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## SECTION 1: IDENTIFICATION

### 1.1. Product Identifier

**Product Form:** Mixture

**Product Name:** Cobalt Copper

**Synonyms:**

### 1.2. Intended Use of the Product

**Use of the Substance/Mixture:** No use is specified.

### 1.3. Name, Address, and Telephone of the Responsible Party

Stanford Advanced Materials

Address : 23661 Birtcher Dr.,

Lake Forest, CA 92630 U.S.A.

Tel: (949) 407-8904

### 1.4. Emergency Telephone Number

**Emergency Number** : (949) 407-8904

## SECTION 2: HAZARDS IDENTIFICATION

### 2.1. Classification of the Substance or Mixture

**Classification (GHS-US)**

Not classified

### 2.2. Label Elements

**GHS-US Labeling** No labeling applicable

### 2.3. Other Hazards

This product is present in a massive form as an alloy. It does not present the same hazards when the individual components are in their powdered forms. The materials present in this product in their powdered forms present aquatic toxicity to the environment, pyrophoricity, flammability, self-heating capabilities, carcinogenicity, water reactivity, and acute toxicity. When processed or where dust is generated a combustible dust hazard may be present. Avoid generating dust, generating sparks, ignition sources, and take all precautions.

Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

Under normal use and handling of the solid form of this material there are few health hazards. Cutting, welding, melting, grinding etc. of these materials will produce dust, fume or particulate containing the component elements of these materials. Exposure to the dust, fume or particulate of these materials may present significant health hazards. Exposure to dust or fume may cause irritation of the eyes, skin and respiratory tract. Fine particulates dispersed in air may present an explosion hazard.

**2.4. Unknown Acute Toxicity (GHS-US)** No data available

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substances

Not applicable

| Name   | Product Identifier | % (w/w) | Classification (GHS-US)   |
|--------|--------------------|---------|---|
| Cobalt | (CAS No) 7440-48-4 | 0-55    | Acute Tox. 4 (Oral), H302<br>Acute Tox. 1 (Inhalation:dust,mist), H330<br>Eye Irrit. 2A, H319 |

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|        |                    |       |  |
|--------|--------------------|-------|--|
|        |                    |       | Resp. Sens. 1B, H334<br>Skin Sens. 1, H317<br>Carc. 2, H351<br>Repr. 2, H361<br>Aquatic Acute 3, H402<br>Aquatic Chronic 1, H410 |
| Copper | (CAS No) 7440-50-8 | 45-95 | Comb. Dust<br>Aquatic Acute 1, H400<br>Aquatic Chronic 3, H412   |

Full text of H-phrases: see section 16

More than one of the ranges of concentration prescribed by Controlled Products Regulations has been used where necessary due to varying composition.

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of First Aid Measures

**General:** IF exposed or concerned: Get medical advice/attention. Never give anything by mouth to an unconscious person.

**Inhalation:** When symptoms occur: go into open air and ventilate suspected area. Keep at rest and in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

**Skin Contact:** Cool skin rapidly with cold water after contact with molten product. Removal of solidified molten material from skin requires medical assistance. Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Wash with plenty of soap and water. Wash contaminated clothing before reuse. Obtain medical attention if irritation persists.

**Eye Contact:** Removal of solidified molten material from the eyes requires medical assistance. Immediately rinse with water for a prolonged period (at least 15 minutes) while holding the eyelids wide open. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists.

**Ingestion:** Rinse mouth. Do NOT induce vomiting. Call a POISON CENTER/doctor/physician if you feel unwell.

### 4.2. Most Important Symptoms and Effects Both Acute and Delayed

**General:** Welding, cutting, or processing this material may release dust or fumes that are hazardous.

**Inhalation:** Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

**Skin Contact:** May cause an allergic skin reaction. Dust from physical alteration of this product causes skin irritation. Causes severe skin burns. Contact with fumes or metal powder will irritate skin. Contact with hot, molten metal will cause thermal burns. Dust may cause irritation in skin folds or by contact in combination with tight clothing. Mechanical damage via flying particles and chipped slag is possible.

**Eye Contact:** Dust may cause mechanical irritation to eyes, nose, throat, and lungs.

**Ingestion:** Ingestion is likely to be harmful or have adverse effects.

**Chronic Symptoms:** 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** If exposed or concerned, get medical advice and attention.

