SAFETY DATA SHEET

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

1.1 Product identifiers

Product name: Ethyl glyoxalate solution
Product Number: 50705
Brand: Aldrich

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 2), H225
- Skin irritation (Category 2), H315
- Skin sensitization (Category 1), H317
- Reproductive toxicity (Category 2), H361
- Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
- Specific target organ toxicity - repeated exposure (Category 2), Central nervous system, H373
- Aspiration hazard (Category 1), H304
- Short-term (acute) aquatic hazard (Category 2), H401
- Long-term (chronic) aquatic hazard (Category 3), H412

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

2.2 GHS Label elements, including precautionary statements
2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none
SECTION 3: Composition/information on ingredients

3.2 Mixtures

Synonyms: Ethyl oxoacetate

Formula: \( C_4H_6O_3 \)
Molecular weight: 102.09 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Toluene</strong></td>
<td>Flam. Liq. 2; Skin Irrit. 2; Repr. 2; STOT SE 3; STOT RE 2; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 3; H225, H315, H361, H336, H373, H304, H401, H412 Concentration limits: 20 %: STOT SE 3, H336;</td>
<td>&gt;= 50 - &lt; 70 %</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>108-88-3</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>203-625-9</td>
<td></td>
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<tr>
<td>Index-No.</td>
<td>601-021-00-3</td>
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<td>Registration number</td>
<td>01-2119471310-51-XXXX</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ethyl glyoxylate</strong></th>
<th>Flam. Liq. 2; Skin Irrit. 2; Skin Sens. 1; H225, H315, H317</th>
<th>&gt;= 50 - &lt; 70 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.</td>
<td>924-44-7</td>
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<tr>
<td>EC-No.</td>
<td>213-105-3</td>
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</table>

<table>
<thead>
<tr>
<th><strong>ethanol</strong></th>
<th>Flam. Liq. 2; Eye Irrit. 2A; H225, H319 Concentration limits: 50 %: Eye Irrit. 2A, H319;</th>
<th>&gt;= 1 - &lt; 5 %</th>
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</thead>
<tbody>
<tr>
<td>CAS-No.</td>
<td>64-17-5</td>
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</tr>
<tr>
<td>EC-No.</td>
<td>200-578-6</td>
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<tr>
<td>Index-No.</td>
<td>603-002-00-5</td>
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<td>01-2119457610-43-XXXX</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Glyoxylic acid</strong></th>
<th>Met. Corr. 1; Eye Dam. 1; Skin Sens. 1; Aquatic Acute 3; H290, H318, H317, H402</th>
<th>&gt;= 0.1 - &lt; 1 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.</td>
<td>298-12-4</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>206-058-5</td>
<td></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**
Show this material safety data sheet to the doctor in attendance.

**If inhaled**
After inhalation: fresh air. Call in physician.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.
In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed

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
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

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. 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. Risk of explosion.

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
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

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>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>TWA 100 ppm</td>
<td>375 mg/m3</td>
<td>USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL 150 ppm</td>
<td>560 mg/m3</td>
<td>USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 200 ppm</td>
<td></td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
</tr>
</tbody>
</table>

Remarks
Z37.12-1967

CEIL 300 ppm
USA. Occupational Exposure Limits (OSHA) - Table Z-2

Z37.12-1967

Peak 500 ppm
USA. Occupational Exposure Limits (OSHA) - Table Z-2

Z37.12-1967
<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Parameters</th>
<th>Value</th>
<th>Biological specimen</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>Toluene</td>
<td>0.02 mg/l</td>
<td>In blood</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks Prior to last shift of workweek</td>
</tr>
<tr>
<td>Toluene</td>
<td></td>
<td>Toluene</td>
<td>0.03 mg/l</td>
<td>Urine</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of shift (As soon as possible after exposure ceases)</td>
</tr>
<tr>
<td>o-Cresol</td>
<td></td>
<td>o-Cresol</td>
<td>0.3 mg/g Creatinin</td>
<td>Urine</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of shift (As soon as possible after exposure ceases)</td>
</tr>
</tbody>
</table>

### Biological occupational exposure limits

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). Safety glasses

**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: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, 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 EC 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**
Flame retardant antistatic 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. Risk of explosion.

