

SECTION I

SAN # 516-530

Manufacturer's Name Handy & Harman	Emergency Telephone No. (212) 207-2632
Address (Number, Street, City, State and Zip Code) 850 Third Avenue, New York, NY 10022	Telephone No. (212) 752-3400
Chemical Name and Synonyms Braze Medium; Silver Solder Ag, Cu, Zn Alloy; Brazing Filler Metal	Trade Name and Specifications Braze 700; AWS A5.8, BAg-10
Chemical Family Ag-Cu-Zn Alloy	Formula 70% Ag, 20% Cu, 10% Zn

SECTION II HAZARDOUS INGREDIENTS AND DECOMPOSITION PRODUCTS*

Filler Metal Ingredients***	CAS#	%	Exposure Limits** mg/m ³	Observed Brazing Hazardous Decomposition Products	CAS#	Observed Emission Max. (mg/m ³)	Exposure Limits* (mg/m ³)
***Silver (Ag)	7440-22-4	70	0.1ACGIH 0.01 OSHA	Zinc Oxide Fume	1314-13-2	10	5.0 ACGIH 10/15mACGI
***Copper (Cu)	7440-50-8	20	1.0ACGIH 1.0 OSHA				5.0 OSHA C15/15mNIO
***Zinc (Zn)	7440-66-6	10	NoneACGIH None OSHA				
				General Welding (Brazing) Fume, Total Particulate (Zn, F, B, K, Cu, Ag, O, C, etc.)		25.	5.0 ACGIH 5.0 OSHA

*Filler metals are hazardous only in powder form as metal or metal oxide dust. Thought should also be given to the flux and the base metals being joined & to possible base metal coating which could emit fumes on heating, depending on their particular chemistry. Hazardous products of combustion, e.g., NO₂, O₃ and CO may also be produced by the heating source.

**American Conference of Governmental Industrial Hygienists-Threshold Limit Value-Time. Weighted Average per 8 hour workday, or Short Term Exposure Limit. Occupational Safety and Health Administration-Permissible-Exposure Limit, 8 hour day TWI National Institute for Occupational Safety and Health-REL, 10 hour day TWA or STEL. C Denotes "Ceiling Limit: - not to be exceeded at any time. See ANSI/AWS F1.1, F1.4, F1.5 and NIOSH Criteria Documents for air sampling and testing methods.

***The indicated ingredients of this product are classified as toxic by EPA in 40 CFR 372.65 and subject to reporting requirements of SARA Title III section 313 and 40 CFR 372.45.

SECTION III PHYSICAL DATA

Boiling Point: Not Known	Specific Gravity (H ₂ O=1): 9.77
Solubility in Water: NIL	Melting Temperature Range: 1275-1360°F
Appearance and Odor: Metallic-Rod, Wire, Strip and Powder- No Odor	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point (method used) N.A.	Flammable Limits N.A.	Lel, Uel- N.A.
Extinguishing Media	Dry powder for metal fires	
Special Fire Fighting Procedures	None Known	
Unusual Fire and Explosion Hazards	None Known	
NFPA Hazard Rating:	Health 1, Flammability 0, Reactivity 1	
CERCLA Hazard Rating:	Health 1, Flammability 0, Reactivity 0	
CERCLA Hazard Category:	Acute Health Hazard - No; Chronic Health Hazard No; Fire Hazard-No; Sudden release of Pressure Hazard-No; Reactivity Hazard-No	

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SECTION V - HEALTH HAZARD DATA

Major Exposure Hazard - Inhalation

Cumulative Limits: Welding (Brazing) Fumes- Total Particulate (C₁ + C₂ + ... C_N) ≤ (C-Concentration, T-TLV) C₁/T₁ + C₂/T₂ + ... C_N/T_N ≤ 1; See Section IX- Other prac.

EFFECTS OF OVEREXPOSURE: Overexposure to Zinc Oxide fumes can cause nausea 'bra chills.' Silver and Copper can cause metal fume fever. No known chronic effects. None of the ingredients or filler metal decomposition products have been determined to be carcinogenic or mutagenic by ACGIH, NTP, IARC, OSHA EPA or NIOSH. See Chemical Fact Sheets.

EMERGENCY & FIRST AID PROCEDURE: Remove victim from contaminated area. Administer oxygen. Call a Doctor. Give artificial respiration if breathing has stopped. See attached Chemical Fact Sheets.

