

# MATERIAL SAFETY DATA SHEET

Date Issued: 10/29/2008  
 MSDS No: LS1004  
 Date Revised: 12/01/2008  
 Revision No: 1

## Silver Solder

### 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Silver Solder  
**PRODUCT DESCRIPTION:** Brazing alloys of Silver, Copper, Nickel, Zinc  
**PRODUCT CODE:** 2020  
**CHEMICAL FAMILY:** Brazing Filler Metal; Silver Solder  
**MOLECULAR FORMULA:** Alloys of silver, copper, nickel, and zinc

#### MANUFACTURER

Ortho Technology, Inc.  
 17401 Commerce Park Boulevard  
 Tampa FL 33647  
**Product Stewardship:** 1-800-999-3161

### 2. COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENT(S)	CAS	% BY WEIGHT
Copper	7440-50-8	~ 19 - 95
Nickel	7440-02-0	~ 0.1 - 24
Silver	7440-22-4	~ 1.5 - 55
Zinc	7440-66-6	~ 2 - 44

See Section 8 for Exposure Limits

**WHMIS CLASS: Division(s):** D2A, D2B

### 3. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

**PHYSICAL APPEARANCE:** Odorless white to light yellow metals in form of wire, rod, strip, powder, grain, clad alloys or preformed shapes.

#### POTENTIAL HEALTH EFFECTS

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

**INGESTION:** Ingestion of these products may cause nausea, vomiting, and gastrointestinal irritation.

**INHALATION:** 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,

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weakness, and a metallic taste. Chronic exposure may damage the liver, kidney, spleen, pancreas, and brain.

**NICKEL:** Acute exposure to nickel may cause headache, nausea, vertigo, asthma, and pulmonary edema. Chronic exposure may increase the risk of cancer to the nasopharynx, lungs, prostate, and kidney.

**SILVER:** Chronic exposure may produce argyria, a permanent blue-gray discoloration of the skin, eyes, mucous membranes, and respiratory tract.

**ZINC:** Acute exposure to zinc oxide fume 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.

**MEDICAL CONDITIONS AGGRAVATED:** Pre-existing pulmonary diseases (e.g., bronchitis, asthma) may be aggravated by inhalation exposure, particularly as fume. Chronic exposure by inhalation may aggravate pre-existing diseases of the liver, kidneys, gastrointestinal system, musculoskeletal system, and nervous system.

**ROUTES OF ENTRY:** Inhalation, ingestion.

### 4. FIRST AID MEASURES

**EYES:** Flush affected areas 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 assistance 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.

**NOTES TO PHYSICIAN:** None of the components are acutely toxic by ingestion, nor are they absorbed through the skin. Extensive or prolonged skin contact may cause contact or allergic dermatitis.

### 5. FIRE FIGHTING MEASURES

**FLASHPOINT AND METHOD:** NA = Not Applicable

**AUTOIGNITION TEMPERATURE:**

**Notes:** NA = Not Applicable

**FLAMMABLE CLASS:** NA = Not Applicable

**EXTINGUISHING MEDIA:** Use dry chemical. Do not use water.

**FIRE FIGHTING PROCEDURES:** 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.

**FIRE EXPLOSION:** In finely-divided form, these products may ignite when exposed to incompatible materials (See Section #10). If present in a fire or explosion, they will emit fumes of the constituent

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metals or metal oxides.

### 6. ACCIDENTAL RELEASE MEASURES

**GENERAL 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.

### 7. HANDLING AND STORAGE

**HANDLING:** No Special handling precautions are required.

**STORAGE:** Do not store in proximity to incompatible materials (see Section #10)

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### EXPOSURE GUIDELINES

HAZARDOUS COMPONENTS					
		EXPOSURE LIMITS			
		OSHA PEL		ACGIH TLV	
Chemical Name		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Copper	TWA	[1]	0.1 - 1 mg/m <sup>3</sup> (fume;dust and mists) [1]		0.2 - 1 mg/m <sup>3</sup> (fume; dusts and mists)
Nickel	TWA		1 mg/m <sup>3</sup>		1.5 mg/m <sup>3</sup> (metal)
Silver	TWA		0.01 mg/m <sup>3</sup>		0.1 mg/m <sup>3</sup> (metal)
Zinc	TWA	[2]	5 mg/m <sup>3</sup> [2]	[3]	5 mg/m <sup>3</sup> [3]
	STEL			[2]	10 mg/m <sup>3</sup> [2]
<b>Footnotes:</b> 1. OSHA PELs : 0.1 mg/m <sup>3</sup> TWA (fume); 1 mg/m <sup>3</sup> TWA (dusts and mists) 2. as ZnO fume 3. as ZnO Fume					

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

#### PERSONAL PROTECTIVE EQUIPMENT

**EYES AND FACE:** Wear eye protection adequate to prevent eye contact with finely-divided product and eye injury if products are used with a flame. Plastic-frame spectacles with side shields and filter lenses (shade #3 or #4) are recommended.

**SKIN:** Wear appropriate protective gloves and clothing to prevent skin injury if these products are used with a flame. Avoid flammable fabrics.

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**RESPIRATORY:** 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).

**WORK HYGIENIC PRACTICES:** To minimize ingestion, wash hands and face before eating, drinking, applying cosmetics or using tobacco.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL STATE:** Solid

**ODOR:** Odorless

**APPEARANCE:** White to light yellow metals in form of wire, rod, strip, powder, grain, clad alloys, or preformed shapes.

**COLOR:** White to Light Yellow

**pH:** NA = Not Applicable

**PERCENT VOLATILE:** NA = Not Applicable

**VAPOR PRESSURE:** NA = Not Applicable

**VAPOR DENSITY:** NA = Not Applicable

**MELTING POINT:** > 660°C (1220°F)

**SOLUBILITY IN WATER:** Insoluble.

### 10. STABILITY AND REACTIVITY

**STABILITY:** Stable.

**POLYMERIZATION:** Will not occur

**CONDITIONS TO AVOID:** Silver and Copper can form unstable acetylides if in contact with acetylene gas.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Heating to elevated temperatures may liberate metal/metal oxide fumes.

**INCOMPATIBLE MATERIALS:** Strong oxidizers; ammonia, ammonium nitrate; azides; nitric acid; ethylene imine; chlorine 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; hydrazine; hydrazoic acid; performic acid; phosphorus; selenium; dioxane; sulfur; titanium plus potassium perchlorate; strong acids; inorganic nitrates; carbonyl disulfide; hydrazine mononitrate; hydroxylamine; selenium; tellurium.

### 11. TOXICOLOGICAL INFORMATION

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### ACUTE

Chemical Name	ORAL LD <sub>50</sub> (rat)	INHALATION LC <sub>50</sub> (rat)
Copper	No data available	No data available
Silver	> 5 gm/kg (oral/guinea pig)	No data available
Zinc	No data available	No data available

### CARCINOGENICITY

**IARC:** Nickel is listed in the IARC Monographs.

**NTP:** Nickel is listed on the National Toxicology Program.

**GENETIC EFFECTS:** Nickel has produced mutagenic responses in mammalian cell cultures.

**REPRODUCTIVE EFFECTS:** Nickel has produced fetotoxic and teratogenic effects in animal studies.

### 12. ECOLOGICAL INFORMATION

**COMMENTS:** In its intended manner of use, this product should not be released into the environment, and adverse effects on ecosystems are not anticipated under recommended conditions of use, storage, and disposal.

### 13. DISPOSAL CONSIDERATIONS

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

### 14. TRANSPORT INFORMATION

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

### 15. REGULATORY INFORMATION

#### UNITED STATES

#### SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

**ACUTE:** Yes **CHRONIC:** Yes

**313 REPORTABLE INGREDIENTS:** Copper, Nickel, Silver.

#### CANADA

**WHMIS CLASS: Division(s):** D2A, D2B

**CANADA INGREDIENT DISCLOSURE LIST:** 1. Copper, elemental (CASRN 7440-50-8)  
 2. Nickel, elemental (CASRN 7440-02-0)  
 3. Silver, elemental (CASRN 7440-22-4)

