



# MATERIAL SAFETY DATA SHEET

## 1. Product and Company Identification

**Material name**                                **Worthington SilPhos Brazing Rod 15% Silver**  
**Version #**                                        01  
**Issue date**                                      18-June-2013  
**Revision date**                                   -  
**Supersedes date**                              -  
**CAS #**    Mixture  
**MSDS Number**                                WC024  
**Product use**                                    Brazing rod.  
**Manufacturer information**  
**Manufacturer/Supplier**                      Worthington Cylinder Corporation  
**Address**     1690 Lowery Street  
    Winston-Salem, NC 27101  
    United States  
**Contact Person:**                              Melissa Grimes  
    Melissa.Grimes@worthingtonindustries.com  
**Telephone Number:**                        336-831-8601  
**CHEMTREC - 24 HOURS:**                (800) 424-9300

## 2. Hazards Identification

**Physical state**                                Solid.  
**Appearance**                                 Metallic wire, rod or strip.  
**Emergency overview**                        WARNING  
  
May cause eye and skin irritation. May cause severe respiratory tract irritation. Harmful if swallowed. Molten material will produce thermal burns.  
**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.  
**Eyes**    Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eyes.  
**Skin**    May cause skin irritation. Contact with molten material may cause thermal burns.  
**Inhalation**                                    Can cause severe respiratory 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**                                    Harmful if swallowed. Ingestion of dusts generated during working operations may cause nausea and vomiting. Copper poisoning can result in hemolytic anemia and kidney, liver and spleen damage.  
**Target organs**                                Eyes. Skin. Respiratory system Kidney. Liver. Blood.  
**Chronic effects**                                Long-term exposure to copper compounds may cause anemia. 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. Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis).  
**Signs and symptoms**                        Dust and fumes may irritate eyes, skin and upper respiratory tract. Contact with molten material may cause thermal burns.  
**Potential environmental effects**        Alloys in massive forms present a limited hazard for the environment. The product contains a substance which is very toxic to aquatic organisms and which may cause long-term adverse effects in the aquatic environment.

## 3. Composition / Information on Ingredients

Components	CAS #	Percent
Copper	7440-50-8	80

Components	CAS #	Percent
Silver	7440-22-4	15
Phosphorous	7723-14-0	5

**Composition comments** 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. If skin rash or an allergic skin reaction develops, get medical attention.
- Inhalation** Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.
- Ingestion** Immediately rinse mouth and drink a cupful of water. Never give anything by mouth to a victim who is unconscious or is having convulsions. Only induce vomiting at the instruction of medical personnel. Get medical attention immediately.

**Notes to physician** Treat symptomatically. Exposure may aggravate pre-existing respiratory disorders. 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.

##### Extinguishing media

- Suitable extinguishing media** Extinguish with foam, carbon dioxide or dry powder. Use fire-extinguishing media appropriate for surrounding materials.
- 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. If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

**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** For a dry material spill, use a HEPA (high efficiency particle air) vacuum to collect material and place in a sealable container for disposal. Avoid dust formation. Recover and recycle, if practical. Keep out of water supplies and sewers.

**Other information** Clean up in accordance with all applicable regulations.

## 7. Handling and Storage

### Handling

Wear appropriate personal protective equipment (See Section 8). Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Avoid inhalation of dust and fumes. Avoid contact with skin and eyes. 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.

Any surface that comes in contact with molten metal must be preheated or specially coated and rust free. Inadvertent contaminants to product such as moisture, ice, snow, grease, or oil can cause an explosion when charged to a molten metal bath or metal furnace (preheating metal will remove moisture from product).

### 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 out of reach of children. 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/m <sup>3</sup> 0.2 mg/m <sup>3</sup>	Dust and mist. Fume.
Phosphorous (CAS 7723-14-0)	TWA	0.1 mg/m <sup>3</sup>	
Silver (CAS 7440-22-4)	TWA	0.1 mg/m <sup>3</sup>	Dust and fume.

#### 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/m <sup>3</sup> 0.1 mg/m <sup>3</sup>	Dust and mist. Fume.
Phosphorous (CAS 7723-14-0)	PEL	0.1 mg/m <sup>3</sup>	
Silver (CAS 7440-22-4)	PEL	0.01 mg/m <sup>3</sup>	

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m <sup>3</sup> 0.2 mg/m <sup>3</sup>	Dust and mist. Fume.
Phosphorous (CAS 7723-14-0)	TWA	0.1 mg/m <sup>3</sup>	
Silver (CAS 7440-22-4)	TWA	0.1 mg/m <sup>3</sup>	

#### 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/m <sup>3</sup> 0.2 mg/m <sup>3</sup>	Dust and mist. Fume.
Phosphorous (CAS 7723-14-0)	TWA	0.1 mg/m <sup>3</sup>	
Silver (CAS 7440-22-4)	STEL TWA	0.03 mg/m <sup>3</sup> 0.01 mg/m <sup>3</sup>	

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

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	0.2 mg/m <sup>3</sup>	Fume.
Phosphorous (CAS 7723-14-0)	TWA	0.1 mg/m <sup>3</sup>	
Silver (CAS 7440-22-4)	TWA	0.1 mg/m <sup>3</sup>	Dust and fume.