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## SECTION 5: FIRE-FIGHTING MEASURES

### 5.1. Extinguishing Media

**Suitable Extinguishing Media:** Use extinguishing media appropriate for surrounding fire. Dry sand; Class D Extinguishing Agent (for metal powder fires).

**Unsuitable Extinguishing Media:** Do not use a heavy water stream. Use of heavy stream of water may spread fire. Do not use water when molten material is involved, may react violently or explosively on contact with water.

### 5.2. Special Hazards Arising From the Substance or Mixture

**Fire Hazard:** A non-combustible material, not considered flammable but will melt above 1470F (800C).

**Explosion Hazard:** In molten state: reacts violently with water (moisture).

**Reactivity:** Hazardous reactions will not occur under normal conditions.

### 5.3. Advice for Firefighters

**Precautionary Measures Fire:** Under fire conditions, hazardous fumes will be present.

**Firefighting Instructions:** Exercise caution when fighting any chemical fire.

**Protection During Firefighting:** Do not enter fire area without proper protective equipment, including respiratory protection.

**Hazardous Combustion Products:** Oxides of tin. Oxides of nickel. Oxides of copper. Chromium oxides. Oxides of silicone and carbon. Oxides of lead. Oxides of aluminum. Cobalt oxide.

**Reference to Other Sections** Refer to section 9 for flammability properties.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal Precautions, Protective Equipment and Emergency Procedures

**General Measures:** Do not handle until all safety precautions have been read and understood. Do not breathe vapors from molten product.

#### 6.1.1. For Non-Emergency Personnel

**Protective Equipment:** Use appropriate personal protection equipment (PPE).

**Emergency Procedures:** Evacuate unnecessary personnel.

#### 6.1.2. For Emergency Personnel

**Protective Equipment:** Equip cleanup crew with proper protection.

**Emergency Procedures:** Ventilate area.

### 6.2. Environmental Precautions

Prevent entry to sewers and public waters.

### 6.3. Methods and Material for Containment and Cleaning Up

**For Containment:** Contain and collect as any solid.

**Methods for Cleaning Up:** Clear up spills immediately and dispose of waste safely. For particulates and dust: Avoid actions that cause dust to become airborne during clean-up such as dry sweeping or using compressed air. Use HEPA vacuum or thoroughly wet with water to clean-up dust. Use PPE described in Section 8. Vacuum must be fitted with HEPA filter to prevent release of particulates during clean-up.

### 6.4. Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection. Concerning disposal elimination after cleaning, see item 13.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for Safe Handling

**Additional Hazards When Processed:** May generate flammable/explosive dusts or turnings when brushed, machined or ground.

Use care during processing to minimize generation of dust. Where excessive dust may result, use approved respiratory protection

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equipment. Heating of product can release toxic or irritating fumes; ensure proper ventilation is employed, proper precautions are enforced, and applicable regulations are followed. Inhalation of fumes may cause metal fume fever.

**Hygiene Measures:** Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

## 7.2. Conditions for Safe Storage, Including Any Incompatibilities

**Storage Conditions:** Store in a dry, cool and well-ventilated place.

**Incompatible Materials:** Strong acids, strong bases, strong oxidizers. Alkalis. Metal oxides. Water, humidity. Corrosive substances in contact with metals may produce flammable hydrogen gas.

## 7.3. Specific End Use(s)

No use is specified.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government.

