

MATERIAL SAFETY DATA SHEET (revised 6/21/02)

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Common Name : SILVER-COPPER-ZINC-CADMIUM-NICKEL BRAZING ALLOY
 Chemical Name : SILVER-COPPER-ZINC-CADMIUM-NICKEL BRAZING ALLOY
 Formula : Ag-Cu-Zn-Cd-Ni
 Product CAS No. : CHEMICAL MIXTURE
HPP 526F
 Supplier : HIGH PERFORMANCE PRODUCTS
 Address : 1220 SHAPPERT DRIVE
 City, State, Zip : MACHESNEY PARK, IL 61115
 Phone : 815-985-0441

SECTION 2: COMPOSITION INFORMATION ON INGREDIENTS

INGREDIENT	CAS NO.	% Wt.
CADMIUM	7440-43-9	5 - 24
COPPER	7440-50-8	15 - 45
SILVER	7440-22-4	20 - 50
ZINC (AS OXIDE)	7723-66-6	16 - 30
NICKEL	7440-02-0	0-3

INGREDIENT NOTES

NOTE: The percentage by weight values reported for the ingredients in this product represent approximate formulation values.

NOTE: See Section 8 for Exposure Limits and Section 11 for Toxicological Information.

WARNING! CADMIUM AND NICKEL ARE HUMAN CARCINOGENS: NTP-2, IARC-2A AND -1, NIOSH-X.

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Metallic wire, rod or strip

Odorless

Flash Point: Not Applicable

Danger. Contains CADMIUM AND NICKEL. Avoid creating dust.

SUSPECT CANCER HAZARD - Risk of cancer depends on route, duration and level of exposure. Harmful if inhaled or swallowed. May cause eye and skin irritation. Prolonged or repeated contact may result in argyria (discoloration) of the eyes, skin, respiratory tract or other mucous membranes. Prolonged or repeated exposure may cause liver and kidney damage. Not a fire or explosion hazard in solid form. Finely divided dust may ignite and burn rapidly when mixed with air in the proper proportions. Toxic metal fumes may be released in a fire situation.

ROUTES OF ENTRY

Eyes? YES Skin? YES Inhalation? YES Ingestion? YES

POTENTIAL HEALTH EFFECTS

EYE CONTACT may cause irritation. **SKIN CONTACT** may cause irritation. **INHALATION** may cause excessive CADMIUM absorption resulting in pulmonary emphysema and/ or kidney dysfunction. **INGESTION** is harmful. May cause abdominal pain, nausea, vomiting and diarrhea. **COPPER** poisoning can result in hemolytic anemia and kidney, liver and spleen damage. **NOTE:** Inhalation of fumes may cause a flu-like illness called metal fume fever. Typically metal fume fever begins four to twelve hours after sufficient exposure to freshly formed fumes. The first symptoms are a metallic taste, dryness and irritation of the throat. Cough and shortness of breath may occur along with headache, fatigue, nausea, vomiting, muscle and joint pain, fever and chills. The syndrome runs its course in 24-48 hours. **NOTE:** The potential health effects described above only apply if dust or fume is formed.

CARCINOGENICITY

NTP? YES

IARC? YES

OSHA? YES

In evaluating CADMIUM and CADMIUM COMPOUNDS, the International Agency for Research on Cancer (IARC) has determined that there is sufficient evidence of carcinogenicity to humans (Group 1). **SIMILAR CARCINOGENICITY RESULTS FOR NICKEL.** The Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) considers all cadmium and cadmium compounds to be suspect human cancer hazard (A2). The National Toxicology Program (NTP) lists only cadmium and certain cadmium compounds as substances which may reasonably be anticipated to be carcinogenic. This product contains one of those cadmium compounds specifically identified by NTP.

CHRONIC HEALTH HAZARDS

Refer to Potential Health Effects and Carcinogenicity.