SECTION VI - REACTIVITY DATA

Stability: Stable at room temperature; vaporization of Zinc occurs above 1275°F
Conditions to avoid: Do not over heat. See Section IX.

INCOMPATIBILITY: Acetylene, Ammonia, moist Chlorine or Fluorine, Cyanide, Mercury, Nitric Acid, Sulfur; or their compounds.

HAZARDOUS POLYMERIZATION: Will not occur; Conditions to avoid: None

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: No special procedures required.

WASTE DISPOSAL METHOD: Not Applicable. CERCLA RQ (40CFR,302)=None; RCRA Hazardous Waste No. (40 CFR,261)= None.

SECTION VIII - SPECIAL PROTECTION INFORMATION

VENTILATION: (Fumes and Gases): Confined Spaces - Local exhaust mechanical ventilation and respiratory protection shall be used consisting of; an airline respirator or hose mask, NIOSH, U.S. Bureau of Mines approved hose type C or self-contained air respirator and local exhaust (mechanical) ventilation with air flow to produce a minimum velocity of 100 lineal ft/min. in brazing zone and for at least 2 ft above the work. Ventilation must be adequate to keep airborne contamination below allowable exposure limits and to provide sufficient clean air for breathing. Indoors - Local exhaust mechanical ventilation shall be used (see confined spaces above.) Outdoors - Respiratory protection approved by Mine Safety & Health Administration (MSHA), National Institute of Occupational Safety & Health (NIOSH), or other approving authority for these purposes may be required. Adjacent Persons: All persons in the immediate vicinity of brazing operations shall be similarly protected as necessary by ventilation and/or approved respirators.

PROTECTIVE GLOVES: Leather welding Gloves

EYE PROTECTION: Plastic frame safety spectacles with side shields-filter lenses shade #3 and #4

OTHER PROTECTIVE EQUIPMENT: Normal clothing for torch brazing (Avoid flammable fabrics)

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Avoid heating above recommended brazing temperature range (1360-1550°F) as excessive fumes may result. (Zinc boils at 1665°F). Use sufficient Flux or Atmosphere to protect the filler metal and minimize oxidation and vaporization during brazing.

OTHER PRECAUTIONS: This filler metal may be used with a separately applied flux which when heated gives off Fluoride fumes and gases that can irritate eyes, nose and throat (TLV=2.5 mg/m³). Use only in wellventilated spaces. Avoid contact of flux with eyes or skin. Do not take flux internally. Products of combustion from torch or furnace may produce toxic NO_x, O₃ and CO gases. (See Footnote).

FOOTNOTE: Refer to "OSHA Standard 2-CFR 1910" from the U.S. Government Printing Office, Washington, D.C. 20402 and "ANSI Standard Z49.1-Safety in Welding & Cutting" published by the American Welding Society, P.O. Box 351040, Miami, FL 33135.

SHIPPING REGULATIONS: Packing or shipment of this filler metal is not controlled or restricted by DOT, IATA, ICAO or IMO regulations.

COPPER

The information in this sheet applies to workplace exposure resulting from processing, manufacturing, storing or handling and is not designed for the population at large. Any generalization beyond occupational exposures should not be made. The best industrial hygiene practice is to maintain concentrations of all chemicals at levels as low as is practical.

Chemical Names: Metallic copper, copper (0); CAS 7440-50-8.

Trade Names: Allbri Natural Copper, CDA, C.I. Pigment Metal 2, Raney Copper, Arwood Copper, and others.

Uses: In the manufacture of copper alloys such as brass and bronze; as an electrical conductor; in the production of copper salts; and many others.

PHYSICAL INFORMATION

Appearance: Reddish, lustrous metal that becomes dull on exposure to air.

Odor: None.

Behavior in Water: Insoluble, sinks.

HEALTH HAZARD INFORMATION

OSHA Standard: Average 8 hour exposure -- 1 mg/m³ (dusts and mists).
Average 8 hour exposure -- 0.1 mg/m³ (fumes).

NIOSH Recommended Limit: None established.

ACGIH Recommended Limit: Average 8 hour exposure -- 1 mg/m³ (dust and mists).
Average 8 hour exposure -- 0.2 mg/m³ (fumes).

Short Term Exposure:

Inhalation: Copper or copper oxide fumes may cause metal fume fever which includes chills, fever, aching muscles, dry mouth and throat, headache, nausea, vomiting, diarrhea and stomach pain. Onset may be delayed several hours.

