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

Product identifier
Product Name
Paraformaldehyde solution 4% in PBS
Product Code
SC-281692

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
CHEMWATCH
877.715.9305 (Within USA or Canada)
+1.800.2436.2255 (From outside USA or Canada)

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 - Inhalation (Gases)
Category 4
Acute toxicity - Inhalation (Vapors)
Category 4
Skin sensitization
Category 1
Germ Cell Mutagenicity
Category 2
Carcinogenicity
Category 1A

Label elements
Signal word
Danger
Hazard statements
May be harmful in contact with skin
Harmful if inhaled
May cause an allergic skin reaction
Suspected of causing genetic defects
May cause cancer
Harmful if inhaled
Harmful if swallowed

Symbols/Pictograms
Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves

Precautionary Statements - Response
IF exposed or concerned: Get medical advice/attention
IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth

Precautionary Statements - Storage
Precautionary Statements - Disposal
Store locked up
Dispose of contents/container to an approved waste disposal plant

Hazard not otherwise classified (HNOC)
Hazard not otherwise classified (HNOC)
Not applicable

Other Information
Other hazards
Harmful to aquatic life with long lasting effects. Harmful to aquatic life.

NFPA
Health hazards 2
Flammability 0
Stability 0
Physical and chemical properties

HMIS
Health hazards 2
Flammability 0
Physical hazards 0
Personal protection

* = Chronic Health Hazard

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>Non-Hazardous Aqueous Buffer***</td>
<td>-</td>
<td>&gt;90</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Formaldehyde***</td>
<td>50-00-0</td>
<td>1 - 5</td>
<td>= 100 mg/kg (Rat)</td>
<td>= 270 mg/kg (Rabbit)***</td>
<td>= 0.578 mg/L (Rat) 4 h***</td>
</tr>
<tr>
<td>Methanol***</td>
<td>67-56-1</td>
<td>1 - 5</td>
<td>= 6200 mg/kg (Rat)***</td>
<td>= 15840 mg/kg (Rabbit) = 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
If symptoms persist, call a physician. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing.

Eye contact
Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.

Skin Contact
Consult a physician if necessary. 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.

Inhalation
Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Call a physician.

Ingestion
Do NOT induce vomiting. Drink plenty of water. If symptoms persist, call a physician. Rinse
Self-protection of the first aider

Use personal protective equipment as required.

**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**
May cause sensitization of susceptible persons.

---

### 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**
  No information available.

**Specific hazards arising from the chemical**

**Specific hazards arising from the chemical**
In the event of fire and/or explosion do not breathe fumes. May cause sensitization by inhalation and skin contact. Thermal decomposition can lead to release of irritating and toxic gases and vapors.

**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**

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**
Avoid contact with skin, eyes or clothing. Use personal protective equipment as required.

**Environmental precautions**
Prevent entry into waterways, sewers, basements or confined areas. Do not flush into surface water or sanitary sewer system. 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.

- **Methods for cleaning up**
  Cover liquid spill with sand, earth or other non-combustible absorbent material. Cover powder spill with plastic sheet or tarp to minimize spreading. Pick up and transfer to properly labeled containers. Soak up with inert absorbent material.

---

### 7. HANDLING AND STORAGE

**Precautions for safe handling**

Avoid contact with skin, eyes or clothing. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Use personal protective equipment as required. Do not breathe dust/fume/gas/mist/vapors/spray.
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. Store at 4 °C.

Incompatible materials
None known based on information supplied.

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).

Other Information

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STEL: 0.3 ppm</td>
<td>TWA: 0.1 ppm ***</td>
<td>IDLH: 20 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA: 0.1 ppm ***</td>
<td>TWA: 0.75 ppm (vacated) TWA: 3 ppm</td>
<td>Ceiling: 0.1 ppm 15 min TWA: 0.016 ppm ***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>unless specified in 1910.1048</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) STEL: 10 ppm 30 min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) Ceiling: 5 ppm unless specified</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1910.1048</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) STEL: 2 ppm see 29 CFR</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1910.1048***</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde***</td>
<td>STEL: 250 ppm</td>
<td>TWA: 200 ppm</td>
<td>IDLH: 6000 ppm</td>
</tr>
<tr>
<td>50-00-0</td>
<td>TWA: 200 ppm S****</td>
<td>TWA: 200 ppm</td>
<td>TWA: 200 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 260 mg/m³</td>
<td>TWA: 260 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) TWA: 200 ppm</td>
<td>STEL: 250 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) TWA: 260 mg/m³</td>
<td>STEL: 325 mg/m³***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) STEL: 250 ppm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(vacated) S****</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.

