1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier
Product Name: Glutaraldehyde solution, 70% w/w
Product Code: SC-257558

Recommended use of the chemical and restrictions on use
For research use only. Not intended for diagnostic or therapeutic use.

Details of the supplier of the safety data sheet
Santa Cruz Biotechnology, Inc.
10410 Finnell Street
Dallas, TX 75220
831.457.3800
800.457.3801
scbt@scbt.com

Emergency telephone number
Chemtrec
1.800.424.9300 (Within USA)
+1.703.527.3887 (Outside USA)

2. HAZARDS IDENTIFICATION

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification
- Acute toxicity - Oral: Category 4
- Acute toxicity - Dermal: Category 3
- Acute toxicity - Inhalation (Vapors): Category 1
- Acute toxicity - Inhalation (Dusts/Mists): Category 2
- Skin corrosion/irritation: Category 1 Sub-category B
- Serious eye damage/eye irritation: Category 1
- Respiratory sensitization: Category 1
- Skin sensitization: Category 1
- Specific target organ toxicity (single exposure): Category 3

Label elements
- Signal word: Danger
- Hazard statements:
  - Harmful if swallowed
  - Toxic in contact with skin
  - Fatal if inhaled
  - Causes severe skin burns and eye damage
  - May cause allergy or asthma symptoms or breathing difficulties if inhaled
  - May cause an allergic skin reaction
  - May cause respiratory irritation. May cause drowsiness or dizziness

Symbols/Pictograms

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SAFETY DATA SHEET
Santa Cruz Biotechnology, Inc.
Revision date: 30-Mar-2017
Version: 1.6
Precautionary Statements - Prevention

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace

Precautionary Statements - Response

Immediately call a POISON CENTER or doctor/physician
IF IN EYES: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
Call a POISON CENTER or doctor/physician if you feel unwell
Wash contaminated clothing before reuse
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation or rash occurs: Get medical advice/attention
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
Call a POISON CENTER or doctor/physician if you feel unwell
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Do NOT induce vomiting

Precautionary Statements - Storage

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

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Hazards not otherwise classified (HNOC) Not applicable

Other Information

NFPA Health hazards 3
Flammability 0
Stability 0
Physical and chemical properties -

HMIS Health hazards 3
Flammability 0
Physical hazards 1
Personal protection -

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No</th>
<th>Weight %</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentanediol</td>
<td>111-30-8</td>
<td>70 - 90</td>
<td>= 252 mg/kg ( Rat )</td>
<td>= 560 µL/kg ( Rabbit )</td>
<td>= 0.1 mg/L ( Rat ) 4 h</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>10 - 30</td>
<td>&gt; 90 mL/kg ( Rat )</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Methanol</td>
<td>67-56-1</td>
<td>1 - 5</td>
<td>= 6200 mg/kg ( Rat )</td>
<td>= 15800 mg/kg ( Rabbit )</td>
<td>= 22500 ppm ( Rat ) 8 h = 64000 ppm ( Rat ) 4 h</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES
First Aid Measures

General advice
Immediate medical attention is required.

Eye contact
Keep eye wide open while rinsing. Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Do not rub affected area.

Skin Contact
Immediate medical attention is required. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Wash off immediately with soap and plenty of water. Consult a physician if necessary.

Inhalation
Remove to fresh air. Call a physician or poison control center immediately. Oxygen or artificial respiration if needed. Call a physician if not breathing; give artificial respiration. If breathing is difficult, give oxygen.

Ingestion
Do NOT induce vomiting. Drink plenty of water. Never give anything by mouth to an unconscious person. Immediate medical attention is required. Remove from exposure, lie down. Clean mouth with water and drink afterwards plenty of water. Call a physician or poison control center immediately.

Self-protection of the first aider
Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed
Symptoms
No information available.

Indication of any immediate medical attention and special treatment needed
Note to physicians
Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media
None.

Specific hazards arising from the chemical
Specific hazards arising from the chemical
The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating and toxic gases and vapors. In the event of fire and/or explosion do not breathe fumes.

Hazardous combustion products
Carbon oxides.

Explosion data
Sensitivity to Mechanical Impact
No information available.

Sensitivity to Static Discharge
No information available.

Protective equipment and precautions for firefighters
Protective equipment and precautions for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Personal precautions
Use personal protective equipment as required. Evacuate personnel to safe areas. Avoid contact with skin, eyes or clothing. Keep people away from and upwind of spill/leak.
Environmental precautions
Do not allow into any sewer, on the ground or into any body of water. Should not be released into the environment. Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. See Section 12 for additional Ecological Information.