Skin: May cause irritation. Metal solution can cause swelling and itching.

Eyes: May cause irritation. See long term exposure.

Ingestion: May cause stomach pain, nausea, vomiting and diarrhea. These symptoms reported from ingestion of 10 mg of copper by an adult and 8.5 mg by a child.

Long Term Exposure:

No long term effects from inhalation or ingestion reported. Copper fragments in the corena may cause cataracts, discoloration (Kaper - Fleischer rings), and loss of the eye.
Note: Individuals with Wilson's Disease may wish to limit occupational exposure to copper.

*Prepared by the Bureau of Toxic Substance Assessment, New York State Department of Health. For an explanation of the terms and abbreviations used, see "Toxic Substances: How Toxic is Toxic" available from the New York State Department of Health.

EMERGENCY AND FIRST AID INSTRUCTIONS

Inhalation: Move victim to fresh air. Give oxygen or artificial respiration as necessary. Seek medical attention, if necessary.

Skin: Remove chemically soiled clothing. Wash with large amounts of water for at least 5 minutes. Seek medical attention if symptoms persist.

Eyes: Wash with large amounts of water for at least 15 minutes. See an ophthalmologist (eye doctor) if symptoms persist.

Ingestion: Seek medical attention.

Note to Physician: Penicillamine or triethylene tetramine dihydrochloride may be beneficial in reducing body burden.

FIRE AND EXPLOSION INFORMATION

General: Fine copper powder is a moderate fire hazard.

Extinguisher: Powdered dolomite, sodium chloride (common salt) or graphite. Do Not use water.

REACTIVITY

Materials to Avoid: Reacts violently with acetylene, ammonium nitrate, bromates, chlorates, iodates, chlorine trifluoride, ethylene oxide, fluorine, hydrogen peroxide, hydrazine mononitrate, hydrogen sulfide, hydrazoic acid, lead azide, potassium peroxide, sodium azide and sodium peroxide.

Conditions to Avoid: High temperatures of smelting, welding, or fire may cause production of copper fumes.

PROTECTIVE MEASURES

Storage and Handling: Avoid conditions which create fumes or fine dusts.

Engineering Controls: Ventilate as needed. Sinks, showers, and eyewash stations should be readily available.

Protective Clothing (Should not be substituted for proper handling and engineering controls): Dust and splash proof safety goggles.

Protective Equipment: If fumes are present: for levels up to 1 mg/m³ use a high efficiency particulate respirator, a fume filter respirator, a supplied-air respirator or a self-contained breathing apparatus. Up to 5 mg/m³ use the above, except fume filter respirator, with full facepiece. Up to 100 mg/m³ use a powered air-purifying respirator with high efficiency filter or a Type C supplied-air respirator operated in a positive pressure mode. Up to 200 mg/m³ use a Type C supplied-air respirator with full facepiece, helmet or hood operated in a positive pressure mode.

If fumes are NOT present: for levels up to 50 mg/m³ use a high efficiency particulate respirator with full facepiece, a supplied-air respirator with full facepiece or self-contained breathing apparatus with full facepiece. Up to 2000 mg/m³ use a supplied-air respirator with full facepiece operated in a positive pressure mode.

PROCEDURES FOR SPILLS AND LEAKS

Warn other workers of spill. Put on proper protective equipment and clothing. Sweep or vacuum up solids being careful not to raise dust levels. For final disposal contact your regional office of the New York State Department of Environmental Conservation.

For more information: Contact the Industrial Hygienist or Safety Officer at your worksite or the New York State Department of Health, Bureau of Toxic Substance Assessment, Empire State Plaza, Corning Tower, Albany, New York 12237.

The information on this sheet applies to workplace exposure resulting from processing, manufacturing, storing or handling and is not designed for the population at large. Any generalization beyond occupational exposures should not be made. The best industrial hygiene practice is to maintain concentrations of all chemicals at levels as low as is practical.

Chemical Names: Zinc white; CAS 1314-13-2.

Trade Names: Amalox, Calamine, Chinese white, Emanay zinc oxide, Hubbuck's white, zincite and many others.

Uses: White pigment in paints, rubber chemicals and ceramics; as a seed disinfectant, fungicide, food additive, vulcanizing aid; in photocopying, cosmetics, pharmaceuticals, dentistry and others.

