Copper Clad Steel Material Safety Data Sheet

1 Product and Company Identification

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Copper Clad Steel, Bare or Plated with Silver or Nickel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Name</td>
<td>Bimetallic Wire</td>
</tr>
<tr>
<td>Synonyms</td>
<td>Copper Coated Steel, Plated Copper Clad Steel</td>
</tr>
<tr>
<td>Chemical Family</td>
<td>Copper and Steel</td>
</tr>
<tr>
<td>Formula</td>
<td>Not applicable - mixture</td>
</tr>
<tr>
<td>Product Use</td>
<td>Metallurgical Products</td>
</tr>
<tr>
<td>Company Address</td>
<td>Fisk Alloy</td>
</tr>
<tr>
<td></td>
<td>PO Box 26</td>
</tr>
<tr>
<td></td>
<td>10 Thomas Road</td>
</tr>
<tr>
<td></td>
<td>Hawthorne, NJ 07507, USA</td>
</tr>
<tr>
<td>MSDS Issue Date</td>
<td>1/5/2010</td>
</tr>
<tr>
<td>Technical Information</td>
<td>Call Fisk Alloy at: 973 427 7550</td>
</tr>
<tr>
<td></td>
<td>fiskalloy.com</td>
</tr>
</tbody>
</table>
2 Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>CAS NUMBER</th>
<th>COMPONENTS</th>
<th>WEIGHT %</th>
<th>EINECS/ELINCS</th>
<th>EU CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-50-8</td>
<td>Copper</td>
<td>30 – 40</td>
<td>231-159-6</td>
<td>None</td>
</tr>
<tr>
<td>7440-89-6</td>
<td>Iron</td>
<td>51 – 61</td>
<td>231-096-4</td>
<td>None</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>Nickel</td>
<td>0 – 10</td>
<td>231-111-4</td>
<td>Xn</td>
</tr>
<tr>
<td>7440-22-4</td>
<td>Silver</td>
<td>0 – 10</td>
<td>231-131-3</td>
<td>None</td>
</tr>
</tbody>
</table>

OSHA Regulatory Status
In solid form this material is not hazardous. Dust or fume is classified as carcinogen, irritant, lung and respiratory system toxicant, neurotoxicant, sensitizer.

3 Hazards Identification

**WARNING!**

EXPOSURE TO DUST OR FUMES CAN CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION. EXPOSURE TO DUST OR FUMES CAN CAUSE RESPIRATORY SYSTEM DAMAGE. CONTAINS A MATERIAL WHICH MAY CAUSE BLOOD, KIDNEY, REPRODUCTIVE AND NEUROLOGICAL EFFECTS. MAY CAUSE AN ALLERGIC SKIN AND/OR RESPIRATORY REACTION. CONTAINS MATERIALS WHICH MAY CAUSE CANCER. USE ONLY WITH ADEQUATE VENTILATION. AVOID CONTACT WITH EYES, SKIN AND CLOTHING. WASH THOROUGHLY AFTER HANDLING.

**Hazard Ratings for Dust or Fume**

Hazardous Materials Identification System (HMIS):
- Health: 2*
- Flammability: 0
- Physical Hazard: None

National Fire Protection Association (NFPA):
Mixture. Not Rated.

**Human Threshold Response Data**

Odor Threshold: Unknown
Irritation Threshold: Unknown
Immediately Dangerous to Life or Health (IDLH) values: The IDLH for this product is not known. The IDLH for copper is 100 mg/m³. The IDLH for nickel and silver is 10 mg/m³.

**Potential Acute Health Effects**

Eye: Dust or fume can cause irritation consisting of redness, swelling, and pain. May cause conjunctivitis with repeated exposures.
Skin: Material not expected to be absorbed through the skin. Contact with dust may cause mild irritation consisting of redness and/or swelling.

Inhalation: Harmful if inhaled. Inhalation of high concentrations of powder, dust, or fume may cause severe respiratory and nasal irritation, coughing, and difficulty breathing. Inhalation of high concentrations of metallic copper dusts or fumes may cause nasal irritation and/or nausea, vomiting and stomach pain. The metal fume may also produce influenza-like symptoms, known as metal fume fever. Symptoms of this reaction may include metallic taste, runny nose, nausea, fever and chills. These effects usually disappear within 24 hours, but may be delayed in onset.

Ingestion: Ingestion of large amounts of dust may cause nausea, diarrhea and or stomach pain.

Potential Chronic Health Effects
Prolonged or repeated skin contact with dust may cause more severe irritation or dermatitis. Prolonged or repeated inhalation of dust or fume may cause more severe irritation and possibly lung damage. Chronic exposure to dust or fume may also lead to the development of permanent, severe, obstructive or fibrotic lung disease characterized by coughing, wheezing, and shortness of breath. Repeated exposure may cause an allergic skin reaction consisting of itching, redness, swelling, and rash or urticaria (hives) in sensitized individuals. Prolonged or repeated inhalation of dust or fume may cause an allergic type of asthma reaction characterized by wheezing, coughing, and extreme breathing difficulty in sensitized individuals. Epidemiological studies in humans have shown an association between lung and nasal cancers and prolonged occupational exposure to high concentrations of nickel. Long-term exposure to silver at high concentrations can produce a condition called argyria, which is a bluish-gray pigmentation of the skin and other body tissues. This effect is not known to be associated with any toxic effects.

