1. PRODUCT AND COMPANY IDENTIFICATION

Product name: DL-Dithiothreitol
Product Number: D0632
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 #: (314) 776-6555
Preparation Information: Sigma-Aldrich Corporation
  Product Safety - Americas Region
  1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Target Organ Effect, Toxic by ingestion, Irritant

Target Organs
Central nervous system

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

GHS Label elements, including precautionary statements

Pictogram

Signal word: Warning

Hazard statement(s)
H302 Harmful if swallowed.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary statement(s)
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
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.
P280 Wear protective gloves/ eye protection/ face protection.
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Call a POISON CENTER or doctor/physician if you feel unwell.

Specific treatment (see supplemental first aid instructions on this label).

Rinse mouth.

If skin irritation occurs: Get medical advice/attention.

If eye irritation persists: Get medical advice/attention.

Take off contaminated clothing and wash before reuse.

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Dispose of contents/container to an approved waste disposal plant.

__HMIS Classification__

| Health hazard: | 2 |
| Chronic Health Hazard: | * |
| Flammability: | 1 |
| Physical hazards: | 1 |

__NFPA Rating__

| Health hazard: | 2 |
| Fire: | 1 |
| Reactivity Hazard: | 1 |

__Potential Health Effects__

- **Inhalation**: May be harmful if inhaled. Causes respiratory tract irritation.
- **Skin**: May be harmful if absorbed through skin. Causes skin irritation.
- **Eyes**: Causes eye irritation.
- **Ingestion**: Toxic if swallowed.

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Synonyms**: threo-1,4-Dimercapto-2,3-butanediol

Cleland’s reagent

DTT

**Formula**: \( C_4H_{10}O_2S_2 \)

**Molecular Weight**: 154.25 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
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<tr>
<td>((R^<em>,R^</em>)-1,4-Dimercaptobutane-2,3-diol)</td>
<td>&lt;= 100 %</td>
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<tr>
<td>CAS-No.</td>
<td>3483-12-3</td>
</tr>
<tr>
<td>EC-No.</td>
<td>222-468-7</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**

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

### 5. FIREFIGHTING MEASURES

**Conditions of flammability**
Not flammable or combustible.

**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, Sulphur oxides, Hydrogen sulfide gas
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides

### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions**
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

**Environmental precautions**
Do not let product enter drains.

**Methods and materials for containment and cleaning up**
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

### 7. HANDLING AND STORAGE

**Precautions for safe handling**
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

**Conditions for safe storage**
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature: 2 - 8 °C

Keep in a dry place.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

**Personal protective equipment**

**Respiratory protection**
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. 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.

- **Full contact**
  - Material: Nitrile rubber
  - Minimum layer thickness: 0.11 mm
  - Break through time: 480 min
  - Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

- **Splash contact**
  - Material: Nitrile rubber
  - Minimum layer thickness: 0.11 mm
  - Break through time: 480 min
  - Material tested: Dermatril® (KCL 740 / Aldrich Z677272, 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.

**Eye protection**
Safety glasses with side-shields conforming to EN166 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, 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: powder
- Colour: white

**Safety data**
- pH: 4.0 - 6 at 15.4 g/l at 25 °C (77 °F)
- Melting point/freezing point: Melting point/range: 41 - 44 °C (106 - 111 °F) - lit.
- Boiling point: no data available
- Flash point: 113 °C (235 °F) - closed cup
- Ignition temperature: no data available
- Auto-ignition temperature: no data available
- Lower explosion limit: no data available
- Upper explosion limit: no data available
- Vapour pressure: no data available
- Density: no data available
- Water solubility: 15.4 g/l at 20 °C (68 °F)
- Partition coefficient: n-octanol/water: no data available
- Relative vapour density: no data available
- Odour: unpleasant
- Odour Threshold: no data available
- Evapouration rate: no data available

### 10. STABILITY AND REACTIVITY

**Chemical stability**
May decompose on exposure to moist air or water. Stable under recommended storage conditions.

**Possibility of hazardous reactions**
no data available

**Conditions to avoid**
no data available
Materials to avoid
Bases, Oxidizing agents, Reducing agents, Alkali metals

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Hydrogen sulfide gas
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 400 mg/kg

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

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

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
Inhalation - May cause respiratory irritation.

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

Aspiration hazard
no data available

Potential health effects
Inhalation  May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion  Toxic if swallowed.
Skin  May be harmful if absorbed through skin. Causes skin irritation.
Eyes  Causes eye irritation.

Signs and Symptoms of Exposure
Nausea, Headache, Vomiting, Central nervous system depression. 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: EK1610000

12. ECOLOGICAL INFORMATION

Toxicity
no data available

Toxicity to daphnia  LC50 - Daphnia magna (Water flea) - 27 mg/l - 48 h
and other aquatic invertebrates

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
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3335  Class: 9
Proper shipping name: Aviation regulated solid, n.o.s. ((R*,R*)-1,4-Dimercaptobutane-2,3-diol)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
UN number: 3335  Class: 9  Packing group: III
Proper shipping name: Aviation regulated solid, n.o.s. ((R*,R*)-1,4-Dimercaptobutane-2,3-diol)

15. REGULATORY INFORMATION
OSHA Hazards
Target Organ Effect, Toxic 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
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No Components Listed

Pennsylvania Right To Know Components
(R*,R*)-1,4-Dimercaptobutane-2,3-diol
CAS-No. 3483-12-3

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

Further information
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