PHYSICAL INFORMATION

Appearance: White to yellowish-white powder. Fume is white, produced by exposure of zinc compounds to high temperatures, as in welding.

Odor: None.

Behavior in Water: Not soluble; material will sink.

HEALTH HAZARD INFORMATION

OSHA Standard: Average 8 hour exposure -- 5 mg/m^3 (Fume).

NIOSH Recommended Limit: Average 10 hour day/40 hour week -- 5 mg/m^3 (Fume).

ACGIH Recommended Limit: Average 8 hour exposure -- 5 mg/m^3 (Fume).

Short Term Exposure:

Inhalation: Exposure to fumes over 52 mg/m^3 can cause "Metal Fume Fever". Onset of symptoms may be delayed 4-12 hours. Symptoms include irritation of the nose, mouth and throat, cough, stomach pain, headache, nausea, vomiting, metallic taste, chills, fever, pains in the muscles and joints, thirst, bronchitis or pneumonia, and a bluish tint to the skin. These symptoms go away in 24 to 48 hours and leave no effect.

Skin: Dust may cause irritation which can result in rash.

Eyes: No information available.

Ingestion: May cause abdominal discomfort, watery diarrhea and cramps.

Long Term Exposure:

No information available.

*Prepared by the Bureau of Toxic Substance Assessment, New York State Department of Health. For an explanation of the terms and abbreviations used, see "Toxic Substances: How Toxic is Toxic" available from the New York State Department of Health.

EMERGENCY AND FIRST AID INSTRUCTIONS

Inhalation: Move victim to fresh air. Give artificial respiration or oxygen as required. Seek medical attention, if necessary.

Skin: Wash affected area thoroughly with soap and water.

Eyes: Rinse eyes for at least 15 minutes with plenty of water. Seek medical attention, if necessary.

Ingestion: Seek medical attention, if necessary.

Note to Physician: In case of fume inhalation, treat pulmonary edema. Give prednisone or other corticosteroid orally to reduce tissue response to fume. Positive pressure ventilation may be necessary. Treat metal fume fever with bed rest, analgesics and antipyretics.

FIRE AND EXPLOSION INFORMATION

General: Not combustible.

REACTIVITY

Conditions to Avoid: Exposure to high heat can generate fumes.

Materials to Avoid: Can react violently with magnesium and chlorinated rubber.

PROTECTIVE MEASURES

Storage and Handling: Store away from sources of high heat and materials listed above.

Engineering Controls: Adequate ventilation, sinks, showers and eyewash stations should be provided.

Protective Clothing (Should not be substituted for proper handling and engineering controls): Safety-goggles or masks; coveralls and gloves, if applicable. Change work clothing daily.

Protective Equipment: For levels up to 25 mg/m^3 use a single-use dust or fume filter. For up to 50 mg/m^3 use an air-purifying respirator with replaceable dust or fume filters, a Type-C supplied-air respirator, or a valve type single use dust or fume respirator. For up to 500 mg/m^3 use the above (except single use respirators) with a full facepiece. For up to $1,000 \text{ mg/m}^3$ use a powered air-purifying respirator with applicable replaceable dust or fume filter. For levels greater than $1,000 \text{ mg/m}^3$ use a Type-C continuous flow type supplied-air respirator.

PROCEDURES FOR SPILLS AND LEAKS

Ventilate area. Vacuum up dust and place in suitable container. For final disposal contact your regional office of the New York State Department of Environmental Conservation.

For more information:

Contact the Industrial Hygienist or Safety Officer at your worksite or the New York State Department of Health, Bureau of Toxic Substance Assessment, Empire State Plaza, Tower Building, Albany, New York 12237.

SILVER (Ag)

OSHA PEL: 0.01mg/M³

ACGIH TLV: 0.1mg/M³

PHYSICAL DATA

Appearance: Soft, ductile, malleable lustrous metal

Melting Point: 962°C

PHYSIOLOGICAL EFFECTS

Chronic occupational exposure to silver results in argyria, a permanent pigmentation (gray to purple) of the skin and eyes. Localized argyria may occur on the skin from handling metallic silver, from embedded particles or from skin absorption. Inhalation of silver may localize the argyria in the respiratory tract with chronic bronchitis as the only symptom.

REACTIVITY DATA

Silver is incompatible with acetylene, ammonia and hydrogen peroxide.