Electroless Copper Zinc Plating Solution

Safety Data Sheet

Section 1: Identification

1.1 Identification
Product Name : Copper-Zinc Electroless Plating Solution

1.2 Relevant identified uses of the substance or mixture and uses advised against
Use of the substance/mixture : Electroless Copper Zinc Plating

1.3 Details of the supplier of the safety data sheet
Nano3D Systems LLC
1110 NE Circle Blvd.,
ATAMI/Bldg. 11
Corvallis, OR 97330

1.4 Emergency telephone number
Emergency number : CHEMTREC: 1-800-424-9300

Section 2: Hazard(s) identification

2.1 Classification of the substance or mixture
Classification (GHS-US)
May be corrosive to metals H290
Acute toxicity, Oral (Category 4) H302
Skin irritation (Category 2) H315
Causes serious eye damage H314
Eye irritation (Category 2A) H319
Acute aquatic toxicity (Category 2) H401
Chronic aquatic toxicity (Category 2) H411

2.2 Label elements
GH-S-US labeling
Hazard pictogram (GHS-US)

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) : H290 – May be corrosive to metals
: H302 – Harmful if swallowed
: H314 – Causes serious eye damage
: H315 – Causes skin irritation
: H319 – Causes serious eye irritation
: H401 – Acute aquatic toxicity
: H411 – Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) : P234 – Keep only in original container
: P264 – Wash hands thoroughly after handling
: P270 – Do not eat, drink or smoke when using this product
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- P273 – Avoid release to the environment
- P280 – Wear protective gloves/protective clothing/ eye protection/face protection
- P301+P312+P330 – If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth
- P302+P352 – If on skin: Wash with plenty of water
- P304+P340 – If inhaled: Remove person to fresh air and keep comfortable for breathing
- P305+P351+P338+P310 – If in eye: 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
- P332+P313 – If skin irritation occurs: Get medical advice/attention.
- P337+P313 – If eye irritation persists: Get medical advice/attention.
- P362 – Take off contaminated clothing and wash before reuse
- P391 – Collect spillage.
- P405 – Store locked up
- P406 – Store in corrosive resistant stainless steel container with resistant inner liner
- P501 – Dispose of contents/ container to an approved waste disposal plant.

2.3 Other Hazards

No additional information available
Section 3: Composition/information on ingredients

3.1 Substance
Not applicable

3.2 Mixture

<table>
<thead>
<tr>
<th>Name</th>
<th>Product Identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper(II) Nitrate</td>
<td>(CAS-No.) 3251-23-8</td>
<td></td>
<td>Trade Secret Acute Tox; Skin Irrit. 2; Eye Irrit. 2A; Aquatic Acute 1; Aquatic Chronic 1; H302, H315, H319, H410</td>
</tr>
<tr>
<td>Zinc(II) Chloride</td>
<td>(CAS-No.) 7646-85-7</td>
<td></td>
<td>Trade Secret Eye Irrit. 2A, Aquatic Acute 1; Aquatic Chronic 1; H319, H319, H410</td>
</tr>
<tr>
<td>Potassium Hydroxide</td>
<td>(CAS-No.) 1310-58-3</td>
<td></td>
<td>Trade Secret Met. Corr. 1; Acute Tox. 4; Skin Corr. 1A; Eye Dam. 1; Aquatic Acute 3; H290, H302, H314, H318, H402</td>
</tr>
<tr>
<td>Potassium Sodium Tartrate</td>
<td>(CAS-No.) 6381-59-5</td>
<td></td>
<td>Trade Secret None</td>
</tr>
</tbody>
</table>

Section 4: First Aid Measures

4.1 Description of first aid measures

General: Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

Inhalation: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

Skin contact: Wash off with soap and plenty of water. Consult a physician.

Eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Ingestion: 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

Inhalation: May cause allergy or asthma symptoms or breathing difficulties if inhaled

Skin contact: May cause an allergic reaction
Electroless Copper Zinc Plating Solution
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Eye contact : Causes serious eye damage
Ingestion : Harmful if swallowed

4.3 Indication of any immediate medical attention and special treatment needed
No further information available

Section 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing media : Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable extinguishing media : None

5.2 Special hazards arising from the substance or mixture
Fire hazard : No information available
Explosion hazard : No information available

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

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
6.1.1 For non-emergency personnel : Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

6.1.2 For emergency personnel : No additional information available

6.2 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.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.
6.4 Reference to other sections
For disposal see section 13.