|                                   | OSHA/PEL  | NIOSH/REL  | ACGIH/TWA  | IDLH                                   |
|-----------------------------------|---|--|--|--|
| <b>Aluminum<br/>(7429-90-5)</b>   | 15 mg/m <sup>3</sup> (total dust)<br>0.1 5 mg/m <sup>3</sup> (respirable fraction)                                | 10 mg/m <sup>3</sup> (total dust)<br>5.695 mg/m <sup>3</sup> (respirable dust) | 1 mg/m <sup>3</sup> (respirable fraction)  |  |
| <b>Antimony<br/>(7440-36-0)</b>   | .5 mg/m <sup>3</sup>  | .5 mg/m <sup>3</sup>   | .5 mg/m <sup>3</sup>   |  |
| <b>Arsenic<br/>(7440-38-2)</b>    |   | 0.002 mg/m <sup>3</sup>  | 0.01 mg/m <sup>3</sup>   | 5 mg/m <sup>3</sup>                    |
| <b>Beryllium<br/>(7440-41-7)</b>  | 2 µg/m <sup>3</sup>   | 0.0005 mg/m <sup>3</sup>   | 0.00005 mg/m <sup>3</sup> (inhalable fraction)   | 4 mg/m <sup>3</sup>                    |
| <b>Bismuth<br/>(7440-69-6)</b>    |   |  |  |  |
| <b>Cadmium<br/>(7440-43-9)</b>    | 0.1 mg/m <sup>3</sup> (fume)<br>0.2 mg/m <sup>3</sup> (dust)<br>5 µg/m <sup>3</sup>                               |  | 0.01 mg/m <sup>3</sup><br>0.002 mg/m <sup>3</sup> (respirable fraction)                    | 9 mg/m <sup>3</sup> (dust)             |
| <b>Cobalt<br/>(7440-48-4)</b>     | 0.1 mg/m <sup>3</sup> (dust and fume)   | 0.05 mg/m <sup>3</sup> (dust and fume)   | 0.02 mg/m <sup>3</sup>   | 20 mg/m <sup>3</sup> (dust and fume)   |
| <b>Copper<br/>(7440-50-8)</b>     | 0.2 mg/m <sup>3</sup> (fume)<br>1 mg/m <sup>3</sup> (dust and mist)   | 5.70mg/m <sup>3</sup> (fume)<br>1 mg/m <sup>3</sup> (dust and mist)            | 0.2 mg/m <sup>3</sup> (fume)   | 100 mg/m <sup>3</sup> (dust and fume)  |
| <b>Iron oxide<br/>(1309-37-1)</b> | 10 mg/m <sup>3</sup> (fume)<br>15 mg/m <sup>3</sup> (total dust)<br>0.3 5 mg/m <sup>3</sup> (respirable fraction) | 5.715 mg/m <sup>3</sup> (dust and fume)  | 5 mg/m <sup>3</sup> (respirable fraction)  | 2500 mg/m <sup>3</sup> (dust and fume) |
| <b>Lead<br/>(7439-92-1)</b>       | 50 µg/m <sup>3</sup>  | 5.720.050 mg/m <sup>3</sup>  | 0.05 mg/m <sup>3</sup>   | 100 mg/m <sup>3</sup>                  |
| <b>Manganese<br/>(7439-96-5)</b>  | 5 mg/m <sup>3</sup> (fume)  | 5.731 mg/m <sup>3</sup> (fume)   | 0.02 mg/m <sup>3</sup> (respirable fraction)<br>0.1 mg/m <sup>3</sup> (inhalable fraction) | 500 mg/m <sup>3</sup>                  |
| <b>Nickel</b>                     | 1 mg/m <sup>3</sup>   | 5.740.015 mg/m <sup>3</sup>  | 1.5 mg/m <sup>3</sup> (inhalable fraction)   | 10 mg/m <sup>3</sup>                   |

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|                               |  |  |   |                       |
|-------------------------------|--|--|---|-----------------------|
| <b>(7440-02-0)</b>            |  |  |   |                       |
| <b>Silicon (7440-21-3)</b>    | 15 mg/m <sup>3</sup> (total dust)<br>5 mg/m <sup>3</sup> (respirable fraction)                               | 10 mg/m <sup>3</sup> (total dust)<br>5.755 mg/m <sup>3</sup> (respirable dust) |   |                       |
| <b>Silver (7440-22-4)</b>     | .01 mg/m <sup>3</sup>  | .01 mg/m <sup>3</sup>  | .1 mg/m <sup>3</sup>                      |                       |
| <b>Tin (7440-31-5)</b>        |  | 2 mg/m <sup>3</sup>  | 2 mg/m <sup>3</sup>                       | 100 mg/m <sup>3</sup> |
| <b>Zinc oxide (1314-13-2)</b> | 5 mg/m <sup>3</sup> (fume)<br>15 mg/m <sup>3</sup> (total dust)<br>5 mg/m <sup>3</sup> (respirable fraction) | 5 mg/m <sup>3</sup> (dust and fume)  | 2 mg/m <sup>3</sup> (respirable fraction) | 500 mg/m <sup>3</sup> |
| <b>Zirconium (7440-67-7)</b>  |  | 5 mg/m <sup>3</sup>  | 5 mg/m <sup>3</sup>                       | 50 mg/m <sup>3</sup>  |

## 8.2. Exposure Controls

**Appropriate Engineering Controls:** Use local exhaust or general dilution ventilation or other suppression methods to maintain dust levels below exposure limits. Power equipment should be equipped with proper dust collection devices. Ensure all national/local regulations are observed.