**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/m <sup>3</sup>	Dust and mist.
		0.2 mg/m <sup>3</sup>	Fume.
Phosphorous (CAS 7723-14-0)	TWA	0.1 mg/m <sup>3</sup>	
Silver (CAS 7440-22-4)	TWA	0.1 mg/m <sup>3</sup>	

**Mexico. Occupational Exposure Limit Values**

Components	Type	Value	Form
Copper (CAS 7440-50-8)	STEL	2 mg/m <sup>3</sup>	Dust and mist.
		2 mg/m <sup>3</sup>	Fume.
	TWA	1 mg/m <sup>3</sup>	Dust and mist.
		0.2 mg/m <sup>3</sup>	Fume.
Phosphorous (CAS 7723-14-0)	STEL	0.3 mg/m <sup>3</sup>	
	TWA	0.1 mg/m <sup>3</sup>	
Silver (CAS 7440-22-4)	TWA	0.1 mg/m <sup>3</sup>	

<b>Engineering controls</b>	Provide adequate ventilation. Observe Occupational Exposure Limits and minimize the risk of inhalation of dust. Keep melting/soldering temperatures as low as possible to minimize the generation of fume. Shower, hand and eye washing facilities near the workplace are recommended.
<b>Personal protective equipment</b>	
<b>Eye / face protection</b>	Wear safety glasses with side shields (or goggles). Wear a face shield when working with molten material.
<b>Skin protection</b>	Chemical resistant clothing is recommended. Heat resistant/insulated gloves and clothing are recommended when working with molten material.
<b>Respiratory protection</b>	Use a respirator when local exhaust or ventilation is not adequate to keep exposures below the OEL. 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.
<b>General hygiene considerations</b>	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**

<b>Appearance</b>	Metallic wire, rod or strip.
<b>Physical state</b>	Solid.
<b>Form</b>	Wire.
<b>Color</b>	Not available.
<b>Odor</b>	Odorless.
<b>Odor threshold</b>	Not Applicable
<b>pH</b>	Not Applicable
<b>Vapor pressure</b>	Not Applicable.
<b>Vapor density</b>	Not Applicable.
<b>Boiling point</b>	Not available.
<b>Melting point/Freezing point</b>	1178.42 °F (636.9 °C)
<b>Solubility (water)</b>	Not soluble
<b>Specific gravity</b>	7.75
<b>Flash point</b>	Not Applicable.
<b>Flammability limits in air, upper, % by volume</b>	Not available.
<b>Flammability limits in air, lower, % by volume</b>	Not available.

**Auto-ignition temperature** Not Applicable.

**Other data**

**Explosive limit - lower (%) temperature** Not applicable

**Explosive limit - upper (%) temperature** Not applicable

### 10. Chemical Stability & Reactivity Information

**Chemical stability** Material is stable under normal conditions.

**Conditions to avoid** Contact with incompatible materials. Avoid molten metal contact with water.

**Incompatible materials** Strong oxidizers, strong acids, and strong bases. Acetylene. Magnesium. Ammonium nitrate. Hydrogen sulfide.

**Hazardous decomposition products** Toxic metal oxides are emitted when heated above the melting point.

**Possibility of hazardous reactions** Hazardous polymerization does not occur.

### 11. Toxicological Information

**Toxicological data**

Components	Species	Test Results
Silver (CAS 7440-22-4)		
<b>Acute</b>		
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg
<b>Sensitization</b>	No sensitizing effects known.	
<b>Acute effects</b>	High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever. When heated, the vapors/fumes given off may cause respiratory tract irritation. Acute overexposure to Copper dust/fume can cause irritation of the eyes, nose, throat, and skin and under severe fume overexposure can cause metal fume fever with flu-like symptoms such as sweet metal taste, dry throat, coughing, fever and chills, tight chest, dyspnea, headache, blurred vision, back pain, nausea, vomiting, fatigue. Symptoms usually disappear within 24 hours. Copper may cause skin and hair discoloration. Inhalation of copper dusts may change the gums and mucous lining of the mouth which is generally attributable to localized tissue effect rather than general toxicity.	
<b>Local effects</b>	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract. Molten material will produce thermal burns.	
<b>Chronic effects</b>	Prolonged and repeated overexposure to dust and fumes can lead to benign pneumoconiosis (stannosis). Ingestion of silver may cause a permanently benign bluish gray discoloration to the skin (argyria).	
<b>Carcinogenicity</b>	Not classifiable as to carcinogenicity to humans.	
<b>Epidemiology</b>	No data available.	
<b>Mutagenicity</b>	No data available.	
<b>Reproductive effects</b>	No data available.	
<b>Further information</b>	No other specific acute or chronic health impact noted.	