Skin and Body Protection
Wear protective gloves and protective clothing.

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
Handle in accordance with good industrial hygiene and safety practice.

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>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>(25°C): 7.0 - 7.6</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>No information available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No information available</td>
</tr>
<tr>
<td>Flash point</td>
<td>No information available</td>
</tr>
<tr>
<td>Liquid Density</td>
<td>No information available</td>
</tr>
<tr>
<td>Evaporation rate</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
Extremes of temperature and direct sunlight.

Incompatible materials
Strong oxidizing agents.

Hazardous Decomposition Products
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
Repeated contact may cause allergic reactions in very susceptible persons. Avoid repeated exposure.

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

Carcinogenicity
The table below indicates whether each agency has listed any ingredient as a carcinogen.

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde***</td>
<td>A1***</td>
<td>Group 1***</td>
<td>Known***</td>
<td>X***</td>
</tr>
</tbody>
</table>

ACGIH (American Conference of Governmental Industrial Hygienists) A2 - Suspected Human Carcinogen
A1 - Known Human Carcinogen

IARC (International Agency for Research on Cancer) Group 1 - Carcinogenic to Humans

NTP (National Toxicology Program) Known - Known Carcinogen

OSHA (Occupational Safety and Health Administration of the US Department of Labor) X - Present

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

ATEmix (oral) 1538 mg/kg
ATEmix (dermal) 4320 mg/kg
ATEmix (inhalation-gas) 11769 mg/l
ATEmix (inhalation-dust/mist) 7.7 mg/l
ATEmix (inhalation-vapor) 14.4 mg/l

12. ECOLOGICAL INFORMATION

Ecotoxicity

<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>Formaldehyde***</td>
<td>-</td>
<td>22.6 - 25.7: 96 h Pimephales promelas mg/L LC50 flow-through 1510: 96 h Lepomis macrochirus µg/L LC50 static 23.2 - 29.7: 96 h Pimephales promelas mg/L LC50 static 0.032 - 0.226: 96 h Oncorhynchus mykiss mL/L LC50 flow-through 100 - 136: 96 h Oncorhynchus mykiss mg/L LC50 static 41: 96 h Brachydanio rerio mg/L LC50 static***</td>
<td>-</td>
<td>11.3 - 18.48 h Daphnia magna mg/L EC50 Static 2: 48 h Daphnia magna mg/L LC50***</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
Bioaccumulation
Mobility

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Partition coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde*** 50-00-0</td>
<td>0.35***</td>
</tr>
<tr>
<td>Methanol*** 67-56-1</td>
<td>-0.77***</td>
</tr>
</tbody>
</table>

13. DISPOSAL CONSIDERATIONS

Disposal of wastes
Disposal should be in accordance with applicable regional, national and local laws and regulations.

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
U122 U154

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>Formaldehyde*** 50-00-0</td>
<td>Toxic</td>
</tr>
<tr>
<td>Methanol*** 67-56-1</td>
<td>Toxic</td>
</tr>
</tbody>
</table>
14. TRANSPORT INFORMATION

DOT Not regulated
IMDG Not regulated
IATA Not regulated

15. REGULATORY INFORMATION

International Inventories
All of the components in the product are on the following Inventory lists
No information available***

<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>Formaldehyde***</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>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 contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
<th>CWA - Hazardous Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde***</td>
<td>100 lb***</td>
<td></td>
<td></td>
<td>X***</td>
</tr>
<tr>
<td>50-00-0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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>Formaldehyde*** - 50-00-0</td>
<td>Carcinogen***</td>
</tr>
<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>Formaldehyde***</td>
<td>X***</td>
<td>X***</td>
<td>X***</td>
</tr>
<tr>
<td>50-00-0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methanol***</td>
<td>X***</td>
<td>X***</td>
<td>X***</td>
</tr>
<tr>
<td>67-56-1</td>
<td></td>
<td></td>
<td></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