**Personal Protective Equipment:** Protective clothing. Gloves. Safety glasses. Dust formation: dust mask. Insufficient ventilation: wear respiratory protection.



**Materials for Protective Clothing:** Chemically resistant materials and fabrics. With molten material wear thermally protective clothing.

**Hand Protection:** Wear chemically resistant protective gloves. If material is hot, wear thermally resistant protective gloves.

**Eye Protection:** Chemical goggles or safety glasses.

**Skin and Body Protection:** Wear suitable protective clothing. Wash contaminated clothing before reuse.

**Respiratory Protection:** Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on Basic Physical and Chemical Properties

|                           |                       |
|---------------------------|-----------------------|
| Physical State            | : Solid               |
| Appearance                | : Metallic            |
| Odor                      | : Odorless            |
| Odor Threshold            | : Not available       |
| pH                        | : Not available       |
| Evaporation Rate          | : Not available       |
| Melting Point             | : x - x °F (x - x °C) |
| Freezing Point            | : Not available       |
| Boiling Point             | : Not available       |
| Flash Point               | : Not applicable      |
| Auto-ignition Temperature | : Not available       |
| Decomposition Temperature | : Not available       |

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|  |   |
|--|---|
| <b>Flammability (solid, gas)</b>                         | : Not available   |
| <b>Lower Flammable Limit</b>                             | : Not available   |
| <b>Upper Flammable Limit</b>                             | : Not available   |
| <b>Vapor Pressure</b>                                    | : Not available   |
| <b>Relative Vapor Density at 20 °C</b>                   | : Not available   |
| <b>Relative Density</b>                                  | : Not available   |
| <b>Specific Gravity</b>                                  | : x - x   |
| <b>Solubility</b>  | : Insoluble in water  |
| <b>Partition Coefficient: N-octanol/water</b>            | : Not available   |
| <b>Viscosity</b>   | : Not available   |
| <b>Explosion Data – Sensitivity to Mechanical Impact</b> | : Not expected to present an explosion hazard due to mechanical impact. |
| <b>Explosion Data – Sensitivity to Static Discharge</b>  | : Not expected to present an explosion hazard due to static discharge.  |

## SECTION 10: STABILITY AND REACTIVITY

- 10.1. Reactivity:** Hazardous reactions will not occur under normal conditions.
- 10.2. Chemical Stability:** Stable under recommended handling and storage conditions (see section 7).
- 10.3. Possibility of Hazardous Reactions:** Hazardous polymerization will not occur.
- 10.4. Conditions to Avoid:** Avoid creating or spreading dust. Sparks, heat, open flame and other sources of ignition.
- 10.5. Incompatible Materials:** When molten: water. Strong acids, strong bases, strong oxidizers. Alkalis. Metal oxides. Moisture. Corrosive substances in contact with metals may produce flammable hydrogen gas.
- 10.6. Hazardous Decomposition Products:** Oxides of iron and carbon. Organic acid vapors. Oxides of lead. Chromium (VI) compounds.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1. Information on Toxicological Effects - Product

**Acute Toxicity:** Not classified.

**LD50 and LC50 Data:** Not available

**Skin Corrosion/Irritation:** Not classified **Serious Eye Damage/Irritation:** Not classified

**Respiratory or Skin Sensitization:** Not classified. Not classified.

**Germ Cell Mutagenicity:** Not classified.

**Teratogenicity:** Not classified.

**Carcinogenicity:** Not classified.

**Specific Target Organ Toxicity (Repeated Exposure):** Not classified.

**Reproductive Toxicity:** Not classified.

**Specific Target Organ Toxicity (Single Exposure):** Not classified

**Aspiration Hazard:** Not classified

**Symptoms/Injuries After Inhalation:** Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

**Symptoms/Injuries After Skin Contact:** May cause an allergic skin reaction. Dust from physical alteration of this product causes skin irritation. Causes severe skin burns. Contact with fumes or metal powder will irritate skin. Contact with hot, molten metal will cause thermal burns. Dust may cause irritation in skin folds or by contact in combination with tight clothing. Mechanical damage via flying particles and chipped slag is possible.