Section 7: Handling and storage

7.1 Precautions for safe handling
Precautions for safe handling: Avoid contact with skin and eyes. Avoid formation of aerosols.

7.2 Conditions for safe storage, including any incompatibilities
Storage conditions: Keep container tightly closed in a dry and well-ventilated place.

Air sensitive. hygroscopic Handle and store under inert gas.

Storage class (TRGS 510): Non Combustible Solids.

Section 8: Exposure controls/personal protection

8.1 Control parameters

Copper(II) Nitrate (CAS-No.) 3251-23-8
TWA 1.000000 mg/m³ USA. NIOSH Recommended Exposure Limits

Zinc(II) Chloride (CAS-No.) 7646-85-7
TWA 1.000000 mg/m³ USA. Occupational Exposure Limits (OSHA) – Table Z-1 Limits for air contaminants

Potassium Sodium Tartrate (CAS-No.) 6381-59-5
No information available

Potassium Hydroxide (CAS-No.) 1310-58-3
TWA 2.000000 mg/m³ USA, ACGIH Threshold Limit Value

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.
Electroless Copper Zinc Plating Solution

Hand protection: Handle with gloves. Gloves must be inspected prior to use. Use proper.

Eye protection: Safety glasses with side-shields conforming to EN166 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.

Respiratory protection: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

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Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Blue</td>
</tr>
<tr>
<td>Odor</td>
<td>Acid odor</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>pH &gt; 12</td>
</tr>
<tr>
<td>Melting point</td>
<td>No information available</td>
</tr>
<tr>
<td>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>Relative evaporation rate (butyl acetate = 1)</td>
<td>No information available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No information available</td>
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<tr>
<td>Explosive properties</td>
<td>No information available</td>
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<tr>
<td>Vapor pressure</td>
<td>No information available</td>
</tr>
<tr>
<td>Relative density</td>
<td>No information available</td>
</tr>
<tr>
<td>Relative vapor density at 20 °</td>
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<tr>
<td>Solubility</td>
<td>Miscible</td>
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<tr>
<td>Log Pow</td>
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<tr>
<td>Auto-ignition temperature</td>
<td>No information available</td>
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<tr>
<td>Viscosity</td>
<td>No information available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No information available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No information available</td>
</tr>
</tbody>
</table>

9.2 Other information

No further information available
Section 10: Stability and reactivity
10.1 Reactivity
No information available

10.2 Chemical Stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No information available

10.4 Conditions to avoid
hygroscopic

10.5 Incompatible materials
Strong oxidizing agents, Bases, reducing agent Powdered metals, Anhydrous copper(II) sulfate, reacts violently with: hydroxylamine, Magnesium,

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Copper oxides, Zinc oxides, sodium oxides, potassium oxides, nitrogen oxides, carbon oxides, hydrogen chloride
Other decomposition products - No data available

Section 11: Toxicological information
11.1 Control parameters
Acute toxicity : No information available

Copper(II) Nitrate (CAS-No.) 3251-23-8
LD50 Oral – Rat – 794 mg/kg

Zinc(II) Chloride (CAS-No.) 7646-85-7
No information available

Potassium Sodium Tartrate (CAS-No.) 6381-59-5
No information available

Potassium Hydroxide (CAS-No.) 1310-58-3
No data available

Skin corrosion/irritation : Causes skin corrosion

Serious eye damage/irritation : Risk of serious damage to eyes
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Respiratory or skin sensitization: Prolonged or repeated exposure may cause allergic reactions in certain sensitive individuals.

Germ cell mutagenicity: No information available

Carcinogenicity: 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 or OSHA.

Reproductive toxicity: Possible risk of congenital malformation in the fetus.

