td>2007-03-01</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 16: Other information

Further information
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.

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Version: 6.11  Revision Date: 05/25/2023  Print Date: 10/07/2023