Methods and material for containment and cleaning up
Methods for containment
Prevent further leakage or spillage if safe to do so. Cover powder spill with plastic sheet or tarp to minimize spreading. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up
Dike far ahead of liquid spill for later disposal. Soak up with inert absorbent material. Take up mechanically, placing in appropriate containers for disposal. Clean contaminated surface thoroughly. Prevent product from entering drains. Dam up. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Ensure adequate ventilation, especially in confined areas. In case of insufficient ventilation, wear suitable respiratory equipment. Use only with adequate ventilation and in closed systems.

Conditions for safe storage, including any incompatibilities
Storage Conditions
Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children. Keep containers tightly closed in a cool, well-ventilated place. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep in properly labeled containers. Store at -20 °C.

Incompatible materials
Incompatible with strong acids and bases. Incompatible with oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure Guidelines
Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentanedial</td>
<td>Ceiling: 0.05 ppm activated and inactivated</td>
<td>(vacated) Ceiling: 0.2 ppm (vacated) Ceiling: 0.8 mg/m³</td>
<td>Ceiling: 0.2 ppm Ceiling: 0.8 mg/m³</td>
</tr>
<tr>
<td>111-30-8</td>
<td></td>
<td>TWA: 200 ppm TWA: 260 mg/m³</td>
<td>IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m³</td>
</tr>
<tr>
<td>Methanol</td>
<td>STEL: 250 ppm S* TWA: 200 ppm STEL: 250 ppm</td>
<td>TWA: 200 ppm TWA: 260 mg/m³ (vacated) TWA: 200 ppm (vacated) TWA: 260 mg/m³</td>
<td>STEL: 250 ppm STEL: 325 mg/m³</td>
</tr>
<tr>
<td>67-56-1</td>
<td></td>
<td>(vacated) STEL: 325 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

NIOSH IDLH Immediately Dangerous to Life or Health

Appropriate engineering controls
Engineering Controls
Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment
Eye/face protection
Tight sealing safety goggles. Face protection shield.

Skin and Body Protection
Wear protective gloves and protective clothing.

Santa Cruz Biotechnology, Inc. www.scbt.com
Respiratory protection

If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations

When using do not eat, drink or smoke. Wash contaminated clothing before reuse. Keep away from food, drink and animal feeding stuffs. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Avoid contact with skin, eyes or clothing. Take off all contaminated clothing and wash it before reuse. Wear suitable gloves and eye/face protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>No information available</td>
</tr>
<tr>
<td>Odor</td>
<td>Pungent</td>
</tr>
<tr>
<td>pH</td>
<td>No information available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>-6 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>101 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>No information available</td>
</tr>
<tr>
<td>Density</td>
<td>1.14 g/mL</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Upper flammability limits</td>
<td>No information available</td>
</tr>
<tr>
<td>Lower flammability limit</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>15 mmHg</td>
</tr>
<tr>
<td>Vapor density</td>
<td>3.5</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.06</td>
</tr>
<tr>
<td>Water solubility</td>
<td>No information available</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No information available</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>No information available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Kinematic viscosity</td>
<td>No information available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No information available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No information available</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Reactivity

Not applicable

Chemical stability

Stable under recommended storage conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization

No information available.

Conditions to avoid

Exposure to air or moisture over prolonged periods. Incompatible with strong acids and bases. Incompatible with oxidizing agents.

Incompatible materials

Thermal decomposition can lead to release of irritating and toxic gases and vapors. Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation No data available.
Eye contact No data available.
Skin Contact No data available.
Ingestion No data available.
Information on toxicological effects
Symptoms  No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure
Chronic Toxicity  Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Avoid repeated exposure. Possible risk of irreversible effects.

Target Organ Effects  Gastrointestinal tract (GI), Central nervous system, Eyes, Respiratory system, Skin.