Prolonged or excessive exposures may result in argyria, a permanent localized blue-grey discoloration of the eyes, skin or mucous membranes. Repeated or long-term exposure to CADMIUM or NICKEL, even at relatively low concentrations, may result in kidney damage and an increased risk of lung cancer.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

May aggravate existing medical conditions, such as respiratory and/or kidney ailments.
Individuals with Wilson's Disease are at increased risk of COPPER poisoning.
NOTE: See Section 8 for Exposure Limits Section 11 for Toxicological Information and Section 12 for Ecological Information.

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Flush eyes with plenty of water. If irritation develops, call a physician. SKIN CONTACT: Immediately wash skin with soap and plenty of water. If irritation persists, call a physician. INHALATION: If exposed to excessive levels of metal fumes, remove to fresh air and seek medical attention. INGESTION: Procedures normally not needed. If large quantities are ingested, seek medical advice.

SECTION 5: FIRE-FIGHTING MEASURES

Flash Point: Not Applicable
Auto-Ignition: Not Applicable
LEL: Not Applicable
UEL: Not Applicable

NFPA HAZARD CLASSIFICATION

Health: 3

Flammable: 0

Reactivity: 0

HMIS HAZARD CLASSIFICATION

Health: 3*

Flammable: 0

Reactivity: 0

* Indicates the possibility of chronic health effects. See Chronic Health Hazards in Section 3 for more information.

EXTINGUISHING MEDIA

Use carbon dioxide, chemical foam or dry chemical. Use any means for extinguishing surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Not a fire or explosion hazard in solid form. Finely divided dust may ignite and burn rapidly when mixed with air in the proper proportions. Toxic metal fumes may be released in a fire situation.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Contain spillage and scoop up or vacuum. Notification of the National Response Center (800/424-8802) may be required. Refer to EPA, DOT and applicable state and local regulations for current response information.

It is recommended that each user establish a spill prevention, control and countermeasure plan (SPCC). Such plan should include procedures applicable to proper storage, control and clean-up of spills, including reuse or disposal as appropriate (see Section: Disposal Considerations).

****NOTE**** In the event of an accidental release of this material, the above procedures should be followed. Additionally, proper exposure controls and personal protection equipment should be used (see Section 8: exposure Control/Personal Protection), and disposal of the material should be in accordance with Section 13: Disposal Considerations.

SECTION 7: HANDLING AND STORAGE

Wash thoroughly after handling. Store in a cool, dry location away from incompatible materials. Avoid contact with any dusts, mists or fumes resulting from the use of this product. Do not eat, drink, or smoke in work area. Use only with adequate ventilation. NOTE: Consult the most recent OSHA CADMIUM Standard (1910.1027) and its attachments, appendices, etc., for full requirements, some of which are not covered in this Material Safety Data Sheet.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS INGREDIENT	PEL-OSHA	TLV-ACGIH
CADMIUM		
CAS NO.: 7440-43-9	0.005 mg/m ³ 0.0025 mg/m ³ ACTION LEVEL	0.01 mg/m ³ (as Cd, total dust) 0.002 mg/m ³ (as Cd, respirable fraction)
COPPER		
CAS NO.: 7440-50-8	0.1 mg/m ³ (Fume) 1 mg/m ³ (Dust) 1 mg/m ³	0.2 mg/m ³ (Fume) 1 mg/m ³ (Dust) 1 mg/m ³
NICKEL		
SILVER		
CAS NO.: 7440-22-4	0.01 mg/m ³	0.1 mg/m ³
ZINC (AS OXIDE)		
CAS NO.: 7440-66-6	10 mg/m ³ (Total dust) 5 mg/m ³ (Respirable fraction) 5 mg/m ³ (Fume) 10 mg/m ³ (Fume) STEL	5 mg/m ³ (Fume) 10 mg/m ³ (Fume) STEL 10 mg/m ³ (Total dust)

Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWAs) and dust (particulates only). All ACGIH TLVs refer to the 1995-96 Standards. All OSHA PELs refer to 29 CFR Part 1910 Air Contaminants: Final Rule, January 19, 1989*. (*NOTE: As a result of the July 7, 1992 decision by the U.S. Circuit Court of Appeals (AFL-CIO v. OSHA) to vacate the 1989 PELs, OSHA will no longer enforce these new limits and will return to the pre-1989 PELs.)
NOTE: The hazards of all ingredients in this product are not known, however exposure is not expected as the product is in solid form. The threshold limit values (TLVs) and potential health effects statements are listed for ingredients of the product for which data is

SECTION 13: DISPOSAL CONSIDERATIONS

US EPA Waste Number: D006/D011

This product may be a hazardous waste under EPA waste regulations (see EPA WASTE above). Before disposal, this product or mixtures containing this product should be tested for toxicity characteristics (TC) under the current EPA Hazardous Waste Regulations TCLP testing procedures 40 CFR Part 261 et seq. Disposal/recycling/reclamation requirements will vary by location and type of disposal selected. Consult with state and local regulatory authorities.

****NOTE**** Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate or otherwise inappropriate.

As local regulations may vary; all waste must be disposed/recycled/reclaimed in accordance with federal, state, and local environmental control regulations.

SECTION 14: TRANSPORT INFORMATION**INTERNATIONAL**

UN Number: Not Regulated

UNITED STATES

EPA Waste Number: D006/D011

DOT Classification: Not Regulated

CANADA

PIN Number: Not Regulated

TDG Class: Not Regulated

EC: DGL: Not Determined

SECTION 15: REGULATORY INFORMATION**US FEDERAL REGULATIONS**

TSCA: IN TSCA

SARA 311 AND 312 HAZARD CATEGORIES

IMMEDIATE (Acute) Health Hazard: YES

DELAYED (Chronic) Health Hazard: YES

FIRE Hazard: NO

REACTIVITY Hazard: NO

Sudden Release of PRESSURE: NO

SARA SECTION 313 NOTIFICATION

This product contains a toxic chemical (or chemicals) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

CHEMICAL NAME**CAS Number****% Wt.**

CADMIUM

7440-43-9

16 - 24

COPPER

7440-50-8

15 - 45

NICKEL

7440-02-0

0 - 1

SILVER

7440-22-4

20 - 50

ZINC (AS OXIDE)

7440-66-6

16 - 30

OZONE DEPLETING SUBSTANCES (ODS)

This product neither contains nor is manufactured with an ozone depleting substance subject to the labeling requirements of the Clean Air Act Amendments 1990 and 40 CFR Part 82.

VOLATILE ORGANIC COMPOUNDS (VOC)

None

US STATE REGULATIONS

CALIFORNIA: The State of California has a regulation (Proposition 65) which identifies specific chemicals known to the State of California to cause cancer or birth defects. Proposition 65 requires a disclosure for products sold within the State of California containing an identified chemical. The following information is required by the State of California for the product:

*WARNING: This product contains chemicals known to the State of California to cause cancer.

VOLATILE ORGANIC COMPOUND (CARB): Not Determined

CANADIAN REGULATIONS

DSL/NDSL: Not Determined

WHMIS Classification: Not Determined

EUROPEAN REGULATIONS

EINECS: Not Determined

OTHER REGULATIONS

MITI (Japan) : Not Determined

AICS (Australia) : Not Determined

SECTION 16: OTHER INFORMATION**REVISIONS**

Revision Number: 4

This MSDS has been revised in the following section(s):

SECTION 3: HAZARDS IDENTIFICATION

SECTION 15: REGULATORY INFORMATION

PREPARATION INFORMATION

Prepared By: Corporate Environment, Health & Safety Group

Phone Number: See Section 1

The information in this Material Safety Data Sheet 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. The information presented in the MSDS is premised upon proper handling and anticipated uses and is for the material without chemical additions/alterations. We believe this information to be reliable and up-to-date as of the date of publication, but make no warranty that it is. Additionally, if this Material Safety Data Sheet is more than three years old, please contact the supplier at the phone number listed in Section 1 to make certain that this sheet is current. End of MSDS.

available. However, these statements may not be applicable as the ingredients are in solid form. If dust, powder, or fume is generated the TLVs and effects of overexposure statements will be applicable.

