1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name: Ethylene glycol

Product Number: 324558
Brand: Sigma-Aldrich
Index-No.: 603-027-00-1

CAS-No.: 107-21-1

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
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)
Acute toxicity, Oral (Category 4), H302
Specific target organ toxicity - repeated exposure, Oral (Category 2), Kidney, H373

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: Warning

Hazard statement(s)
H302 Harmful if swallowed.
H373 May cause damage to organs (Kidney) through prolonged or repeated exposure if swallowed.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P314 Get medical advice/ attention if you feel unwell.
P501 Dispose of contents/ container to an approved waste disposal plant.
2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms: 1,2-Ethanediol

Formula: C₂H₆O₂

Molecular weight: 62.07 g/mol

CAS-No.: 107-21-1

EC-No.: 203-473-3

Index-No.: 603-027-00-1

Registration number: 01-2119456816-28-XXXX

Hazardous components

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene glycol</td>
<td>Acute Tox. 4; STOT RE 2; H302, H373</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. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
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
No data available

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

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
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**
Soak up with inert absorbent material and dispose of as hazardous waste. 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.
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.

Hygroscopic.
Storage class (TRGS 510): Combustible liquids

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>Ethylene glycol</td>
<td>107-21-1</td>
<td>C</td>
<td>100.000000 mg/m3</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye &amp; Upper Respiratory Tract irritation</td>
<td>Not classifiable as a human carcinogen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>100.000000 mg/m3</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
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<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Upper Respiratory Tract irritation</td>
<td>Eye irritation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Not classifiable as a human carcinogen</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>40 ppm 100 mg/m3</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
</tr>
</tbody>
</table>

**Derived No Effect Level (DNEL)**

<table>
<thead>
<tr>
<th>Application Area</th>
<th>Exposure routes</th>
<th>Health effect</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers</td>
<td>Inhalation</td>
<td>Long-term local effects</td>
<td>35 mg/m3</td>
</tr>
<tr>
<td>Workers</td>
<td>Skin contact</td>
<td>Long-term systemic effects</td>
<td>106mg/kg BW/d</td>
</tr>
<tr>
<td>Consumers</td>
<td>Inhalation</td>
<td>Long-term local effects</td>
<td>7 mg/m3</td>
</tr>
<tr>
<td>Consumers</td>
<td>Skin contact</td>
<td>Long-term systemic effects</td>
<td>53mg/kg BW/d</td>
</tr>
</tbody>
</table>
Predicted No Effect Concentration (PNEC)

<table>
<thead>
<tr>
<th>Compartment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>1.53 mg/kg</td>
</tr>
<tr>
<td>Marine water</td>
<td>1 mg/l</td>
</tr>
<tr>
<td>Fresh water</td>
<td>10 mg/l</td>
</tr>
<tr>
<td>Marine sediment</td>
<td>3.7 mg/kg</td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>37 mg/kg</td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>199.5 mg/l</td>
</tr>
<tr>
<td>Aquatic intermittent release</td>
<td>10 mg/l</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face 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 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.

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
Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance
   Form: liquid
   Colour: colourless

b) Odour
   No data available
c) Odour Threshold No data available
d) pH No data available
e) Melting point/freezing point Melting point/range: -13 °C (9 °F)
f) Initial boiling point and boiling range 196 - 198 °C (385 - 388 °F)
g) Flash point 111 °C (232 °F) - closed cup
h) Evaporation rate 1
i) Flammability (solid, gas) No data available
j) Upper/lower flammability or explosive limits Upper explosion limit: 15.3 % (V)
   Lower explosion limit: 3.2 % (V)
k) Vapour pressure 0.11 hPa (0.08 mmHg) at 20 °C (68 °F)
   0.13 hPa (0.10 mmHg) at 20 °C (68 °F)
l) Vapour density 2.14 - (Air = 1.0)
m) Relative density 1.113 g/mL at 25 °C (77 °F)
n) Water solubility completely misciblesoluble
o) Partition coefficient: n-octanol/water log Pow: -1.36
p) Auto-ignition temperature 400 °C (752 °F) Auto-flammability
q) Decomposition temperature No data available
r) Viscosity No data available
s) Explosive properties No data available
t) Oxidizing properties No data available

9.2 Other safety information
Relative vapour density 2.14 - (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 No data available

10.5 Incompatible materials Strong acids, Strong oxidizing agents, Strong bases, Aldehydes, Aluminum

10.6 Hazardous decomposition products Hazardous decomposition products formed under fire conditions. - Carbon oxides
   In the event of fire: see section 5
11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

**Acute toxicity**
LD50 Oral - Rat - 4,700 mg/kg
Inhalation: No data available
LD50 Dermal - Rabbit - 10,626 mg/kg
No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: No skin irritation

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Mild eye irritation - 24 h

**Respiratory or skin sensitisation**
No data available

**Germ cell mutagenicity**
No data available

**Carcinogenicity**
This product is or contains a component that is probably not carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

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.

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**
Laboratory experiments have shown teratogenic effects.
Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

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

**Specific target organ toxicity - repeated exposure**
Oral - May cause damage to organs through prolonged or repeated exposure. - Kidney

**Aspiration hazard**
No data available

**Additional Information**
RTECS: KW2975000

When ingested early symptoms mimic alcohol inebriation and are followed by nausea, vomiting, abdominal pain, weakness, muscle tenderness, respiratory failure, convulsions, cardiovascular collapse, pulmonary edema, hypocalcemic tetany, and severe metabolic acidosis. Without treatment, death may occur in 8 to 24 hours. Victims who survive the initial toxicity period usually develop renal failure along with brain and liver damage., Exposure to and/or consumption of alcohol may increase toxic effects.

Central nervous system - Irregularities - Based on Human Evidence
Central nervous system - Irregularities - Based on Human Evidence
12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish
- LC50 - Oncorhynchus mykiss (rainbow trout) - 18,500 mg/l - 96 h
- LC50 - Leuciscus idus (Golden orfe) - > 10,000 mg/l - 48 h
- NOEC - Pimephales promelas (fathead minnow) - 32,000 mg/l - 7 d
- NOEC - Pimephales promelas (fathead minnow) - 39,140 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates
- EC50 - Daphnia magna (Water flea) - 74,000 mg/l - 24 h
- NOEC - Daphnia (water flea) - 24,000 mg/l - 48 h
- LC50 - Daphnia magna (Water flea) - 41,000 mg/l - 48 h

12.2 Persistence and degradability

No data available

Ratio BOD/ThBOD 0.78 %

12.3 Bioaccumulative potential

Does not bioaccumulate.

Bioaccumulation other fish - 61 d - 50 mg/l

Bioconcentration factor (BCF): 0.60

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

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

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: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Ethylene glycol)
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods
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
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>107-21-1</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

Ethylene glycol

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
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<td>2007-07-01</td>
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Ethylene glycol

Pennsylvania Right To Know Components

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>107-21-1</td>
<td>2007-07-01</td>
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Ethylene glycol

New Jersey Right To Know Components

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>107-21-1</td>
<td>2007-07-01</td>
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Ethylene glycol

California Prop. 65 Components

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Ethylene glycol

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>107-21-1</td>
<td>2015-06-19</td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

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

Acute Tox. Acute toxicity
H302 Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure if swallowed.
STOT RE Specific target organ toxicity - repeated exposure

HMIS Rating
Health hazard: 1
Chronic Health Hazard: *
Flammability: 1
Physical Hazard 0

NFPA Rating
Health hazard: 1
Fire Hazard: 1
Reactivity Hazard: 0

Further information
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