1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: ALUMINUM ALLOY
Chemical Name: Metal Alloy
Synonyms: Metallic Aluminum and Aluminum based Aluminum/Copper/Iron/Manganese/Zinc Alloy Formulations
Chemical Family: Mixture – Metal Alloy
Formula: Not applicable - mixture
Product Use: Metallurgical Products

COMPANY ADDRESS
SDS Control Group
Olin Brass
305 Lewis and Clark Blvd
East Alton, IL
62024-1197
www.olinbrass.com

2. HAZARD IDENTIFICATION

United States (US)
According to OSHA 29 CFR 1910.1200 HCS

Health hazards associated with this product only apply in a fume or dust form.

Classification of the substance or mixture (Fume or Dust)
OSHA HCS 2012

- Flammability - 0
- Health - 1
- Physical - 0

Label elements
OSHA HSC 2012

Hazard Statements

- Causes skin irritation - H315
- May cause respiratory irritation - H335

Precautionary statements

- Avoid breathing dust or fumes - P261
- Do not get in eyes, on skin, or on clothing - P262
- In case of inadequate ventilation wear respiratory protection - P285
Response

EYE CONTACT: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. – P305 + P351 + P338
If eye irritation develops, Get medical advice/attention – P313

SKIN CONTACT: Rinse skin with water/shower – P353
Take off contaminated clothing and wash before reuse – P362
If skin irritation or rash develops, get medical advice/attention – P363

INHALATION: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing – P340
Get medical advice/attention – P313

INGESTION: Not a likely route of exposure for finished metal alloy. If dust is ingested, immediately drink water to dilute.
Get medical advice/attention – P363

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

Other Hazards

OSHA HSC 2012

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Exposure to dust or fume may aggravate an existing dermatitis, asthma, emphysema, or other respiratory disease.

Canada
According to WHMIS

Classification of the substance or mixture
WHMIS
This product is considered to be a manufactured article and therefore not subject to WHMIS requirements.

Other Information
NFPA
Not rated

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Components</th>
<th>% By Weight</th>
<th>EINECS/ ELINCS #</th>
<th>EU Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Symbol</td>
</tr>
<tr>
<td>7440-50-8</td>
<td>Copper</td>
<td>0.1 - 4.7</td>
<td>231-159-6</td>
<td>None</td>
</tr>
<tr>
<td>7440-21-3</td>
<td>Silicon</td>
<td>1 - 13.5</td>
<td>231-130-8</td>
<td>None</td>
</tr>
<tr>
<td>7439-95-4</td>
<td>Magnesium</td>
<td>1 - 5</td>
<td>231-104-6</td>
<td>None</td>
</tr>
<tr>
<td>7439-96-5</td>
<td>Manganese</td>
<td>1 - 2</td>
<td>231-105-1</td>
<td>None</td>
</tr>
<tr>
<td>7439-89-6</td>
<td>Iron</td>
<td>0.1 - 1.3</td>
<td>231-096-4</td>
<td>None</td>
</tr>
<tr>
<td>7429-90-5</td>
<td>Aluminum</td>
<td>81 - 99</td>
<td>231-072-3</td>
<td>None</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>Nickel</td>
<td>1 - 5</td>
<td>231-111-4</td>
<td>Xn</td>
</tr>
</tbody>
</table>

OSHA REGULATORY STATUS: In solid form, not hazardous. Dust or fume: carcinogen, irritant, neurotoxin, sensitizer

In solid form, this material is not hazardous. Dust and fumes are hazardous materials.
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.

5. FIRE FIGHTING MEASURES

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>VALUE</th>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explosive</td>
<td>No</td>
<td>Flammable</td>
<td>No</td>
</tr>
<tr>
<td>Combustible</td>
<td>No</td>
<td>Pyrophoric</td>
<td>No</td>
</tr>
<tr>
<td>Flash Point (°C):</td>
<td>Not applicable</td>
<td>Burning Rate of Material:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Lower Explosive Limit:</td>
<td>applicable</td>
<td>Autoignition Temp.:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper Explosive Limit:</td>
<td>applicable</td>
<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

SPECIAL FIREFIGHTING PROCEDURES: None required.
6. ACCIDENTAL RELEASE MEASURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL (618) 258-5167. In dust form, this product may be an explosion hazard. Remove all sources of ignition. Dust of 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 #</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 (fume), 1 mg/m³ (dusts and mists)</td>
<td>0.1 mg/m³ (fume) 1 mg/m³ (dusts and mists)</td>
<td>Austria, Belgium, Canada: 0.2 mg/m³ (fumes), 1 mg/m³ (dusts) Denmark: 1.0 mg/m³ (dust and powder) Germany (MAK): 0.1 mg/m³ (fume), 1 mg/m³ (dusts and mists)</td>
</tr>
<tr>
<td>7439-96-5</td>
<td>Manganese</td>
<td>0.2 mg/m³</td>
<td>Ceiling - 5 mg/m³</td>
<td>Belgium, Denmark, Finland, France, Switzerland, U.K. - 1 mg/m³ Sweden - 2.5 mg/m³ Germany (MAK) - 0.5 mg/m³</td>
</tr>
<tr>
<td>7440-02-0</td>
<td>Nickel</td>
<td>1.5 mg/m³ (inhalable)</td>
<td>1 mg/m³</td>
<td>Germany, MAK = 1 mg/m³ Canada (B.C.), Czechoslovakia, Denmark, Norway - 0.05 mg/m³, Kl, sensitizer Poland = 0.25 mg/m³ Ireland, Sweden, Switzerland, U.K. = 0.5 mg/m³ Belgium, Canada (Alberta &amp; others), Finland, Japan, Mexico, Netherlands - 1 mg/m³ Portugal = 1.5 mg/m³</td>
</tr>
<tr>
<td>7439-95-4</td>
<td>Magnesium</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
</tr>
<tr>
<td>7439-89-6</td>
<td>Iron</td>
<td>None established</td>
<td>None established</td>
<td>None established</td>
</tr>
<tr>
<td>7440-21-3</td>
<td>Silicon*</td>
<td>10 mg/m³</td>
<td>15 mg/m³</td>
<td>Belgium, Denmark, France, Netherlands, U.K. - 10 mg/m³ Switzerland - 4 mg/m³</td>
</tr>
<tr>
<td>7429-90-5</td>
<td>Aluminum*</td>
<td>10 mg/m³</td>
<td>15 mg/m³</td>
<td>Belgium, France, Hungary, Sweden - 5 mg/m³ (resp. dust) Germany, Switzerland - 6 mg/m³ Denmark, Netherlands, U.K. - 10</td>
</tr>
</tbody>
</table>

