MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**Safety-Silv® 20, Safety-Silv® 25, Safety-Silv® 30, Safety-Silv® 35, Safety-Silv® 40, Safety-Silv® 45, Safety-Silv® 50**
Version #	01
Issue date	28-February-2014
Revision date	-
Supersedes date	-
CAS #	-
Product type	High Silver Brazing Alloys containing Cu, Ag and Zn
Product use	Metal brazing.
Manufacturer information	
Manufacturer/Supplier	Harris Products Group 4501 Quality Place Mason, Ohio 45040 US custservmason@jwharris.com
Telephone number	513-754-2000
Emergency Telephone Numbers	1-888-609-1762 (US, Canada, Mexico only) Please quote 333988

2. Hazards Identification

Physical state	Solid.
Appearance	Wire and rods.
Emergency overview	WARNING Toxic: danger of serious damage to health by prolonged exposure through inhalation. May cause eye, skin and respiratory tract irritation.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Inhalation. Skin contact. Eye contact. Ingestion.
Eyes	Fumes from heated material may cause eye irritation. Dust may irritate the eyes. Exposure to hot material may cause thermal burns.
Skin	Dust may irritate skin. May cause allergic skin reaction. Exposure to hot material may cause thermal burns.
Inhalation	May cause respiratory tract irritation. Lung damage and possible pulmonary edema can result from dust exposure. Inhalation of fumes may cause a flu-like illness called metal fume fever.
Ingestion	Ingestion of this product may cause nausea, vomiting and diarrhea. Copper poisoning can result in hemolytic anemia and kidney, liver and spleen damage.
Target organs	Respiratory system Eyes. Skin. Kidneys.
Chronic effects	Chronic inhalation of fumes or dust may cause irritation or other respiratory conditions (e.g., bronchitis). May cause lung damage. Prolonged overexposure to fluorides may increase fluoride content of bones and teeth, and may result in fluorosis, and brittleness of bones. Absorbed fluoride can cause metabolic imbalances with irregular heartbeat, nausea, dizziness, vomiting and seizures. Ingestion of silver may cause a permanently benign bluish gray discoloration to the skin (argyria). Prolonged exposure to silver may cause damage to the nasal septum. Excessive Zinc intake has been associated with copper deficiency anemia. Individuals with Wilson's disease are at an increased risk of copper poisoning. Refer to Section 11 Toxicological Information for more details.

Signs and symptoms Contact may cause irritation and redness. Dust may irritate respiratory system. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Typical 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.

Potential environmental effects Alloys in massive forms present a limited hazard for the environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Copper	7440-50-8	25 - 50
Silver	7440-22-4	20 - 50
Zinc	7440-66-6	10 - 40

Coating(s)	CAS #	Percent
Potassium fluoroborate	14075-53-7	30 - 50
Boric acid	10043-35-3	10 - 35
Methacrylate polymer	Proprietary	1 - 5
Water	7732-18-5	Balance

Composition comments Rods may be coated with flux containing Boric acid (CAS 10043-35-3) and Potassium fluoborate (CAS 14075-53-7). It can be reasonably assumed that on coated rods each of the flux constituents may comprise up to 30% by mass of the total mass.

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First Aid Measures

First aid procedures

Eye contact Rinse immediately with plenty of water for at least 15 minutes. Remove any contact lenses. Get medical attention if irritation develops or persists.

Skin contact Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation develops and persists.

Inhalation Remove person from contaminated area to fresh air. Apply artificial respiration if needed. Call a physician if symptoms develop or persist.

Ingestion Do NOT induce vomiting. Immediately rinse mouth and drink a cupful of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Notes to physician Treat symptomatically. Symptoms may be delayed.

General advice Show this safety data sheet to the doctor in attendance.

5. Fire Fighting Measures

Flammable properties Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. Do not use water on molten metal: Explosion hazard could result.

Extinguishing media

Suitable extinguishing media Extinguish with foam, carbon dioxide or dry powder.

Unsuitable extinguishing media Do not use water or halogenated extinguishing media.

Protection of firefighters

Specific hazards arising from the chemical Fire or high temperatures create: Metal oxides.

Fire fighting equipment/instructions Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Move containers from fire area if you can do it without risk.

6. Accidental Release Measures

Personal precautions Keep unnecessary personnel away. Avoid inhalation of dust from the spilled material. Wear protective clothing as described in Section 8 of this MSDS. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not contaminate water.

Methods for containment Stop leak if you can do so without risk. Local authorities should be advised if significant spillages cannot be contained.

Methods for cleaning up Collect for salvage or disposal. Put material in suitable, covered, labeled containers. Avoid the generation of dusts during clean-up. For waste disposal, see Section 13 of the MSDS.

Other information Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling Avoid inhalation of dust and fumes. Use process enclosures, local exhaust ventilation, or other engineering controls to control sources of dust and fumes. Keep formation of airborne dusts to a minimum. Avoid contact with skin and eyes. Wear appropriate personal protective equipment (See Section 8). Do not get this material on clothing. Do not eat, drink or smoke when using the product. Wash thoroughly after handling. Avoid release to the environment.