Numerical measures of toxicity  - Product Information
Unknown acute toxicity  No information available
The following values are calculated based on chapter 3.1 of the GHS document

<table>
<thead>
<tr>
<th>Chemical</th>
<th>ATEmix (oral)</th>
<th>ATEmix (dermal)</th>
<th>ATEmix (inhalation-dust/mist)</th>
<th>ATEmix (inhalation-vapor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentanedial 111-30-8</td>
<td>347 mg/kg</td>
<td>825 mg/kg</td>
<td>0.1 mg/l</td>
<td>0.1 mg/l</td>
</tr>
</tbody>
</table>

12. ECOLOGICAL INFORMATION

Ecotoxicity  Very toxic to aquatic life with long lasting effects

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Algae/aquatic plants</th>
<th>Fish</th>
<th>Toxicity to Microorganisms</th>
<th>Crustacea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentanedial 111-30-8</td>
<td>0.84: 96 h Desmodesmus subspicatus mg/L EC50 0.61: 72 h Desmodesmus subspicatus mg/L EC50</td>
<td>7.8 - 22: 96 h Lepomis macrochirus mg/L LC50 static 5.4: 96 h Pimephales promelas mg/L LC50 static 7.8 - 13: 96 h Oncorhynchus mykiss mg/L LC50 static 2.6 - 4.8: 96 h Oncorhynchus mykiss mg/L LC50 flow-through</td>
<td>-</td>
<td>14: 48 h Daphnia magna mg/L EC50 0.56 - 1.0: 48 h Daphnia magna mg/L EC50 Static</td>
</tr>
<tr>
<td>Methanol 67-56-1</td>
<td>-</td>
<td>28200: 96 h Pimephales promelas mg/L LC50 flow-through 100: 96 h Pimephales promelas mg/L LC50 static 13500 - 17600: 96 h Lepomis macrochirus mg/L LC50 flow-through 18 - 20: 96 h Oncorhynchus mykiss mL/L LC50 static 19500 - 20700: 96 h Oncorhynchus mykiss mg/L LC50 flow-through</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

0% of the mixture consists of components(s) of unknown hazards to the aquatic environment.

Persistence and degradability  No information available.
Bioaccumulation  No information available.
Mobility  No information available.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Partition coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentanedial 111-30-8</td>
<td>0.22</td>
</tr>
<tr>
<td>Methanol 67-56-1</td>
<td>-0.77</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS
Disposal of wastes
This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261).
Contaminated packaging
Do not reuse container.
Other Information
Waste codes should be assigned by the user based on the application for which the product was used.
US EPA Waste Number
U154 D002
California Hazardous Waste Status
This product contains one or more substances that are listed with the State of California as a hazardous waste.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>California Hazardous Waste Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentanedial</td>
<td>Toxic</td>
</tr>
<tr>
<td>111-30-8</td>
<td></td>
</tr>
<tr>
<td>Methanol</td>
<td>Toxic</td>
</tr>
<tr>
<td>67-56-1</td>
<td>Ignitable</td>
</tr>
</tbody>
</table>

14. TRANSPORT INFORMATION

DOT
UN/ID no UN2922
Hazard Class 8
Subsidiary class 6.1
Packing Group II
Proper shipping name Corrosive liquids, toxic, n.o.s.
Description UN2922, Corrosive liquids, toxic, n.o.s. (Pentanedial, Methanol), 8 (6.1), II
Emergency Response Guide Number 154

IMDG
UN/ID no UN2922
Hazard Class 8
Subsidiary hazard class 6.1
Packing Group II
Proper shipping name Corrosive liquid, toxic, n.o.s.
Description UN2922, Corrosive liquid, toxic, n.o.s. (Pentanedial, Methanol), 8 (6.1), II
Special Provisions 274
EmS-No F-A, S-B

IATA
UN/ID no UN2922
Hazard Class 8
Subsidiary hazard class 6.1
Packing Group II
Proper shipping name Corrosive liquid, toxic, n.o.s.
Description UN2922, Corrosive liquid, toxic, n.o.s. (Pentanedial, Methanol), 8 (6.1), II

15. REGULATORY INFORMATION

International Inventories
All of the components in the product are on the following Inventory lists
TSCA (United States): Canada (DSL/NDSL) Europe (EINECS/ELINCS/NLP) Australia (AICS) South Korea (KECL): China (IECSC) Philippines (PICCS)

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>ENCS</th>
<th>IECSC</th>
<th>KECL</th>
<th>PICCS</th>
<th>AICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentanedial</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Water</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Methanol</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
X - Listed
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories
Acute health hazard  Yes
Chronic Health Hazard Yes
Fire hazard No
Sudden release of pressure hazard No
Reactive hazard No

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

US State Regulations

California Proposition 65
This product contains the following Proposition 65 chemicals.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>California Proposition 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol - 67-56-1</td>
<td>Developmental</td>
</tr>
</tbody>
</table>

U.S. State Right-to-Know Regulations

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>New Jersey</th>
<th>Massachusetts</th>
<th>Pennsylvania</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentanediol 111-30-8</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Methanol 67-56-1</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

Revision note No information available

Disclaimer
The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet