2-mercaptoethanol
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Date of issue: 10/09/2015 Version: 1.0

SECTION 1: Identification

1.1. Identification

Product form : Substance
Substance name : 2-mercaptoethanol
CAS No : 60-24-2
Product code : BC98, P001, 103M-A, 103M-B, 103M-C, 103M-D
Formula : C2H6OS
BIG no : 10274

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

Use of the substance/mixture : Solvent
Pesticide: intermediate product

1.3. Details of the supplier of the safety data sheet

Geno Technology, Inc./ G-Biosciences
9800 Page Avenue
Saint Louis, 63132-1429 - United States
T 800-628-7730 - F 314-991-1504
technical@GBiosciences.com - www.GBiosciences.com

1.4. Emergency telephone number

Emergency number : Chemtrec 1-800-424-9300 (USA/Canada), +1-703-527-3887 (Intl)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

Classification (GHS-US)
Flammable liquids Category 4 H227
Acute toxicity (oral) Category 4 H302
Acute toxicity (dermal) Category 3 H311
Acute toxicity (inhalation:dust,mist) Category 4 H332

Full text of H statements : see section 16

2.2. Label elements

GHS-US labeling
Hazard pictograms (GHS-US) :

Signal word (GHS-US) : Danger
Hazard statements (GHS-US) :
H227 - Combustible liquid
H302+H332 - Harmful if swallowed or if inhaled
H311 - Toxic in contact with skin
P210 - Keep away from sparks, open flames, hot surfaces, heat. - No smoking
P261 - Avoid breathing fume, gas, vapors, spray, mist
P264 - Wash hands, forearms and face thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear eye protection, face protection, protective clothing, protective gloves
P301 + P312 - If swallowed: Call a a doctor, a POISON CENTER if you feel unwell
P302 + P352 - If on skin: Wash with plenty of water
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2.3. Other hazards
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-mercaptoethanol (Main constituent)</td>
<td>(CAS No): 60-24-2</td>
<td>100</td>
<td>Flam. Liq. 4, H227, Acute Tox. 4 (Oral), H302</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Acute Tox. 3 (Dermal), H311, Acute Tox. 4 (Inhalation:dust,mist), H332</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

3.2. Mixtures
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures


First-aid measures after inhalation: Remove the victim into fresh air. Immediately consult a doctor/medical service.

First-aid measures after skin contact: Wash immediately with lots of water. Do not apply (chemical) neutralizing agents. Remove clothing before washing. Consult a doctor/medical service.

First-aid measures after eye contact: Rinse immediately with plenty of water for 15 minutes. Take victim to an ophthalmologist. Do not apply neutralizing agents.


4.2. Most important symptoms and effects, both acute and delayed


Symptoms/injuries after skin contact: Red skin. Tingling/irritation of the skin. ON CONTINUOUS EXPOSURE/CONTACT: Caustic burns/corrosion of the skin.

Symptoms/injuries after eye contact: Corrosion of the eye tissue. Inflammation/damage of the eye tissue.


Chronic symptoms: ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: Skin rash/edema.

4.3. Indication of any immediate medical attention and special treatment needed
Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media


 Unsuitable extinguishing media: Solid water jet ineffective as extinguishing medium.
5.2. Special hazards arising from the substance or mixture

<table>
<thead>
<tr>
<th>Fire hazard</th>
<th>DIRECT FIRE HAZARD. Material presenting a fire hazard. INDIRECT FIRE HAZARD. Temperature above flashpoint: higher fire/explosion hazard. Reactions involving a fire hazard: see &quot;Reactivity Hazard&quot;.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosion hazard</td>
<td>DIRECT EXPLOSION HAZARD. No data available on direct explosion hazard. INDIRECT EXPLOSION HAZARD. No data available on indirect explosion hazard.</td>
</tr>
<tr>
<td>Reactivity</td>
<td>Decomposes slowly on exposure to water (moisture) with (some) acids. Decomposes on exposure to temperature rise: release of toxic/combustible gases/vapours (hydrogen sulphide). On burning: release of toxic and corrosive gases/vapours (sulphur oxides, carbon monoxide - carbon dioxide). Reacts violently with (strong) oxidizers; (increased) risk of fire. Reacts violently with many compounds e.g.: with (strong) bases and (strong) reducers.</td>
</tr>
</tbody>
</table>

5.3. Advice for firefighters

| Precautionary measures fire | Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to fire/heat: seal off low-lying areas. Exposure to fire/heat: have neighbourhood close doors and windows. |
| Firefighting instructions | Cool tanks/drums with water spray/remove them into safety. Do not move the load if exposed to heat. Dilute toxic gases with water spray. Take account of toxic fire-fighting water. Use water moderately and if possible collect or contain it. |
| Protection during firefighting | Heat/fire exposure: compressed air/oxygen apparatus. |

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel


6.1.2. For emergency responders

| Protective equipment | Do not attempt to take action without suitable protective equipment. For further information refer to section 8 Exposure controls/personal protection"". |

6.2. Environmental precautions

Prevent soil and water pollution. Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up

| For containment | Contain released substance, pump into suitable containers. Plug the leak, cut off the supply. Dam up the liquid spill. Hazardous reaction: measure explosive gas-air mixture. If reacting: dilute combustible/toxic gases/vapours. Take account of toxic/corrosive precipitation water. |
| Methods for cleaning up | Take up liquid spill into absorbent material, e.g.: dry sand/earth/vermiculite powdered limestone or saw dust. Scoop absorbed substance into closing containers. Carefully collect the spill/losses. Leftovers: neutralize with an aqueous solution of sodium hypochlorite. Damaged/cool tanks must be emptied. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling. |
| Other information | Dispose of materials or solid residues at an authorized site. |

6.4. Reference to other sections

For further information refer to section 8 : Exposure-controls/personal protection"". 

SECTION 7: Handling and storage

7.1. Precautions for safe handling

| Precautions for safe handling | Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Use earthed equipment. Keep away from naked flames/heat. At temperature > flashpoint: use spark/explosionproof appliances. Finely divided: spark- and explosionproof appliances. Finely divided: keep away from ignition sources/sparks. Observe very strict hygiene - avoid contact. Keep container tightly closed. Carry operations in the open/under local exhaust/ventilation or with respiratory protection. Exhaust gas must be neutralised. |
| Hygiene measures | Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product. |
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7.2. Conditions for safe storage, including any incompatibilities

<table>
<thead>
<tr>
<th>Storage conditions</th>
<th>Store in a well-ventilated place. Keep cool. Store locked up.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum storage period</td>
<td>24 months</td>
</tr>
<tr>
<td>Heat-ignition</td>
<td>KEEP SUBSTANCE AWAY FROM: heat sources.</td>
</tr>
<tr>
<td>Prohibitions on mixed storage</td>
<td>KEEP SUBSTANCE AWAY FROM: oxidizing agents. reducing agents. (strong) acids. (strong) bases. alcohols. water/moisture.</td>
</tr>
<tr>
<td>Storage area</td>
<td>Store in a cool area. Keep out of direct sunlight. Store in a dry area. Ventilation at floor level. Fireproof storeroom. Keep locked up. Provide for a tub to collect spills. Provide the tank with earthing. Unauthorized persons are not admitted. Meet the legal requirements.</td>
</tr>
<tr>
<td>Special rules on packaging</td>
<td>SPECIAL REQUIREMENTS: closing, dry, clean, correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.</td>
</tr>
<tr>
<td>Packaging materials</td>
<td>SUITABLE MATERIAL: No data available. MATERIAL TO AVOID: No data available.</td>
</tr>
</tbody>
</table>

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

| Appropriate engineering controls | Ensure good ventilation of the work station. |
| Materials for protective clothing | GIVE EXCELLENT RESISTANCE: No data available. GIVE GOOD RESISTANCE: neoprene. nitrile rubber. PVC. plastics. rubber. GIVE LESS RESISTANCE: No data available. GIVE POOR RESISTANCE: No data available. |
| Hand protection | Gloves. |
| Eye protection | Face shield. |
| Skin and body protection | Protective clothing. |
| Respiratory protection | High gas/vapour concentration: gas mask with filter type A. |
| Environmental exposure controls | Avoid release to the environment. |