---

**SECTION 9: Physical and chemical properties**

9.1 **Information on basic physical and chemical properties**

a) Appearance
Form: clear, liquid
Color: light yellow

b) Odor
No data available

c) Odor Threshold
No data available

d) pH
No data available

e) Melting
No data available
point/freezing point

f) Initial boiling point and boiling range No data available

7 °C (45 °F)

h) Flammability (solid, gas) No data available

j) Upper/lower flammability or explosive limits No data available

k) Vapor pressure No data available

l) Vapor density No data available

m) Density 1.03 g/mL at 20 °C (68 °F)

Relative density No data available

n) Water solubility No data available

o) Partition coefficient: n-octanol/water No data available

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 No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Vapors may form explosive mixture with air.

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

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Warming.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5
SECTION 11: Toxicological information

11.1 Information on toxicological effects

**Mixture**

**Acute toxicity**
Oral: No data available

Inhalation: No data available
Acute toxicity estimate Inhalation - 4 h - 51.4 mg/l - vapor (Calculation method)

Dermal: No data available
No data available

**Skin corrosion/irritation**
No data available
Mixture causes skin irritation.

**Serious eye damage/eye irritation**
No data available

**Respiratory or skin sensitization**
Mixture may cause an allergic skin reaction.

**Germ cell mutagenicity**
No data available

**Carcinogenicity**

IARC: 1 - Group 1: Carcinogenic to humans (ethanol)
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**
No data available
Suspected of damaging the unborn child.
No data available
Suspected of damaging fertility.

**Specific target organ toxicity - single exposure**

Remarks: No data available
Mixture may cause drowsiness or dizziness.

**Specific target organ toxicity - repeated exposure**
Remarks: No data available
Mixture may cause damage to organs through prolonged or repeated exposure. - Central nervous system

**Aspiration hazard**
No data available Aspiration hazard, Aspiration may cause pulmonary edema and pneumonitis.
11.2 Additional Information

Lung irritation, chest pain, pulmonary edema, Inhalation studies on toluene have demonstrated the development of inflammatory and ulcerous lesions of the penis, prepuce, and scrotum in animals. Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence

Components

Toluene

**Acute toxicity**
- LD50 Oral - Rat - male - 5,580 mg/kg
  (Tested according to Directive 92/69/EEC.)
- LC50 Inhalation - Rat - male and female - 4 h - 25.7 mg/l - vapor
  (OECD Test Guideline 403)
- LD50 Dermal - Rabbit - > 5,000 mg/kg
  Remarks: (ECHA)
  No data available

**Skin corrosion/irritation**
- Skin - Rabbit
  Result: irritating - 4 h
  Remarks: (ECHA)

**Serious eye damage/eye irritation**
- Eyes - Rabbit
  Result: slight irritation
  (OECD Test Guideline 405)

**Respiratory or skin sensitization**
- Maximization Test - Guinea pig
  Result: negative

**Germ cell mutagenicity**
- Test Type: In vitro mammalian cell gene mutation test
- Test system: Mouse lymphoma test
  Result: negative
- Test Type: Ames test
- Test system: S. typhimurium
  Result: negative
- Species: Rat - Bone marrow
  Result: negative
  Remarks: (ECHA)

**Carcinogenicity**
- No data available

**Reproductive toxicity**
- Suspected of damaging the unborn child.
Specific target organ toxicity - single exposure
May cause drowsiness or dizziness. - Central nervous system

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure. - Central nervous system

Aspiration hazard
Aspiration hazard, Aspiration may cause pulmonary edema and pneumonitis.

Ethyl glyoxylate

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 4 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(Regulation (EC) No. 440/2008, Annex, B.5)

Respiratory or skin sensitization
May cause allergic skin reaction.