*This substance is regulated by OSHA as a Particulate Not Otherwise Regulated (PNOR). The exposure limits listed for both OSHA and ACGIH refer to total dust; the OSHA PEL for the respirable fraction is 5 mg/m³.

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 (aprons, coveralls) as appropriate to prevent skin contact when using this product. 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>
<th>PROPERTY</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Gray to silver</td>
<td>Vapor Density (air = 1):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Odor</td>
<td>None</td>
<td>Boiling Point (°F):</td>
<td>No data</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>Not applicable -</td>
<td>Melting point:</td>
<td>482 - 642°C (900 - 1200°F)</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
<td>Specific gravity (g/cc):</td>
<td>&gt; 3</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
<td>Bulk Density</td>
<td>&gt; 3 g/cc</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg):</td>
<td>Not applicable</td>
<td>Viscosity (cps):</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not applicable</td>
<td>Decomposition</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Solubility in Water (20 °C):</td>
<td>Negligible</td>
<td>Temperature:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Volatiles, Percent by volume:</td>
<td>Not applicable</td>
<td>Octanol/water partition coefficient:</td>
<td>Unknown</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: For finely divided aluminum:
- Water – water/aluminum mixtures may be hazardous when confined due to hydrogen generation.
- Halogenated hydrocarbons can react violently with finely divided

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. TOXICOLOGICAL INFORMATION

POTENTIAL EXPOSURE ROUTES: For dust: ingestion, inhalation, and eye contact. For fume: inhalation and eye contact. The finished alloy metal is not hazardous.

ACUTE ANIMAL TOXICITY DATA:

<table>
<thead>
<tr>
<th>For Product:</th>
<th>For Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Copper</td>
</tr>
<tr>
<td>Oral LD₅₀</td>
<td>Believed to be &gt; 5 g/kg</td>
</tr>
<tr>
<td>Dermal LD₅₀</td>
<td>Believed to be &gt; 2 g/kg</td>
</tr>
</tbody>
</table>
### 6. ECOLOGICAL INFORMATION

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Toxicity Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>96 hr LC$<em>{50}$, rainbow trout =31.7 mg/L; 96 hr LC$</em>{50}$, fathead minnow = 3.1 mg/L; 72 hr EC$<em>{50}$, freshwater algae (4 species): = 0.1 mg/L; 96 hr LC$</em>{50}$, Daphnia = 0. 51 mg/L</td>
</tr>
<tr>
<td>Nickel</td>
<td>96 hr LC$<em>{50}$, rainbow trout =31.7 mg/L; 96 hr LC$</em>{50}$, fathead minnow = 3.1 mg/L; 72 hr EC$<em>{50}$, freshwater algae (4 species): = 0.1 mg/L; 96 hr LC$</em>{50}$, Daphnia = 0. 51 mg/L</td>
</tr>
</tbody>
</table>

**MOBILITY:** No data

**PERSISTENCE/DEGRADABILITY:** Not data

**BIOACCUMULATION:** No data.

### 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

PROPER SHIPPING NAME: Not regulated
HAZARD CLASS: Not regulated
UN NO.: Not regulated
PACKING GROUP: Not regulated
LABEL: Not regulated
REPORTABLE QUANTITY: Not regulated

15. REGULATORY INFORMATION

US FEDERAL

TSCA
The components of this product are listed on the Toxic Substance Control Act inventory.

CERCLA: Copper, R.Q. = 5000 lbs.; Nickel, R.Q. = 100 lbs. (No reporting is required if diameter of the pieces of metal is equal to or exceeds 100 micrometers (0.004 inches).

SARA 313: Copper, Manganese, Aluminum (fume or dust), Nickel
SARA 313 Hazard Class: Health: For dust or fume only, Acute - Yes, Chronic - Yes, Fire: None, Reactivity: None, Release of Pressure: None

SARA 302 EHS List: None of the components of this product are listed.

*RQ = Reportable Quantity

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>Manganese</td>
<td>Not listed</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Not listed</td>
</tr>
<tr>
<td>Magnesium</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>Aluminum</td>
<td>Not listed</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Not listed</td>
</tr>
<tr>
<td>Silicon</td>
<td>Not listed</td>
<td>Not listed</td>
<td>X</td>
<td>X</td>
<td>Not listed</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>
</tbody>
</table>

* "WARNING: This product contains detectable amounts of a chemical(s) known to the State of California to cause cancer and/or birth defects or other reproductive harm."

EUROPEAN REGULATIONS
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

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

IDL: Copper, Manganese, and Nickel

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

16. OTHER INFORMATION

REVISED: Format revised 6/1/15
PREPARED BY: Olin Brass

NOTICE: THE INFORMATION IN THIS SDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. OLIN BRASS BELIEVES THIS INFORMATION TO BE RELIABLE AND CURRENT AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS. This document reviewed annually.