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| Physical state | Liquid |
| Appearance | Liquid. |
| Color | Colourless to light yellow |
| Odor | Repulsive odour |
| Odor threshold | 0.12 - 0.83 ppm 0.38 - 2.0 mg/m³ |
| pH | 4.6 - 6.0 (50 %) |
| pH solution | 50 % |
| Melting point | < -100 °C |
| Freezing point | No data available |
| Boiling point | 155.8 °C (1013.3 hPa) |
| Flash point | 74 °C (Open cup; 1013.25 hPa) |
| Relative evaporation rate (butyl acetate=1) | < 1 |
| Flammability (solid, gas) | No data available |
| Explosion limits | 2.3 - 18 vol % |
| Explosive properties | No data available |
| Oxidizing properties | No data available |
| Vapor pressure | 1.33 hPa (20 °C) |
| Vapor pressure at 50 °C | 11 hPa (50 °C) |
| Relative density | 1.11 (20 °C) |
| Relative vapor density at 20 °C | 2.7 |
| Relative density of saturated gas/air mixture | 1.0 |
| Density | 1110 kg/m³ (20 °C) |
| Molecular mass | 78.13 g/mol |
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<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solubility</td>
<td>Soluble in water. Soluble in ethanol. Soluble in ether. Soluble in other organic solvents.</td>
</tr>
<tr>
<td>Log Pow</td>
<td>-0.056 (Experimental value; Equivalent or similar to OECD 107; 25 °C)</td>
</tr>
<tr>
<td>Self ignition temperature</td>
<td>295 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>157 °C</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>2.90 mm²/s (20 °C; Calculated)</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>0.000322 Pa.s (20 °C)</td>
</tr>
</tbody>
</table>

9.2. Other information
VOC content: 100 %
Other properties: Gas/vapour heavier than air at 20°C. Clear. Slightly volatile. Substance has acid reaction.

SECTION 10: Stability and reactivity

10.1. Reactivity
Decomposes slowly on exposure to water (moisture) with (some) acids. Decomposes on exposure to temperature rise: release of toxic/combustible gases/vapours (hydrogen sulphide). On burning: release of toxic and corrosive gases/vapours (sulphur oxides, carbon monoxide - carbon dioxide). Reacts violently with (strong) oxidizers: (increased) risk of fire. Reacts violently with many compounds e.g.: with (strong) bases and (strong) reducers.

10.2. Chemical stability
Unstable on exposure to moisture.

10.3. Possibility of hazardous reactions
No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid
Avoid contact with hot surfaces. Heat. No flames, No sparks. Eliminate all sources of ignition.

10.5. Incompatible materials
No additional information available

10.6. Hazardous decomposition products
Hazardous decomposition products.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

2-mercaptoethanol (60-24-2)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>336 mg/kg (Rat; according to BASF-internal standards; Experimental value; 162 mg/kg bodyweight; Rat; OECD 401: Acute Oral Toxicity; Weight of evidence; 32 - 135 mg/kg bodyweight; Rat; OECD 401: Acute Oral Toxicity; Weight of evidence; 98 - 168 mg/kg bodyweight; Rat; OECD 401: Acute Oral Toxicity; Weight of evidence)</td>
</tr>
<tr>
<td>LD50 dermal rabbit</td>
<td>112 - 224 mg/kg body weight (Rabbit; Experimental value; Other)</td>
</tr>
<tr>
<td>LC50 inhalation rat (mg/l)</td>
<td>&lt; 1.1 mg/l/4h (Rat; Weight of evidence; 2 mg/l/4h; Rat)</td>
</tr>
<tr>
<td>LC50 inhalation rat (ppm)</td>
<td>&lt; 350 ppm/4h (Rat)</td>
</tr>
<tr>
<td>ATE US (oral)</td>
<td>336,000 mg/kg body weight</td>
</tr>
<tr>
<td>ATE US (dermal)</td>
<td>112,000 mg/kg body weight</td>
</tr>
<tr>
<td>ATE US (dust,mist)</td>
<td>1.500 mg/l/4h</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>pH: 4.6 - 6.0 (50 %)</td>
<td></td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Not classified</td>
</tr>
<tr>
<td>pH: 4.6 - 6.0 (50 %)</td>
<td></td>
</tr>
<tr>
<td>Respiratory or skin sensitization</td>
<td>Not classified</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not classified</td>
</tr>
<tr>
<td>Specific target organ toxicity (single exposure)</td>
<td>Not classified</td>
</tr>
</tbody>
</table>
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Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified


Symptoms/injuries after skin contact : Red skin. Tingling/irritation of the skin. ON CONTINUOUS EXPOSURE/CONTACT: Caustic burns/corrosion of the skin.