### 12. Ecological Information

**Ecotoxicological data**

Components	Species	Test Results
Copper (CAS 7440-50-8)		
<b>Aquatic</b>		
Crustacea	EC50 Water flea (Daphnia obtusa)	0.0076 - 0.026 mg/l, 48 hours
Phosphorous (CAS 7723-14-0)		
<b>Aquatic</b>		
Crustacea	EC50 Water flea (Daphnia magna)	0.025 - 0.037 mg/l, 48 hours
Fish	LC50 Bluegill (Lepomis macrochirus)	0.002 - 0.006 mg/l, 96 hours

Components	Species	Test Results
Silver (CAS 7440-22-4)		
<b>Aquatic</b>		
Crustacea	EC50	Water flea (Daphnia magna) 0.0002 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas) 0.0023 - 0.0033 mg/l, 96 hours
<b>Ecotoxicity</b>	Alloys in massive forms present a limited hazard for the environment. The product contains a substance which is very toxic to aquatic organisms and which may cause long-term adverse effects in the aquatic environment.	
<b>Environmental effects</b>	No data available for this product.	
<b>Persistence and degradability</b>	The product is not biodegradable.	
<b>Bioaccumulation / Accumulation</b>	No data available.	
<b>Mobility in environmental media</b>	Alloys in massive forms are not mobile in the environment.	

### 13. Disposal Considerations

<b>Waste codes</b>	D011: Waste Silver Product contains silver a hazardous waste constituent regulated under 40 CFR 261.24.
<b>Disposal instructions</b>	Dispose in accordance with all applicable regulations.
<b>Waste from residues / unused products</b>	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.

### 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

<b>US federal regulations</b>	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.
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#### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

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

Phosphorous (CAS 7723-14-0)

#### US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity

Phosphorous (CAS 7723-14-0) 1 lbs

#### US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity

Phosphorous (CAS 7723-14-0) 100 lbs

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

Copper (CAS 7440-50-8) 1.0 %

Phosphorous (CAS 7723-14-0) 1.0 %

Silver (CAS 7440-22-4) 1.0 %

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

Copper (CAS 7440-50-8) Listed.

Phosphorous (CAS 7723-14-0) Listed.

Silver (CAS 7440-22-4) Listed.

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

Copper: 5000  
 Silver: 1000  
 Phosphorous: 1

**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

**Section 302 extremely hazardous substance (40 CFR 355, Appendix A)** No

**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** D2B - Other Toxic Effects-TOXIC

**WHMIS labeling**

**Inventory status**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
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.  
 Phosphorous (CAS 7723-14-0) Listed.  
 Silver (CAS 7440-22-4) Listed.

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

Not listed.

**US - New Jersey RTK - Substances: Listed substance**

Copper (CAS 7440-50-8) Listed.  
 Phosphorous (CAS 7723-14-0) Listed.  
 Silver (CAS 7440-22-4) Listed.

**US - Pennsylvania RTK - Hazardous Substances: All compounds of this substance are considered environmental hazards**

Copper (CAS 7440-50-8)	LISTED
Silver (CAS 7440-22-4)	LISTED

**US. Massachusetts RTK - Substance List**

Copper (CAS 7440-50-8)	Listed.
Phosphorous (CAS 7723-14-0)	Listed.
Silver (CAS 7440-22-4)	Listed.

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

Copper (CAS 7440-50-8)	500 lbs
Phosphorous (CAS 7723-14-0)	100 lbs
Silver (CAS 7440-22-4)	500 lbs

**US. Pennsylvania RTK - Hazardous Substances**

Copper (CAS 7440-50-8)	Listed.
Phosphorous (CAS 7723-14-0)	Listed.
Silver (CAS 7440-22-4)	Listed.

**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**

Health: 2  
Flammability: 0  
Instability: 0

**Disclaimer**

All information in this Material Safety Data Sheet is believed to be accurate and reliable. However, no guarantee or warranty of any kind is made with regard to the accuracy of information or the suitability of the recommendations contained herein. It is the user's responsibility to assess the safety and toxicity of this product under their own conditions of use and to comply with all applicable laws and regulations.