Storage Store in tightly closed original container in a dry, cool and well-ventilated place. Store in a closed container away from incompatible materials. Keep away from food, drink and animal feedingstuffs.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Silver (CAS 7440-22-4)	TWA	0.1 mg/m3	Dust and fume.
Coating(s)	**Type**	**Value**	**Form**
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.
Fluorides (CAS 16984-48-8)	TWA	2.5 mg/m3	
Decomposition	**Type**	**Value**	**Form**
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Silver (CAS 7440-22-4)	PEL	0.01 mg/m3	
Coating(s)	**Type**	**Value**	
Fluorides (CAS 16984-48-8)	PEL	2.5 mg/m3	
Decomposition	**Type**	**Value**	**Form**
Zinc oxide (CAS 1314-13-2)	PEL	5 mg/m3	Respirable fraction.
		5 mg/m3	Fume.
		15 mg/m3	Total dust.

US. OSHA Table Z-2 (29 CFR 1910.1000)

Coating(s)	Type	Value	Form
Fluorides (CAS 16984-48-8)	TWA	2.5 mg/m3	Dust.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Silver (CAS 7440-22-4)	TWA	0.1 mg/m3	
Coating(s)	**Type**	**Value**	
Fluorides (CAS 16984-48-8)	TWA	2.5 mg/m3	
Decomposition	**Type**	**Value**	**Form**
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable.
	TWA	2 mg/m3	Respirable.

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Silver (CAS 7440-22-4)	STEL	0.03 mg/m3	
	TWA	0.01 mg/m3	
Coating(s)	**Type**	**Value**	**Form**
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable
	TWA	2 mg/m3	Inhalable
Fluorides (CAS 16984-48-8)	TWA	2.5 mg/m3	
Decomposition	**Type**	**Value**	**Form**
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable.
	TWA	2 mg/m3	Respirable.

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Silver (CAS 7440-22-4)	TWA	0.1 mg/m3	Dust and fume.
Coating(s)	**Type**	**Value**	**Form**
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.
Fluorides (CAS 16984-48-8)	TWA	2.5 mg/m3	
Decomposition	**Type**	**Value**	**Form**
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	0.2 mg/m3	Fume.
Silver (CAS 7440-22-4)	TWA	0.1 mg/m3	Dust and fume.
Coating(s)	**Type**	**Value**	**Form**
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.
Fluorides (CAS 16984-48-8)	TWA	2.5 mg/m3	
Decomposition	**Type**	**Value**	**Form**
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Silver (CAS 7440-22-4)	TWA	0.1 mg/m3	
Welding fume (CAS -)	TWA	5 mg/m3	Welding fume.
Coating(s)	**Type**	**Value**	
Fluorides (CAS 16984-48-8)	TWA	2.5 mg/m3	
Decomposition	**Type**	**Value**	**Form**
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Fume.
	TWA	5 mg/m3	Fume.
		10 mg/m3	Total dust.

Mexico. Occupational Exposure Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	STEL	2 mg/m3	Dust and mist.
		2 mg/m3	Fume.
	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Silver (CAS 7440-22-4)	TWA	0.1 mg/m3	
Welding fume (CAS -)	TWA	5 mg/m3	Welding fume.
Coating(s)	**Type**	**Value**	
Fluorides (CAS 16984-48-8)	TWA	2.5 mg/m3	
Decomposition	**Type**	**Value**	**Form**
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Fume.
	TWA	5 mg/m3	Fume.
		10 mg/m3	Dust.

Engineering controls Provide adequate ventilation. Observe occupational exposure limits and minimize the risk of inhalation of dust and fumes. Shower, hand and eye washing facilities near the workplace are recommended.

Personal protective equipment

Eye / face protection Wear safety glasses with side shields (or goggles). When these products are used in conjunction with brazing, it is recommended that safety glasses, goggles, or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, “Safety in Welding and Cutting”) be worn.

Skin protection Protective clothing is recommended. When these products are used in conjunction with brazing, wear protective clothing that protects from sparks and flame (per ANSI Z49.1-1988, “Safety in Welding and Cutting”).

Respiratory protection Use a respirator when local exhaust or ventilation is not adequate to keep exposures below the TLV. In a confined space a supplied respirator may be required. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical & Chemical Properties

Appearance Wire and rods.

Physical state Solid.

Form Solid.

Color Not available.

Odor Odorless.

Odor threshold Not available.

pH Not applicable.

Vapor pressure Not applicable.

Vapor density Not applicable.

Boiling point Not available.

Melting point/Freezing point Not applicable.

Solubility (water) Insoluble.

Specific gravity Not available.

Flash point Not available.

Flammability limits in air, upper, % by volume Not available.

Flammability limits in air, lower, % by volume Not available.

Auto-ignition temperature Not available.

10. Chemical Stability & Reactivity Information

Chemical stability Material is stable under normal conditions.

Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Strong acids. Strong bases. Acetylene. Ammonia. Hydrogen peroxide (H_2O_2). Chlorine. Bromine, iodine, turpentine, magnesium metal. Hydrogen sulfide. Ammonium nitrate.
Hazardous decomposition products	Toxic metal oxides are emitted when heated above the melting point. Coated rods may also release boric anhydride, fluoride compounds and hydrogen fluorides. Methacrylate polymer decomposes when heated and will release flammable vapors which irritate eyes and the respiratory system. They comprise mainly n-butyl methacrylate (CAS 97-88-1).
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Components	**Species**	**Test Results**
Silver (CAS 7440-22-4)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg
Oral		
LD50	Rat	> 5000 mg/kg
Coating(s)	**Species**	**Test Results**
Boric acid (CAS 10043-35-3)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg
Oral		
LD50	Rat	2660 mg/kg

Sensitization	This product is not expected to cause skin sensitization.
Acute effects	When heated, the vapors/fumes given off may cause respiratory tract irritation. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death.
Local effects	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract.
Chronic effects	Ingestion of silver may cause a permanently benign bluish gray discoloration to the skin (argyria). Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. Absorbed fluoride can cause metabolic imbalances with irregular heartbeat, nausea, dizziness, vomiting and seizures.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens

Boric acid (CAS 10043-35-3)	A4 Not classifiable as a human carcinogen.
Fluorides (CAS 16984-48-8)	A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

Fluorides (CAS 16984-48-8)	3 Not classifiable as to carcinogenicity to humans.

Epidemiology	Based on epidemiological studies, pre-existing pulmonary disorders may be aggravated by prolonged exposure to high concentrations of metal dust or fumes.
Mutagenicity	No data available.
Reproductive effects	This product is not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of the Boric Acid and Copper components of this product indicate adverse reproductive effects.
Further information	No other specific acute or chronic health impact noted.

12. Ecological Information

Ecotoxicological data

Components		Species	Test Results
Copper (CAS 7440-50-8)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia obtusa)	0.0076 - 0.026 mg/l, 48 hours
Silver (CAS 7440-22-4)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	0.0019 - 0.003 mg/l, 96 hours
Zinc (CAS 7440-66-6)			
Aquatic			
Fish	LC50	Rainbow trout,donaldson trout (Oncorhynchus mykiss)	0.41 mg/l, 96 hours

Coating(s)		Species	Test Results
Boric acid (CAS 10043-35-3)			
Aquatic			
Fish	LC50	Razorback sucker (Xyrauchen texanus)	> 100 mg/l, 96 hours

Ecotoxicity Alloys in massive forms present a limited hazard for the environment.

Environmental effects Significant environmental persistence and bioaccumulation can be expected.

Persistence and degradability The product is not biodegradable.

Bioaccumulation / Accumulation The product contains potentially bioaccumulating substances.

Mobility in environmental media Alloys in massive forms are not mobile in the environment.

13. Disposal Considerations

Waste codes D011: Waste Silver

Disposal instructions Dispose in accordance with all applicable regulations.

Waste from residues / unused products Scrapped material should be sent for refining to recover precious metal content. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport Information

DOT

Not regulated as a hazardous material by DOT.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

TDG

Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Copper (CAS 7440-50-8)	1.0 %
Silver (CAS 7440-22-4)	1.0 %

Zinc (CAS 7440-66-6) 1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Copper (CAS 7440-50-8) Listed.
Silver (CAS 7440-22-4) Listed.
Zinc (CAS 7440-66-6) Listed.

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

Copper: 5000
Silver: 1000
Zinc: 1000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Drug Enforcement Administration (DEA) (21 CFR 1308.11-15) Not controlled

Canadian regulations This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS status Controlled

WHMIS classification D2A - Other Toxic Effects-VERY TOXIC

WHMIS labeling

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

State regulations This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

Copper (CAS 7440-50-8) Listed.
Fluorides (CAS 16984-48-8) Listed.
Potassium fluoroborate (CAS 14075-53-7) Listed.
Silver (CAS 7440-22-4) Listed.
Zinc (CAS 7440-66-6) Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

US. Massachusetts RTK - Substance List

Copper (CAS 7440-50-8) Listed.
Silver (CAS 7440-22-4) Listed.
Zinc (CAS 7440-66-6) Listed.

US. New Jersey Worker and Community Right-to-Know Act

Boric acid (CAS 10043-35-3)
Copper (CAS 7440-50-8)
Fluorides (CAS 16984-48-8)
Silver (CAS 7440-22-4)
Zinc (CAS 7440-66-6)

US. Pennsylvania Worker and Community Right-to-Know Law

Copper (CAS 7440-50-8)
Fluorides (CAS 16984-48-8)
Potassium fluoroborate (CAS 14075-53-7)
Silver (CAS 7440-22-4)
Zinc (CAS 7440-66-6)

Mexico regulations

This safety data sheet was prepared in accordance with the Official Mexican Standard (NOM-018-STPS-2000).

16. Other Information

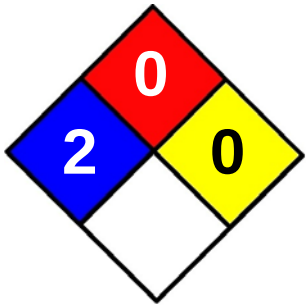
Further information

HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings

Health: 2*
Flammability: 0
Physical hazard: 0

NFPA Ratings



Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.