1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product name</th>
<th>Glutaraldehyde solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Number</td>
<td>340855</td>
</tr>
<tr>
<td>Brand</td>
<td>Sigma-Aldrich</td>
</tr>
<tr>
<td>Supplier</td>
<td>Sigma-Aldrich</td>
</tr>
<tr>
<td></td>
<td>3050 Spruce Street</td>
</tr>
<tr>
<td></td>
<td>SAINT LOUIS MO 63103</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
<tr>
<td>Telephone</td>
<td>+1 800-325-5832</td>
</tr>
<tr>
<td>Fax</td>
<td>+1 800-325-5052</td>
</tr>
<tr>
<td>Emergency Phone #</td>
<td>(314) 776-6555</td>
</tr>
<tr>
<td>Preparation Information</td>
<td>Sigma-Aldrich Corporation</td>
</tr>
<tr>
<td></td>
<td>Product Safety - Americas Region</td>
</tr>
<tr>
<td></td>
<td>1-800-521-8956</td>
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</table>

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Respiratory sensitiser, Skin sensitiser, Target Organ Effect, Toxic by inhalation., Toxic by ingestion, Corrosive

Target Organs
Central nervous system, Heart

GHS Classification
Acute toxicity, Oral (Category 3)
Acute toxicity, Inhalation (Category 2)
Acute toxicity, Dermal (Category 5)
Skin irritation (Category 2)
Serious eye damage (Category 1)
Respiratory sensitization (Category 1)
Skin sensitization (Category 1)
Acute aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word  Danger

Hazard statement(s)
H301  Toxic if swallowed.
H313  May be harmful in contact with skin.
H315  Causes skin irritation.
H317  May cause an allergic skin reaction.
H318  Causes serious eye damage.
H330  Fatal if inhaled.
H334  May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H400  Very toxic to aquatic life.
Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.
P284 Wear respiratory protection.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/ physician.

HMIS Classification
Health hazard: 3
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 1

NFPA Rating
Health hazard: 4
Fire: 0
Reactivity Hazard: 0

Potential Health Effects
Inhalation Toxic if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Skin May be harmful if absorbed through skin. Causes skin burns.
Eyes Causes eye burns.
Ingestion Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS
Synonyms : Pentane-1,5-dial
Glutaric dialdehydesolution
Formula : C_5H_8O_2
Molecular Weight : 100.12 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
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</thead>
<tbody>
<tr>
<td>Glutaral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAS-No.</td>
<td>111-30-8</td>
<td>Acute Tox. 3; Skin Corr. 1B; Resp. Sens. 1; Skin Sens. 1; Aquatic Acute 1; 1; H301, H314, H317, H331, H334, H400</td>
</tr>
<tr>
<td>EC-No.</td>
<td>203-856-5</td>
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</tr>
<tr>
<td>Index-No.</td>
<td>605-022-00-X</td>
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<tr>
<td></td>
<td>30 - 60 %</td>
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For the full text of the H-Statements and R-Phrases mentioned in this Section, see Section 16

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. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

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

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Conditions for safe storage
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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
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</thead>
<tbody>
<tr>
<td>Glutaral</td>
<td>111-30-8</td>
<td>C</td>
<td>0.2 ppm 0.8 mg/m3</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
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<tr>
<td></td>
<td></td>
<td>C</td>
<td>0.2 ppm 0.8 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
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<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|                |         | C     | 0.05 ppm           | USA. ACGIH Threshold Limit Values (TLV)         |

Eye & Upper Respiratory Tract irritation Central Nervous System impairment Skin irritation Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories. Sensitizer
Personal protective equipment

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).

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.

Eye protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). 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
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

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<tr>
<th>Property</th>
<th>Value</th>
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<tr>
<td>Appearance</td>
<td>Form: liquid, clear</td>
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<tr>
<td></td>
<td>Colour: colourless</td>
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<tr>
<td>Safety data</td>
<td>pH: no data available</td>
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<tr>
<td></td>
<td>Melting point/freezing point: -21 °C (-6 °F)</td>
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<tr>
<td></td>
<td>Boiling point: 101 °C (214 °F) at 1,013 hPa (760 mmHg)</td>
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<tr>
<td></td>
<td>Flash point: no data available</td>
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<tr>
<td></td>
<td>Ignition temperature: no data available</td>
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<td>Autoignition temperature: no data available</td>
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<td>Lower explosion limit: no data available</td>
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<td></td>
<td>Upper explosion limit: no data available</td>
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<td></td>
<td>Vapour pressure: 20 hPa (15 mmHg) at 20 °C (68 °F)</td>
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<tr>
<td></td>
<td>Density: 1.106 g/mL at 25 °C (77 °F)</td>
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<tr>
<td></td>
<td>Water solubility: soluble</td>
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<tr>
<td></td>
<td>Partition coefficient: n-octanol/water: no data available</td>
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<td></td>
<td>Relative vapour density: 3.46 - (Air = 1.0)</td>
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<td></td>
<td>Odour: no data available</td>
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<td></td>
<td>Odour Threshold: no data available</td>
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<tr>
<td></td>
<td>Evaporation rate: no data available</td>
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</tbody>
</table>

10. STABILITY AND REACTIVITY
Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong acids, Strong bases, Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

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
Eyes: no data available

Respiratory or skin sensitization
May cause allergic respiratory reaction.

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.

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)
no data available

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

Aspiration hazard
no data available

Potential health effects

Inhalation: Toxic if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

Ingestion: Toxic if swallowed.

Skin: May be harmful if absorbed through skin. Causes skin burns.

Eyes: Causes eye burns.

Synergistic effects
no data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity
no data available

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
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life.

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: 3265  Class: 8  Packing group: II
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (Glutaral)
Reportable Quantity (RQ):
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3265  Class: 8  Packing group: II  EMS-No: F-A, S-B
Proper shipping name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Glutaral)
Marine pollutant: No
IATA  
UN number: 3265  Class: 8  Packing group: II  
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (Glutaral)

15. REGULATORY INFORMATION

OSHA Hazards  
Respiratory sensitiser, Skin sensitiser, Target Organ Effect, Toxic by inhalation., Toxic by ingestion, Corrosive

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  
Reportable Quantity: lowest RQ > 999999 lbs

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
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<tbody>
<tr>
<td>Glutaral</td>
<td>111-30-8</td>
<td>2007-03-01</td>
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Pennsylvania Right To Know Components

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<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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<tr>
<td>Glutaral</td>
<td>111-30-8</td>
<td>2007-03-01</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>2007-07-01</td>
</tr>
<tr>
<td>Methanol</td>
<td>67-56-1</td>
<td>2007-07-01</td>
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New Jersey Right To Know Components

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<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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<td>Water</td>
<td>7732-18-5</td>
<td>2007-07-01</td>
</tr>
<tr>
<td>Methanol</td>
<td>67-56-1</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

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

Text of H-code(s) and R-phrase(s) mentioned in Section 3

- Serious eye damage/eye irritation  
- Acute toxicity  
- Acute aquatic toxicity  
- Toxic if swallowed.  
- Causes severe skin burns and eye damage.  
- May cause an allergic skin reaction.  
- Toxic if inhaled.  
- May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
- Very toxic to aquatic life.  
- Respiratory sensitization  
- Skin corrosion  
- Skin sensitization

Further information  
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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 Co., shall not be held liable for any damage resulting from handling or from contact with the
above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.