Medical Conditions Aggravated by Exposure
Exposure to dust or fume may aggravate an existing dermatitis, blood condition, asthma, emphysema, or other respiratory disease.

Potential Environmental Effects
None known. Product has not been tested for environmental properties.

4 First Aid Measures

Eye Contact
Immediately flush out fume and dust particles with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If eye irritation develops, call a physician at once.
**Skin Contact**

If exposed to dust or fumes, wash skin with plenty of water. Remove contaminated clothing and shoes and launder before reuse. If skin irritation or rash develops and persists or recurs, get medical attention.

**Inhalation**

If symptoms of lung irritation occur (coughing, wheezing or breathing difficulty), remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep affected person warm and at rest. Get medical attention.

**Ingestion**

Not a likely route of exposure for finished metal alloy. If dust is ingested, immediately drink water to dilute. Consult a physician if symptoms develop.

**Note to Physicians**

There is no specific antidote to the active ingredients in this product; use symptomatic treatment.

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**5 Fire Fighting Measures**

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosive</td>
<td>No</td>
</tr>
<tr>
<td>Flammable</td>
<td>No</td>
</tr>
<tr>
<td>Combustible</td>
<td>No</td>
</tr>
<tr>
<td>Pyrophoric</td>
<td>No</td>
</tr>
<tr>
<td>Flash Point (°C)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Burning Rate of Meltal</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Lower Explosive Limit</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Upper Explosive Limit</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Flammability Classification (Defined by 29 CFR 1910.1200)</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

*Unusual Fire and Explosion Hazards*

Dust may cause an ignitable and/or an explosive atmosphere.

*Extinguishing Media*

For localized powder fires, smother with dry sand, dry dolomite, sodium chloride or soda ash. Use fire-extinguishing media appropriate to fight surrounding fire.
Special Fire Fighting Procedures
None required.

6 Accidental Release Measures

In dust form, this product may be an explosion hazard. Remove all sources of ignition. Dust or fume may be suppressed by the use of a local exhaust system. Dispose of per guidelines under Section 13, WASTE DISPOSAL.

7 Handling and Storage

Handling
Avoid dispersion of dust in air.

Storage
No special requirements.

Shelf Life Limitations: None known.
Incompatible Materials for Packaging: None known.
Incompatible Materials for Storage or Transport: None known.

Other Precautions
Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or HEPA vacuuming.

8 Exposure Controls/Personal Protection

<table>
<thead>
<tr>
<th>CAS No</th>
<th>CHEMICAL NAME</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>INTERNATIONAL OELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-50-8</td>
<td>Copper</td>
<td>0.2 mg/m³ (fumes)</td>
<td>0.1 mg/m³ (fumes)</td>
<td>Austria, Belgium, Canada: 0.2 mg/m³ (fumes), 1 mg/m³ (dusts); Denmark: 1.0 mg/m³ (dusts and powders); Germany (MAK): 0.1 mg/m³ (fumes), 1 mg/m³ (dusts and mists)</td>
</tr>
<tr>
<td>7440-89-6</td>
<td>Iron</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
</tr>
</tbody>
</table>
Engineering Controls
Local exhaust ventilation is recommended if significant dusting occurs or fumes are generated. Otherwise, use general exhaust ventilation.

Eye/Face Protection
Use safety glasses.

Skin Protection
Wear impervious (cut-resistant) gloves and other protective clothing. If generating a dust, wash thoroughly after handling, especially before eating, drinking, or smoking.

Respiratory Protection
Respiratory protection not normally needed. If dusting occurs or fumes are generated above the PEL/TLV, use a NIOSH-approved half-face or full-face respirator equipped with High Efficiency Particulate (HEPA) filter cartridges.

General Hygiene Considerations
Do not eat, drink, or smoke while using this product in dust form.

9 Physical and Chemical Properties

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Red Metallic (silver metallic if plated)</td>
</tr>
<tr>
<td>Odor</td>
<td>None</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>Not Applicable - Mixture</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
</tr>
<tr>
<td>pH</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Solubility in Water (20 °C)</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
10 Stability and Reactivity

Stability
Stable under normal temperatures and pressure.

Conditions to Avoid
Avoid contact with carbon monoxide, particularly at temperatures between 50°C and 300°C, to prevent formation of nickel carbonyl which is toxic and a carcinogen.

Materials to Avoid
Acetylene, chlorine

Hazardous Decomposition Products
When heated to decomposition, may produce metal oxides and fumes. Inhalation of high concentrations of metal fumes may cause a condition known as “metal fume fever” which is characterized by flu-like symptoms.