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**Symptoms/Injuries After Eye Contact:** Dust may cause mechanical irritation to eyes, nose, throat, and lungs.

**Symptoms/Injuries After Ingestion:** Ingestion is likely to be harmful or have adverse effects.

**Chronic Symptoms:** In massive form, no hazard exists. If physically altered to present slivers, ribbons, dusts or fumes from molten material:

Aluminum: Inhalation of finely divided aluminum powder may cause pulmonary fibrosis.

Antimony: Overexposure can cause Nausea, Vomiting, Headache, Dizziness

Beryllium: Over time inhalation of dust and fumes from this product in certain individuals may cause Chronic Beryllium Disease. This causes allergic reactions in sensitized individuals in the lungs, possibly resulting in pulmonary fibrosis, and can even be fatal. Beryllium is a known carcinogen. Take appropriate precautions for workers exposure to Beryllium compounds, avoid breathing dust, and fumes from this product.

Copper: Overexposure to fumes may cause metal fume fever (chills, muscle aches, nausea, fever, dry throat, cough, weakness, lassitude); metallic or sweet taste; discoloration of skin and hair. Tissue damage of mucous membranes may follow chronic dust exposure.

Iron Oxide: Inhalation of iron oxide fumes undergoing decomposition may cause irritation and flu-like symptoms, otherwise iron oxide is not hazardous.

Lead: Exposure can result in lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; encephalopathy; kidney disease; hypertension. May cause genetic defects. May damage fertility. May damage the unborn child.

Lithium: Large doses of lithium ion have caused dizziness and prostration, and can cause kidney damage if sodium intake is limited. Dehydration, weight loss, dermatological effects, and thyroid disturbances have been reported. Central nervous system effects that include slurred speech, blurred vision, sensory loss, ataxia, and convulsions may occur. Diarrhea, vomiting, and neuromuscular effects such as tremor, clonus, and hyperactive reflexes may occur as a result of repeated exposure to lithium ion., Cough, Shortness of breath, Headache, Nausea

Manganese : Chronic exposure can cause inflammation of the lung tissue, scarring the lungs (pulmonary fibrosis).

Nickel: Inhalation of Nickel compounds has been shown in studies to provide an increased incidence of cancer of the nasal cavity, lung and possibly larynx in nickel refinery workers. May cause a form of dermatitis known as nickel itch and intestinal irritation, which may cause disorders, convulsions and asphyxia.

Silicon : Can cause chronic bronchitis and narrowing of the airways.

Tin: Has been shown to increase incidence of sarcoma in animal tests. Chronic exposure to tin dusts and fume may result in "stannosis", a mild form of pneumoconiosis.

Silver: May cause argyria (a slate-gray or bluish discoloration of the skin and deep tissues due to the deposit of insoluble albuminate of silver).

Zinc: Prolonged exposure to high concentrations of zinc fumes may cause "zinc shakes", an involuntary twitching of the muscles. Otherwise, zinc is non-toxic.

## 11.2. Information on Toxicological Effects - Ingredient(s)

### LD50 and LC50 Data:

|                        | LD50 Oral Rat      | LD50 Inhalation Rat                  | ATE - US   | IARC | NTP Status                                    |
|------------------------|--------------------|--------------------------------------|--|------|---|
| Arsenic (7440-38-2)    | 15 mg/kg           |                                      | Dust, Mist - 0.50 mg/l/4h                                    | 1    | Known Human Carcinogens                       |
| Beryllium (7440-41-7)  |                    |                                      | Dust, Mist - 0.05 mg/l/4h                                    | 1    | Known Human Carcinogens                       |
| Bismuth(7440-69-9)     | > 5000 mg/kg       |                                      |  |      |   |
| Cadmium (7440-43-9)    | 1140 mg/kg         | 25 mg/m <sup>3</sup> (Exp time: ½ h) | Vapors - 25.00 mg/l/4h<br>Dust, Mist - 0.05 mg/l/4h          | 1    | Known Human Carcinogens                       |
| Cobalt (7440-48-4)     | 215.9 - 1140 mg/kg | > 10 mg/l (Exp time: 1 h)            | Dust, Mist - 0.01 mg/l/4h                                    | 2B   |   |
| Iron oxide (1309-37-1) | > 10000 mg/kg      |                                      |  | 3    |   |
| Lead (7439-92-1)       |                    |                                      | Oral - 500.00 mg/kg body weight<br>Dust, Mist - 1.50 mg/l/4h | 2A   | Reasonably anticipated to be Human Carcinogen |