Specific target organ toxicity (single exposure): Respiratory system

Specific target organ toxicity (repeated exposure): Liver

Aspiration hazard: No information available

Additional information
Symptoms of systemic copper poisoning may include: capillary damage, headache, cold sweat, weak pulse, and kidney and liver damage, central nervous system excitation followed by depression, jaundice, convulsions, paralysis, and coma. Death may occur from shock or renal failure. Chronic copper poisoning is typified by hepatic cirrhosis, brain damage and demyelination, kidney defects, and copper deposition in the cornea as exemplified by humans with Wilson's disease. It has also been reported that copper poisoning has led to hemolytic anemia and accelerates arteriosclerosis. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Section 12: Ecological information

12.1 Toxicity

Copper(II) Nitrate (CAS-No.) 3251-23-8
Toxicity to daphnia and other aquatic invertebrates: EC50 - Daphnia magna (Water flea) - 0.024 mg/l - 48 h

Zinc(II) Chloride (CAS-No.) 7646-85-7
No information available

Potassium Sodium Tartrate (CAS-No.) 6381-59-5
No information available
12.2 Persistence and degradability

Copper (II) Nitrate (CAS-No.) 3251-23-8
No information available

Zinc(II) Chloride (CAS-No.) 7646-85-7
No information available

Potassium Sodium Tartrate (CAS-No.) 6381-59-5
Expected to be inherently biodegradable

Potassium Hydroxide (CAS-No.) 1310-58-3
No information available

12.3 Bioaccumulative potential

Copper (II) Nitrate (CAS-No.) 3251-23-8
No information available

Zinc(II) Chloride (CAS-No.) 7646-85-7
No information available

Potassium Sodium Tartrate (CAS-No.) 6381-59-5
No information available

Potassium Hydroxide (CAS-No.) 1310-58-3
No information available

12.4 Mobility in soil

Copper (II) Nitrate (CAS-No.) 3251-23-8
No information available

Zinc(II) Chloride (CAS-No.) 7646-85-7
No information available

Potassium Sodium Tartrate (CAS-No.) 6381-59-5
No information available

Potassium Hydroxide (CAS-No.) 1310-58-3
No information available

12.4 Other adverse effects
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An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life. May be harmful to aquatic organisms due to the shift of the pH. Avoid release to the environment.

Section 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.

Section 14: Transportation information

14.1 Transportation information

Department of Transportation (DOT)
UN number: 3266  Class: 8  Packing group: II
Proper shipping name: Corrosive liquid, Basic, inorganic, n.o.s. (Copper nitrate, Potassium hydroxide)
Reportable Quantity (RQ): 10 lbs
Marine pollutant: yes
Poison Inhalation Hazard: Yes

Section 15: Regulatory information

15.1 US Federal regulations

Copper (II) Nitrate (CAS-No.) 3251-23-8
SARA Title III, Section 313
SARA 311/312 Hazards Acute Health Hazard, Chronic Health Hazard

Zinc(II) Chloride (CAS-No.) 7646-85-7
SARA 311/312 Hazards Acute Health Hazard

Potassium Sodium Tartrate (CAS-No.) 6381-59-5
None

Potassium Hydroxide (CAS-No.) 1310-58-3
SARA 311/312 Hazards Acute Health Hazard

15.2 US State regulations
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**Copper(II) Sulfate Hydrate (CAS-No.) 23254-43-5**
Massachusetts Right To Know
Pennsylvania Right To Know
New Jersey Right To Know

**Zinc(II) Chloride (CAS-No.) 7646-85-7**
Massachusetts Right To Know
Pennsylvania Right To Know
New Jersey Right To Know

**Potassium Sodium Tartrate (CAS-No.) 6381-59-5**
Pennsylvania Right To Know
New Jersey Right To Know

**Potassium Hydroxide**
Massachusetts Right To Know
Pennsylvania Right To Know
New Jersey Right To Know

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### Section 16: Other information

**HMIS Rating**

Health 3
Chronic Health *
Flammability 0
Physical 0

**NFPA Rating**

Health 3
Fire 0
Reactivity 0

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**SDS Preparation date:** May 29, 2018  **Supersedes previous version:** New SDS

**This SDS contains revisions in the following sections(s):** Not applicable. New SDS.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other
Electroless Copper Zinc Plating Solution

Safety Data Sheet

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End of Safety Data Sheet