



**I – Identification of the Substance and of the Company**

**SUPPLIER:** RMO, Inc.  
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 Denver, CO 80204  
 303-592-8200

Emergency Information Chemtrec: 800-424-9300  
 Chemtrec International: 202-483-7616

**Trade Name and Synonyms –** Cadmium Free Silver Solder

**Description:** Rectangular, Bar Strip, and Wire Silver Solder

**Product Grade / Name:**  
**CADMIUM FREE SILVER BRAZING ALLOY**

**II – Composition / Information on Ingredients**

<u>Product name</u>	<u>AWS A5.8</u>	<u>AMS</u>	<u>AG</u>	<u>CU</u>	<u>ZN</u>	<u>NI</u>	<u>SN</u>	<u>MN</u>
Silver-Copper-Tin-Zinc Alloys	BAG-7	4763	56	22	17		5	

<u>Ingredient</u>	<u>CAS No.</u>	<u>%</u>
Copper	7440-50-8	4 - 41
Silver	7440-22-4	24 - 81
Tin	7440-31-5	1.5 - 26
Zinc	7440-66-6	1 - 35

**III – Hazards Identification**

Important: This section covers the materials from which the product is manufactured. The fumes and gases produced during brazing with normal use of this product are covered in Section X. Section I lists nominal composition of the brazing filler metals. The table below lists the exposure limits for hazardous decomposition products that may be present in fume generated during brazing. Actual exposure should be determined by monitoring fume in the operator's breathing zone.

<u>Ingredient</u>	<u>PEL mg/m<sup>3</sup></u>	<u>PEL mg/m<sup>3</sup></u>	<u>TIV mg/m<sup>3</sup></u>	<u>TIV mg/m<sup>3</sup></u>
Copper	1.0 (Dusts & Mists)	0.1 (Fume)	1.0 (Dusts & Mists)	0.2 (Fume)
Silver	0.01		0.1 (Metal)	
Tin	2.0 (as Sn)		2.0 (as Sn)	
Zinc	5.0 (as ZnO Fume)		2.0* (as ZnO)	10.0* (Stel)

\*Both as respirable fractions.

SARA Sections 313 Supplier Notification: Individual filler metals covered by this MSDS may contain the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CFR 372. Copper, Manganese, Nickel, Silver and Zinc. Refer to Section I of this MSDS for the filler metal name and the percent by weight, and the above table for the CAS number for each chemical.

One way to determine the composition and quantity of fumes and gases to which workers are

exposed is to take an air sample in the workers breathing zone. See ANSI/AWS F1.1 available from the American Welding Society, 550 Laguna Rd. Miami FL, 33126.

Primary Route of Exposure: Inhalation of fume.

**Pre-Existing Medical Conditions:** Individuals with impaired pulmonary functions or illness may have symptoms exacerbated by fume irritants.

**Possible Effects of Exposure:** Copper and Zinc fume may cause fume fever. Short term symptoms may include a metallic taste in the mouth, dryness of irritation of the throat, followed by coughing, shortness of breath, nausea, fever, body ache, and chills. Long-term exposure to brazing fume, gasses, or dust may contribute to pulmonary irritation or pneumoconiosis. Nickel should be considered a possible carcinogen per OSHA 29 CFR 1910.1200. Certain nickel compounds have been implicated based on experience in some nickel refining operations. The specific compounds, however, have not been determined and direct association between nickel in welding fume and cancer has not been demonstrated.

**Other Health Considerations:** Brazing alloys are frequently used with a fluoride type flux. If applicable, flux fume should be considered in evaluation of hazards.

Without Nickel –Carcinogenicity NTP No / IARC Monographs No / OSHA Regulated No

With Nickel – Carcinogenicity NTP Yes / IARC Monographs No / OSHA Regulated No

The State of California requires the following information for products containing Nickel.

**WARNING:** This product contains a chemical known to the State of California that may cause cancer.

**Primary Routes of Entry:** Ingestion; inhalation.

**Eye Hazards:** Eye contact with these products in finely-divided forms may cause irritation, conjunctivitis, ulceration of the cornea, and/or argyria, a permanent blue-gray discoloration of the eyes, skin, mucous membranes, and respiratory tract.