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|                        |              |              |  |    |   |
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| Manganese (7439-96-5)  | > 2000 mg/kg |              |  |    |   |
| Nickel (7440-02-0)     | > 9000 mg/kg |              |  | 2B | Reasonably anticipated to be Human Carcinogen |
| Silver(7440-22-4)      | > 5000 mg/kg |              |  |    |   |
| Tin (7440-31-5)        | 700 mg/kg    |              |  |    |   |
| Zinc oxide (1314-13-2) | > 5000 mg/kg | > 2000 mg/kg |  |    |   |

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1. Toxicity No additional information available

|                                |   |  |
|--------------------------------|---|--|
| <b>Antimony (7440-36-0)</b>    |   |  |
| LC50 Fish 1                    | 6.2 - 8.3 mg/l (Exposure Time 96 h – Species: Cyprinodon variegatus)                                    |  |
| <b>Cadmium (7440-43-9)</b>     |   |  |
| LC50 Fish 1                    | 0.003 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])                          |  |
| EC50 Daphnia 1                 | 0.0244 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])                                     |  |
| LC 50 Fish 2                   | 0.006 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static])                                |  |
| <b>Cobalt (7440-48-4)</b>      |   |  |
| LC50 Fish 1                    | 100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])                                    |  |
| <b>Copper (7440-50-8)</b>      |   |  |
| LC50 Fish 1                    | <= 0.0068 (0.0068 - 0.0156) mg/l (Exposure time: 96 h - Species: Pimephales promelas)                   |  |
| EC50 Daphnia 1                 | 0.03 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])                                       |  |
| EC50 Other Aquatic Organisms 1 | 0.0426 (0.0426 - 0.0535) mg/l (Exposure time: 72 h - Species: Pseudokirchneriella subcapitata [static]) |  |
| LC 50 Fish 2                   | 0.3 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])                                  |  |
| EC50 Other Aquatic Organisms 2 | 0.031 (0.031 - 0.054) mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata [static])    |  |
| <b>Lead (7439-92-1)</b>        |   |  |
| LC50 Fish 1                    | 0.44 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])                                |  |
| EC50 Daphnia 1                 | 600 µg/l (Exposure time: 48 h - Species: water flea)  |  |
| LC 50 Fish 2                   | 1.17 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])                           |  |
| <b>Manganese (7439-96-5)</b>   |   |  |
| NOEC chronic fish              | 3.6 mg/l (Exposure time: 96h; Species: Oncorhynchus mykiss)   |  |
| <b>Nickel (7440-02-0)</b>      |   |  |
| LC50 Fish 1                    | 100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio)   |  |
| EC50 Daphnia 1                 | 13 (13 - 200) µg/l (Exposure time: 48h - Species: Ceriodaphnia dubia [static])                          |  |
| LC 50 Fish 2                   | 1.3 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])                                 |  |
| EC50 Daphnia 2                 | 1 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])  |  |
| EC50 Other Aquatic Organisms 2 | 0.174 (0.174 - 0.311) mg/l (Exposure time: 96 h - Species: Pseudokirchneriella subcapitata [static])    |  |
| <b>Zinc oxide (1314-13-2)</b>  |   |  |
| LC50 Fish 1                    | 780 µg/l (Exposure time: 96 h - Species: Pimephales promelas)   |  |
| EC50 Daphnia 1                 | 0.122 mg/l  |  |
| NOEC chronic fish              | 0.026 mg/l (Species: Jordanella floridae)   |  |

**Persistence and Degradability** - Not readily biodegradable.

12.3. Bioaccumulative Potential N/A

12.4. Mobility in Soil Not available

12.5. Other Adverse Effects



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**Other Information:** Avoid release to the environment.