RESPIRATORY PROTECTION

A NIOSH/MSHA-approved respirator is recommended if dust is generated.

VENTILATION

General; local exhaust ventilation as necessary to control any air contaminants to within their PELs or TLVs during the use of this product.

PROTECTIVE EQUIPMENT

Refer to ANSI/ASC Z49.1-88 (Safety in Welding, Cutting and Allied Processes), published by the American Welding Society, for further information on the selection of personal protective equipment. Safety glasses (with side shields). Body protection as necessary to prevent skin contact.

PERSONNEL SAMPLING PROCEDURE

For METALLIC COMPONENTS: Refer to NIOSH Manual of Analytical Methods (NMAM), 3rd Edition, Method 7300.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Metallic wire, rod or strip

Odor: Odorless

Boiling Point: Not Determined

Specific Gravity (H₂O=1): 8.0 - 10.0

Melting Point: 607 - 632 ° C

Vapor Pressure (mm Hg): Not Applicable

Vapor Density (Air=1): Not Applicable

Evaporation Rate (Butyl Acetate=1): Not Applicable

% Solubility In Water: Insoluble

pH: Not Applicable

SECTION 10: STABILITY AND REACTIVITY

Stability: Generally considered stable.

Avoid: None expected.

INCOMPATIBILITY (Materials to Avoid)

Strong acids and bases, strong oxidizers, acetylene, ammonia, hydrogen peroxide, magnesium metal, ammonium nitrate, hydrogen sulfide, elemental sulfur, selenium, tellurium, chlorinated rubber.

Silver. Acetylene and ethylenimine form explosive compounds with silver. If silver is treated with nitric acid in the presence of ethyl alcohol, silver fulminate can be formed which can be detonated. Fine powder and hydrogen peroxide solutions may explode.

Incompatible with oxalic and tartaric acid. Bromoazide explodes on contact with silver foil.

Nickel. Nickel may react with fluorine, ammonium nitrate, hydrogen+dioxane, performic acid, selenium, sulfur, ammonia, hydrazine phosphorus, and titanium+potassium chlorate, and with oxidants.

Copper. Copper is incompatible with ammonium nitrate, bromates, iodates, chlorates, ethylene oxide, hydrazoic acid, potassium oxide, dimethyl sulfoxide+trichloroacetic acid, hydrogen peroxide, sodium peroxide, sodium azide, sulfuric acid, hydrogen sulfide + air, lead azide, and acetylenic compounds. Copper ignites on contact with chlorine, fluorine, chlorine trifluoride, and hydrazinium nitrate.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS

Toxic metal oxides are emitted when heated above the melting point. The amount of fume evolved increases as the temperature rises.

Polymerization: Polymerization is not expected to occur.

Avoid: Not applicable.

SECTION 11: TOXICOLOGICAL INFORMATION

CHEMICAL NAME	% Wt.	LD50	LC50
CADMIUM			
CAS NO.: 7440-43-9	18	225 mg/kg RAT, oral	Not Available
COPPER			
CAS NO.: 7440-50-8	26	3.5 mg/kg MOUSE, intraperitoneal	Not Available
NICKEL	1	None	None
CAS NO. 7440-02-0			
SILVER			
CAS NO.: 7440-22-4	35	Not Available	Not Available
ZINC (AS OXIDE)			
CAS NO.: 7440-66-6	21	7,950 mg/kg MOUSE, oral	2,500 mg/kg MOUSE

NOTE: See Sections 3, 8 and 12 for additional information.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY

No data available.

ENVIRONMENTAL FATE

No data available.