**Skin Hazards:** Skin contact with these products, particularly in finely-divided forms, may cause irritation, argyria, discoloration, and/or contact dermatitis.

**Ingestion Hazards:** Ingestion of these products in finely divided forms may cause nausea, vomiting, and gastrointestinal irritation.

**Inhalation Hazards:** Inhalation of the components of these products is not known to present a significant risk to health when used according to instructions and with appropriate protective measures (see Section 8). Inhalation of component elements has been reported to cause one or more of the following symptoms and effects upon excessively high or prolonged exposure:

**Copper:** Acute exposure may cause respiratory tract irritation, fever, muscle ache, chills, cough, weakness, and a metallic taste. Chronic exposure may damage the liver, kidney, spleen, pancreas, and brain (a benign pneumoconiosis), shortness of breath, and respiratory tract irritation.

**Silver:** Chronic exposure via inhalation may cause argyria.

**Tin:** Exposure to tin dust or fume by inhalation may cause stannosis (a benign pneumoconiosis), shortness of breath, and respiratory tract irritation.

**Zinc:** Acute exposure to zinc oxide may cause respiratory tract irritation and “metal fume fever”, which is characterized by a metallic taste, cough, dry throat, chills, fever, tightness of chest, headache, nausea, shortness of breath, vomiting, and fatigue.

#### IV – First Aid Measures

**Eye:** Flush affected area with water for at least fifteen minutes. Seek medical assistance if necessary.

**Skin:** Remove contaminated clothing. Wash affected area with large quantities of water for at least five minutes. Seek medical attention if necessary. Launder or dry-

clean clothing before reuse.

**Ingestion:** If subject is conscious, induce vomiting. If unconscious or convulsive, seek immediate medical assistance.

**Inhalation:** If signs and symptoms of toxicity are observed, remove subject from area, administer oxygen, and seek medical attention. Keep the subject warm and at rest. Perform artificial respiration if breathing has stopped.

**Note to Physician:** None of the components are acutely toxic in ingestion, not are they absorbed through the skin. Extensive or prolonged skin contact may cause dermatitis and / or argyria.

## V – Fire Fighting Measures

**Flash Point:** Not Applicable F, Not applicable C

**Autoignition Point:** Not Applicable F, Not applicable C

**Flammability Class:** Not Applicable

**Lower Explosive Limit:** Not Applicable

**Upper Explosive Limit:** Not Applicable

In finely-divided form, these products may ignite when exposed to flame or by reaction with incompatible materials (see Section 10). If present in a fire or explosion, they may emit fumes of the constituent metals or metal oxides.

**Extinguishing Media:** Use dry chemical. Do not use water.

**Fire Fighting Instructions:** If fighting a fire in which these products are present, wear a self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode.

## VI – Accidental Release Measures

**Spill or Leak Procedures:**

If a finely-divided form of product is spilled, clean up spillage so as to minimize dispersion of dust. Wet sweeping or vacuuming using HEPA filtration are recommended.

## VII – Handling and Storage

**Handling Precautions:** No special handling precautions are required.

**Storage Precautions:** Do not store in proximity to incompatible materials (see Section 10).

**Work/Hygienic Practices:** To minimize ingestion, wash hands and face before eating, drinking, applying cosmetics, or using tobacco.

Use good housekeeping procedures to prevent accumulation of fumes, and dusts.

## VIII – Exposure Controls / Personal Protection

**Ventilation Requirements:**

Use enough ventilation, local exhaust at the flame to keep the fumes and gases below TLV's in the worker's breathing zone and the general area. Train the employee to keep his/her head out of the fumes. See ANSI/ASC Z49.1 Section 5.

**Personal Protective Equipment:**

**Respiratory Protection:**

If an exposure level exceeds an applicable exposure standard, use a NIOSH-approved respirator having a configuration (type of facepiece, filter media, assigned protection factor, etc.) appropriate to the concentration of

the contaminant(s) generated. For guidance on selection and use of respiratory protection, consult American National Standard Z88.2 (ANSI, New York, NY 10036, USA).

**Eye/Face Protection:**

Wear eye protection adequate to prevent eye contact with finely-divided forms of product and eye injury of products are used with a flame. Plastic-frame spectacles with side shields and filter lenses (shade #3 / #4) are recommended.