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

**Waste Treatment Methods:** Recycle product or dispose properly.

**Waste Disposal Recommendations:** Dispose of waste material in accordance with all local, regional, national, and international regulations.

## SECTION 14: TRANSPORT INFORMATION

**14.1. In Accordance with DOT** Not regulated for transport

**14.2. In Accordance with IMDG** Not regulated for transport

**14.3. In Accordance with IATA** Not regulated for transport

**14.4. In Accordance with TDG** Not regulated for transport

## SECTION 15: REGULATORY INFORMATION

|                                   | RTK - MA | RTK - NJ | RTK - PA                | SARA 313 –<br>Emission Reporting | Listed on TSCA<br>Inventory |
|-----------------------------------|----------|----------|-------------------------|----------------------------------|-----------------------------|
| <b>Aluminum<br/>(7429-90-5)</b>   | Yes      | Yes      | Environmental<br>Hazard | 1.0%                             | Yes                         |
| <b>Antimony<br/>(7440-36-0)</b>   | Yes      | Yes      | Yes                     | N/A                              | Yes                         |
| <b>Arsenic<br/>(7440-38-2)</b>    | Yes      | Yes      | Special Hazard          | 0.1%                             | Yes                         |
| <b>Beryllium<br/>(7440-41-7)</b>  | Yes      | Yes      | Special Hazard          | 0.1%                             | Yes                         |
| <b>Cadmium<br/>(7440-43-9)</b>    | Yes      | Yes      | Special Hazard          | 0.1%                             | Yes                         |
| <b>Cobalt<br/>(7440-48-4)</b>     | Yes      | Yes      | Environmental<br>Hazard | 0.1%                             | Yes                         |
| <b>Copper<br/>(7440-50-8)</b>     | Yes      | Yes      | Environmental<br>Hazard | 1.0%                             | Yes                         |
| <b>Iron oxide<br/>(1309-37-1)</b> | Yes      | Yes      | Yes                     | N/A                              | Yes                         |
| <b>Lead<br/>(7439-92-1)</b>       | Yes      | Yes      | Special Hazard          | 0.1%                             | Yes                         |
| <b>Lithium<br/>(7439-93-2)</b>    | Yes      | Yes      | Yes                     | N/A                              | Yes                         |
| <b>Magnesium<br/>(7439-95-4)</b>  | Yes      | Yes      | Yes                     | N/A                              | Yes                         |
| <b>Manganese (7439-96-5)</b>      | Yes      | Yes      | Environmental<br>Hazard | 1.0%                             | Yes                         |
| <b>Nickel<br/>(7440-02-0)</b>     | Yes      | Yes      | Special Hazard          | 0.1%                             | Yes                         |
| <b>Silicon</b>                    | Yes      | Yes      | Yes                     | N/A                              | Yes                         |

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|                               |     |     |                      |     |     |
|-------------------------------|-----|-----|----------------------|-----|-----|
| <b>(7440-21-3)</b>            |     |     |                      |     |     |
| <b>Silver (7440-22-4)</b>     | Yes | Yes | Yes                  | N/A | Yes |
| <b>Tin (7440-31-5)</b>        | Yes | Yes | Yes                  | N/A | Yes |
| <b>Titanium (7440-32-6)</b>   |     | Yes | Yes                  | N/A | Yes |
| <b>Zinc oxide (1314-13-2)</b> | Yes | Yes | Environmental Hazard | N/A | Yes |
| <b>Zirconium (7440-67-7)</b>  | Yes | Yes | Yes                  | N/A | Yes |

| Prop 65 Info                 | Carcinogen | Developmental | Reproductive - Female | Reproductive - Male |
|------------------------------|------------|---------------|-----------------------|---------------------|
| <b>Beryllium (7440-41-7)</b> | X          |               |                       |                     |
| <b>Cadmium (7440-43-9)</b>   | X          | X             |                       | X                   |
| <b>Cobalt (7440-48-4)</b>    | X          |               |                       |                     |
| <b>Lead (7439-92-1)</b>      | X          | X             | X                     | X                   |
| <b>Nickel (7440-02-0)</b>    | X          |               |                       |                     |