Hazardous Polymerization
Will not occur.
11 Toxilogical Information

Potential Exposure Routes

For Dust: Ingestion, inhalation, and eye contact.
For Fumes: Inhalation and eye contact. The finished alloy metal is not hazardous.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>FOR PRODUCT</th>
<th>FOR COMPONENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>COPPER</td>
</tr>
<tr>
<td>Oral LD₅₀</td>
<td>Believed to be &gt; 5 g/kg</td>
<td>3.5 mg/kg (mouse, intra-peritoneal)</td>
</tr>
<tr>
<td>Dermal LD₅₀</td>
<td>Believed to be &gt; 2g/kg</td>
<td>375 mg/kg (rabbit, subcutaneous)</td>
</tr>
<tr>
<td>Inhalation LC₅₀</td>
<td>Believed to be slightly toxic</td>
<td>No data</td>
</tr>
<tr>
<td>Irritation</td>
<td>Eye and respiratory irritant, sensitizer</td>
<td>Respiratory irritant</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>No data</td>
<td></td>
</tr>
</tbody>
</table>

Subchronic/Chronic Toxicity

No information for product.

Carcinogenicity

In laboratory animal studies, chronic exposure to high concentrations of nickel has caused an increase in lung and nasal tumors. The International Agency for Research on Cancer (IARC) has classified nickel as possibly carcinogenic to humans, group 2B. The National Toxicology Program (NTP) classifies nickel as a known human carcinogen.

Mutagenicity

This product is not known or reported to be mutagenic. Nickel has been shown to be mutagenic in in vitro studies.

Reproductive, Teratogenicity or Developmental Effects

This product is not known or reported to cause reproductive or developmental effects. Exposure of male rats to high concentrations of nickel caused testicular degeneration. However, symptoms of systemic toxicity, including severe weight loss, were also observed at the same concentrations indicating that the testicular effects were secondary to the frank toxicity. Exposure at these levels is highly unlikely under normal working conditions.
Neurological Effects
This product is not known or reported to cause neurological effects.

Interactions With Other Chemicals That Enhance Toxicity
None known or reported.

12 Ecological Information

Ecotoxicity
No data is available on this product. Individual constituents are as follows:

Copper: The toxicity of copper to aquatic organisms varies significantly not only with the species, but also with the physical and chemical characteristics of the water, such as its temperature, hardness, turbidity and carbon dioxide content. Copper concentrations varying from 0.1 to 1.0 mg/l have been found by various investigators to be not toxic for most fish. However, concentrations of 0.015 to 3.0 mg/l have been reported as toxic, particularly in soft water to many kinds of fish, crustaceans, mollusks, insects, and plankton.

Nickel: 96 hr LC50, rainbow trout =31.7 mg/L; 96 hr LC50, fathead minnow = 3.1 mg/L; 72 hr EC50, freshwater algae (4 species): = 0.1 mg/L; 96 hr LC50, Daphnia = 0.51 mg/L

13 Disposal Considerations

If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D. Care must be taken to prevent environmental contamination from the use of this material. The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and non-hazardous wastes. This product may be a candidate for metal reclamation.

14 Transport Information

Shipping is not regulated for this product.
15 Regulatory Information

**US FEDERAL**

<table>
<thead>
<tr>
<th>TSCA</th>
<th>The components of this product are listed on the Toxic Substance Control Act inventory.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CERLA</td>
<td>Copper, R.Q. = 5000 lbs.; Nickel, R.Q. = 100 lbs.; Silver, R.Q. = 1000 lbs. No reporting is required if diameter of the pieces of metal is equal to or exceeds 100 micrometers (0.004 inches).</td>
</tr>
<tr>
<td>SARA 313</td>
<td>Copper, Nickel, Silver.</td>
</tr>
<tr>
<td>SARA 313 Hazard Class</td>
<td>Health: For dust or fume only</td>
</tr>
<tr>
<td>SARA 302 EHS List</td>
<td>None of the components of this product are listed.</td>
</tr>
</tbody>
</table>

* R.Q. = Reportable Quality.

**STATE RIGHT TO KNOW STATUS**

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CA PROP. 65</th>
<th>NEW JERSEY</th>
<th>PENNSYLVANIA</th>
<th>MASSACHUSETTS</th>
<th>MICHIGAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>Not listed</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Iron</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>Nickel</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Silver</td>
<td>Not listed</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**European Regulations**

If nickel plated at > 0.1%, this material is classified as Xn, Harmful. However, this material in its massive solid form is not required to be labeled under EC regulations. German WGK Classification: Unknown

**Canadian Regulations**

The components of this product are on the DSL or are exempt from reporting under the New Substances Notification Regulations.

IDL: Copper

WHMIS: This product is considered to be a manufactured article and therefore not subject to WHMIS requirements.

16 Other Information

This document is based on information obtained from Olin Brass, 427 North Shamrock St. East Alton, IL 62024-1197, MSDS No. B04. **EMERGENCY TELEPHONE NUMBER: 1-618-258-5167.** For additional information visit olinbrass.com
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