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

ethanol

Acute toxicity
LD50 Oral - Rat - male and female - 10,470 mg/kg
(OECD Test Guideline 401)
LC50 Inhalation - Rat - male and female - 4 h - 124.7 mg/l - vapor
(OECD Test Guideline 403)
Dermal: No data available
No data available
Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes serious eye irritation.
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: Methanol

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Result: negative
Method: OECD Test Guideline 478
Species: Mouse - male
Result: Positive results were obtained in some in vivo tests.

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Aspiration hazard
No data available

Glyoxylic acid

Acute toxicity
LD50 Oral - Rat - 2,528 mg/kg
(OECD Test Guideline 401)
Inhalation: No data available
LD50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive
(OECD Test Guideline 405)

**Respiratory or skin sensitization**
Freund’s complete adjuvant test - Guinea pig
Result: May cause sensitization by skin contact.

**Germ cell mutagenicity**
Test Type: Ames test
Test system: *S. typhimurium*
Result: negative
Species: Mouse - male and female
Result: negative

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available
No data available

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

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

**Aspiration hazard**
No data available

---

**SECTION 12: Ecological information**

**12.1 Toxicity**
- **Mixture**
  No data available

**12.2 Persistence and degradability**
No data available

**12.3 Bioaccumulative potential**
No data available

**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**
No data available

**Components**

**Toluene**
Toxicity to fish
flow-through test LC50 - *Oncorhynchus kisutch* (coho salmon) - 5.5 mg/l - 96 h
Remarks: (ECHA)

Toxicity to daphnia and other aquatic invertebrates
EC50 - Ceriodaphnia dubia (water flea) - 3.78 mg/l - 48 h
(US-EPA)

Toxicity to bacteria
static test EC50 - Bacteria - 84 mg/l - 24 h
Remarks: (ECHA)

**Ethyl glyoxylate**
No data available

**ethanol**

Toxicity to fish
flow-through test LC50 - Pimephales promelas (fathead minnow) - 15,300 mg/l - 96 h
(US-EPA)

Toxicity to daphnia and other aquatic invertebrates
static test LC50 - Ceriodaphnia dubia (water flea) - 5,012 mg/l - 48 h
Remarks: (ECHA)

Toxicity to algae
static test ErC50 - Chlorella vulgaris (Fresh water algae) - 275 mg/l - 72 h
(OECD Test Guideline 201)

Toxicity to bacteria
static test IC50 - activated sludge - > 1,000 mg/l - 3 h
(OECD Test Guideline 209)

**Glyoxylic acid**

Toxicity to fish
semi-static test LC50 - Danio rerio (zebra fish) - > 200 mg/l - 96 h
(OECD Test Guideline 203)

Toxicity to daphnia and other aquatic invertebrates
static test EC50 - Daphnia magna (Water flea) - > 200 mg/l - 48 h
(OECD Test Guideline 202)

Toxicity to algae
static test EC50 - Scenedesmus capricornutum (fresh water algae) - 65.4 mg/l - 72 h
(OECD Test Guideline 201)

Toxicity to bacteria
Respiration inhibition EC10 - Sludge Treatment - > 2,000 mg/l - 3 h
(OECD Test Guideline 209)

---

**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

Aldrich - 50705
containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

**DOT (US)**
UN number: 1294  Class: 3  Packing group: II
Proper shipping name: TolueneSOLUTION

Reportable Quantity (RQ): 2000 lbs
Poison Inhalation Hazard: No

**IMDG**
UN number: 1294  Class: 3  Packing group: II  EMS-No: F-E, S-D
Proper shipping name: TOLUENESOLUTION

**IATA**
UN number: 1294  Class: 3  Packing group: II
Proper shipping name: TolueneSOLUTION

SECTION 15: Regulatory information

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

**SARA 313 Components**
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

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

**Massachusetts Right To Know Components**
No components are subject to the Massachusetts Right to Know Act.
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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