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

## SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

**Revision Date** : 09/20/2016

**Other Information** : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200. **GHS Full Text Phrases:**

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|  |  |                |   |
|--|--|----------------|---|
| Acute Tox. 1<br>(Inhalation:dust,mist) | Acute toxicity (inhalation:dust,mist) Category 1                 | STOT RE 1      | Specific target organ toxicity (repeated exposure) Category 1                       |
| Acute Tox. 2<br>(Inhalation)           | Acute toxicity (inhalation) Category 2                           | STOT RE 2      | Specific target organ toxicity (repeated exposure) Category 2                       |
| Acute Tox. 2<br>(Inhalation:dust,mist) | Acute toxicity (inhalation:dust,mist) Category 2                 | Water-react. 2 | Substances and mixtures which in contact with water emit flammable gases Category 2 |
| Acute Tox. 2 (Oral)                    | Acute toxicity (oral) Category 2                                 | H228           | Flammable solid - May form combustible dust concentrations in air                   |
| Acute Tox. 3<br>(Inhalation:dust,mist) | Acute toxicity (inhalation:dust,mist) Category 3                 | H261           | In contact with water releases flammable gases                                      |
| Acute Tox. 3<br>(Inhalation:gas)       | Acute toxicity (inhalation:gas) Category 3                       | H280           | Contains gas under pressure; may explode if heated                                  |
| Acute Tox. 4<br>(Inhalation:dust,mist) | Acute toxicity (inhalation:dust,mist) Category 4                 | H300           | Fatal if swallowed  |
| Acute Tox. 4 (Oral)                    | Acute toxicity (oral) Category 4                                 | H302           | Harmful if swallowed  |
| Aquatic Acute 1                        | Hazardous to the aquatic environment - Acute Hazard Category 1   | H314           | Causes severe skin burns and eye damage   |
| Aquatic Acute 3                        | Hazardous to the aquatic environment - Acute Hazard Category 3   | H317           | May cause an allergic skin reaction   |
| Aquatic Chronic 1                      | Hazardous to the aquatic environment - Chronic Hazard Category 1 | H318           | Causes serious eye damage   |
| Aquatic Chronic 3                      | Hazardous to the aquatic environment - Chronic Hazard Category 3 | H319           | Causes serious eye irritation   |
| Carc. 1A                               | Carcinogenicity Category 1A                                      | H330           | Fatal if inhaled  |
| Carc. 1B                               | Carcinogenicity Category 1B                                      | H331           | Toxic if inhaled  |
| Carc. 2                                | Carcinogenicity Category 2                                       | H332           | Harmful if inhaled  |
| Comb. Dust                             | Combustible Dust   | H334           | May cause allergy or asthma symptoms or breathing difficulties if inhaled           |
| Compressed gas                         | Gases under pressure Compressed gas                              | H340           | May cause genetic defects   |
| Eye Dam. 1                             | Serious eye damage/eye irritation Category 1                     | H341           | Suspected of causing genetic defects  |
| Eye Irrit. 2A                          | Serious eye damage/eye irritation Category 2A                    | H350           | May cause cancer  |
| Flam. Sol. 1                           | Flammable solids Category 1                                      | H351           | Suspected of causing cancer   |
| Muta. 1B                               | Germ cell mutagenicity Category 1B                               | H360           | May damage fertility or the unborn child  |
| Muta. 2                                | Germ cell mutagenicity Category 2                                | H361           | Suspected of damaging fertility or the unborn child                                 |
| Repr. 1A                               | Reproductive toxicity Category 1A                                | H372           | Causes damage to organs through prolonged or repeated exposure                      |
| Repr. 2                                | Reproductive toxicity Category 2                                 | H373           | May cause damage to organs through prolonged or repeated exposure                   |
| Resp. Sens. 1B                         | Respiratory sensitisation Category 1B                            | H400           | Very toxic to aquatic life  |
| Skin Corr. 1B                          | Skin corrosion/irritation Category 1B                            | H402           | Harmful to aquatic life   |
| Skin Sens. 1                           | Skin sensitization Category 1                                    | H410           | Very toxic to aquatic life with long lasting effects                                |
|  |  | H412           | Harmful to aquatic life with long lasting effects                                   |

#### Party Responsible for the Preparation of This Document

Stanford Advanced Materials

Address : 23661 Birtcher Dr.,

Lake Forest, CA 92630 U.S.A.

Tel: (949) 407-8904

Fax: (949) 812-6690

*This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.*