Symptoms/injuries after eye contact : Corrosion of the eye tissue. Inflammation/damage of the eye tissue.


Chronic symptoms : ON CONTINUOUS/REPEATED EXPOSURE/CONTACT: Skin rash/inflammation.

SECTION 12: Ecological information

12.1. Toxicity
Ecology - general : Dangerous for the environment.
Ecology - water : Ground water polluant. Harmful to fishes. Very toxic to invertebrates (Daphnia). Harmful to algae. Inhibition of activated sludge.

2-mercaptoethanol (60-24-2)
Threshold limit algae 2 : 19 mg/l (EC50; OECD 201: Alga, Growth Inhibition Test; 72 h; Desmodesmus subspicatus; Static system; Fresh water; Experimental value)

12.2. Persistence and degradability
2-mercaptoethanol (60-24-2)

Biochemical oxygen demand (BOD) : 0.105 g O²/g substance

Chemical oxygen demand (COD) : 1.894 g O²/g substance

12.3. Bioaccumulative potential
2-mercaptoethanol (60-24-2)
Log Pow : -0.056 (Experimental value; Equivalent or similar to OECD 107; 25 °C)
Bioaccumulative potential : Low potential for bioaccumulation (Log Kow < 4).

12.4. Mobility in soil
2-mercaptoethanol (60-24-2)
Log Koc : log Koc,PCKOCWIN v1.66; 0.122; Calculated value

12.5. Other adverse effects
No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Waste disposal recommendations : Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle by distillation. Remove to an authorized waste incinerator for solvents with energy recovery. Do not discharge into drains or the environment.

Additional information : LWCA (the Netherlands): KGA category 06. Hazardous waste according to Directive 2008/98/EC.
SECTION 14: Transport information

Department of Transportation (DOT)
In accordance with DOT
Transport document description : UN2966 Thioglycol, 6.1, II
UN-No.(DOT) : UN2966
DOT Proper Shipping Name : Thioglycol
Hazard labels (DOT) : 6.1 - Poison

Packing group (DOT) : II - Medium Danger
DOT Packaging Non Bulk (49 CFR 173.xxx) : 202
DOT Packaging Bulk (49 CFR 173.xxx) : 243
DOT Special Provisions (49 CFR 172.102) : IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized

T7 - 4 178.274(d)(2) Normal............. 178.275(d)(3)
TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: tr is the maximum mean bulk temperature during transport, tf is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (tf) and the maximum mean bulk temperature during transportation (tr) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d15 and d50 are the densities (in units of mass per unit volume) of the liquid at 15 °C (59 °F) and 50 °C (122 °F), respectively

DOT Packaging Exceptions (49 CFR 173.xxx) : 153
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 60 L
DOT Vessel Stowage Location : A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel

Other information : No supplementary information available.

TDG
No additional information available

Transport by sea
UN-No. (IMDG) : 2966
Class (IMDG) : 6.1 - Toxic substances
EmS-No. (1) : F-A
EmS-No. (2) : S-A

Air transport
UN-No.(IATA) : 2966
Class (IATA) : 6 -
Packing group (IATA) : II - Medium Danger

SECTION 15: Regulatory information

15.1. US Federal regulations
2-mercaptoethanol (60-24-2)
Not listed on the United States TSCA (Toxic Substances Control Act) inventory
15.2. International regulations

**CANADA**
No additional information available

**EU-Regulations**
No additional information available

**National regulations**
No additional information available

15.3. US State regulations
No additional information available

SECTION 16: Other information

Full text of H-phrases:

<table>
<thead>
<tr>
<th>H-Phrase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H227</td>
<td>Combustible liquid</td>
</tr>
<tr>
<td>H302</td>
<td>Harmful if swallowed</td>
</tr>
<tr>
<td>H311</td>
<td>Toxic in contact with skin</td>
</tr>
<tr>
<td>H332</td>
<td>Harmful if inhaled</td>
</tr>
</tbody>
</table>

**NFPA health hazard**: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

**NFPA fire hazard**: 2 - Must be moderately heated or exposed to relatively high temperature before ignition can occur.

**NFPA reactivity**: 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.

SDS US (GHS HazCom 2012)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.