**Engineering Controls:** Use appropriate ventilation (e.g., dilution, local exhaust) adequate to maintain concentrations of all components to within their applicable standards.

**Skin Protection:** Wear appropriate protective gloves and clothing to prevent skin injury if these products are used with a flame and/or for prolonged or repeated contact with finely-divided forms of product. Avoid flammable fabrics.

**IX – Physical and Chemical Properties**

The products are shipped as non-flammable, non-explosive and non-reactive solid metal materials.

**Appearance:** Odorless, white to light-yellow metals in forms of wire, rod, strip, powder, grain, tape, or preformed shapes.

**Chemical Type:** Mixture

**Physical State:** Solid

**Melting Point:** 1145 - 1270° F, 620 - 690° C

**Specific Gravity:** 8.7 - 9.4

**Solubility:** Insoluble

Other commonly-reported physical properties (odor threshold, evaporation rate, vapor pressure, vapor density, oil-water partition coefficient, percent volatiles, percent VOCs, pH, viscosity) are not applicable to these products.

**X – Stability and Reactivity**

**Stability:** Stable

**Hazardous Decomposition Products:**

**Hazardous Polymerization:** Will not occur.

**Conditions to Avoid (Stability):** Silver and copper can form unstable acetylides if in contact with acetylene gas.

**Incompatible Materials:** Strong oxidizers; ammonia; nitric acid; ethylene imine; chlorine trifluoride; bromine trifluoride; sulfuric acid; inorganic and organic peroxides; peroxyformic acid; oxalic acid; tartaric acid; 1-bromo-2-propyne; permonosulfuric acid; bromates' chlorates, and iodates of alkali and alkali earth metals; halogens; carbon disulfide; hydrazine mononitrate; hydroxylamine; selenium; tellurium; cupric nitrate; sulfur.

**Hazardous Decomposition Products:** Heating to elevated temperatures may liberate metal/metal oxide fumes.

**XI – Toxicological Information**

**Chronic/Carcinogenicity:** These products contain no chemicals classified as potential or demonstrated carcinogens by IARC, NTP, or OSHA.

**Conditions Aggravated by Overexposure:** Pre-existing pulmonary diseases (e.g., bronchitis, emphysema) may be aggravated by inhalation overexposure, particularly as fume. Chronic overexposure by inhalation and/or ingestion may aggravate pre-existing diseases of the liver, kidneys, gastrointestinal system, and nervous system.

**Ingredient(s) – Toxicological Data:**

**Copper:** LD50: No data available, LC50: No data available.

**Silver:** LD50: >2,000 mg/kg (oral/rat), LC50: No data available.

**Tin:** LD50: No data available, LC50: No data available.

**Zinc:** LD50: No data available, LC50: No data available.

**XII – Ecological Information**

In their intended manner to use, these products should not be released into the environment, and adverse effects on ecosystems are not anticipated under recommended conditions of use, storage, and disposal.

**XIII – Disposal Considerations**

Dispose of unused or unusable product in accordance with applicable Federal, State/Provincial, and local regulations.

**XIV – Transportation Information**

**Technical Shipping Name:** Not Regulated.

**Freight Class Bulk:** N/A

**Freight Class Package:** N/A

**Product Label:** N/A

**Hazard Class or Division:** Non-Hazardous

**Hazard Class Division Number:** Not Hazardous by DOT Regulations

These products are not Hazardous Substances or Dangerous Goods per USDOT, TDG (Canada), IATA, or IMO regulations.

**XV – Regulatory Information**

**SARA Hazard Classes:** Acute Health Hazard; Chronic Health Hazard.

**Ingredient(s) – US Regulatory Information:**

**Copper:** SARA Title III – Section 313, Form “R”/TRI Reportable Chemical

**Silver:** SARA Title III – Section 313, Form “R”/TRI Reportable Chemical

**Canadian Regulatory Information:**

**WHMIS Class(es) and Division(s):** Non Applicable.

**Component(s) on Ingredients Disclosure List:**

1. Copper, elemental (CASRN 7440-50-8)

2. Silver, elemental (CASRN 7440-22-4)
3. Tin, elemental (CASRN 7440-31-5)

#### XVI – Other Information

**Disclaimer:** Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

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