

**MATERIAL SAFETY DATA SHEET**  
**PHOSPHOR BRONZE ALLOYS 510, 511, 519, 521**  
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**1.0 PRODUCT AND COMPANY IDENTIFICATION**

*Malin Company*  
*5400 Smith Road*  
*Brook Park, OH 44142*

**PRODUCT NAMES:**

ALLOY #	COMMON NAME	UNS #/CDA #
510	Phosphor Bronze 5%	C51000
511	Phosphor Bronze 4%	C51100
519	Phosphor Bronze 6%	C51900
521	Phosphor Bronze 8%	C52100

**CHEMICAL FAMILY:** Copper Alloy

**ISSUE DATE:** December 15, 2004

**SUPERSEDES DATE:** May 13, 1999

**2.0 HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW:**

Copper alloy products in the natural state do not present a hazard for emergency response personnel.

**POTENTIAL HEALTH EFFECTS:**

Copper alloy products in the natural state do not present an inhalation, ingestion, or contact hazard. However, operations such as burning, welding, sawing, brazing, or grinding may release fumes and/or dusts which may present health hazards if occupational exposure limits are exceeded.

**LIKELY ROUTES OF EXPOSURE:** Inhalation, Eye Contact, Skin Contact

**INHALATION:** Short-term exposure to fumes/dust may produce irritation of the respiratory system. Exposure to high concentrations of oxide fumes of copper or tin may cause metal fume fever.

**EYE:** Short-term exposure to fumes/dust may produce irritation.

**SKIN:** Repeated or prolonged exposure to copper dusts or mists may cause irritant or allergic contact dermatitis.

**INGESTION:** Abdominal pain, nausea, vomiting.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:**

Exposure to fumes or dust may aggravate existing respiratory disease or dermatitis.

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**TARGET ORGANS:** Upper respiratory tract, eyes, skin

**SIGNS AND SYMPTOMS:**

Metal fume fever – metallic taste in mouth, dryness, and irritation of the throat, and influenza-like symptoms. The effects may be delayed.

**CARCINOGENICITY:**

COMPONENT	ACGIH	IARC	NTP
Copper (fume, dusts & mists)	No	No	No
Tin (metal/oxide)	No	No	No

See Toxicological Information (Section #11)

**POTENTIAL ENVIRONMENTAL EFFECTS:**

None known. Product has not been tested for environmental properties.

**3.0 CHEMICAL COMPONENTS**

NOTE: This MSDS applies to a range of alloys. For actual compositions refer to material test report or specific alloy specification. All percentages are by weight.

COMPONENT	CAS #	%
Copper	7440-50-8	91.9 – 95.9
Tin	7440-31-5	4 – 8

**4.0 FIRST AID MEASURES**

**INHALATION:** If exposed to excessive levels of metal fumes, remove to fresh air. Seek medical attention.

**EYE:** Flush with water for at least 15 minutes.

**SKIN:** Wash with soap and water.

**5.0 FIRE FIGHTING MEASURES**

**SUITABLE EXTINGUISHING MEDIA:** Use extinguishing media appropriate to the surrounding material.

**SPECIAL FIREFIGHTING INSTRUCTIONS:** Copper alloy products in the solid state present no fire or explosion hazard, but may react with strong acids, bases, or oxidizing agents.

**6.0 ACCIDENTAL RELEASE MEASURES**

**STEPS TO BE TAKEN IN THE EVENT OF SPILLS, LEAKS, OR RELEASES:** Not applicable

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## 7.0 HANDLING AND STORAGE

**HANDLING:** In welding, precautions should be taken for airborne contaminants that may originate from components of the welding rod.

## 8.0 EXPOSURE CONTROLS/PERSONAL PROTECTION

### EXPOSURE GUIDELINES

COMPONENT	OSHA PEL TWA	ACGIH® TLV® TWA
Copper dust, mist	1.0 mg/m <sup>3</sup>	1.0 mg/m <sup>3</sup>
Copper fume	0.1 mg/m <sup>3</sup>	0.2 mg/m <sup>3</sup>
Tin metal/oxide	2.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>

**ENGINEERING CONTROLS:** Local exhaust ventilation should be utilized when welding, burning, sawing, brazing, grinding, or machining when exposure exceeds occupational exposure limits.

**EYE PROTECTION:** Safety glasses or goggles should be utilized as required by exposure. Other protective equipment should be utilized as required by welding standards.

**SKIN PROTECTION:** Wear appropriate personal protective clothing to prevent skin contact with copper dusts and mists.

**RESPIRATORY PROTECTION:** NIOSH-approved dust or fume respirator should be used to avoid excessive inhalation of particulates when exposure exceeds occupational exposure limits.

**OTHER PREVENTIVE MEASURES:** Do not eat, drink, or smoke during work. Wash hands before eating or smoking.

## 9.0 PHYSICAL AND CHEMICAL PROPERTIES

<b>APPEARANCE:</b>	Salmon-colored, lustrous metal		
<b>ODOR:</b>	None	<b>PHYSICAL STATE:</b>	Solid
<b>PH:</b>	Not applicable	<b>VAPOR PRESSURE:</b>	Not applicable
<b>VAPOR DENSITY (AIR = 1)</b>	Not applicable	<b>PERCENT VOLATILE:</b>	Not applicable
<b>EVAPORATION RATE:</b>	Not applicable	<b>SPECIFIC GRAVITY:</b>	8.8 – 8.9
<b>SOLUBILITY IN WATER:</b>	Not applicable	<b>DENSITY, LB/IN<sup>3</sup>:</b>	0.32
<b>MELTING POINT:</b>	1,880 – 1,945 °F		
<b>FLASH POINT:</b>	Not applicable	<b>LOWER EXPLOSIVE LIMIT (%):</b>	None
<b>AUTOIGNITION TEMPERATURE:</b>	Not applicable	<b>UPPER EXPLOSIVE LIMIT (%):</b>	None

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**10.0 STABILITY AND REACTIVITY**

**CHEMICAL STABILITY:** Stable

**CONDITIONS TO AVOID:** None

**INCOMPATIBLE MATERIALS:** Mercury, ammonia, acetylene acids. Contact with strong acids, bases, or oxidizing agents

**HAZARDOUS DECOMPOSITION PRODUCTS:** Metallic dust or fumes may be produced during welding, burning, grinding, and machining.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Will not occur

**11.0 TOXICOLOGY INFORMATION**

**ACUTE TOXICITY DATA FOR COMPONENTS**

Copper TDLo: 120 µg/kg (human, oral—gastrointestinal effects)  
LD<sub>50</sub>: 0.07 mg/kg (mouse, intraperitoneal)

Tin TDLo: 250 mg/kg (human, oral—gastrointestinal effects)

**CHRONIC EFFECTS:**

Repeated or prolonged overexposure to copper fume may cause the skin and hair to change color.  
Repeated or prolonged overexposure to tin dusts or fumes may cause stannosis.

**12.0 ECOLOGICAL INFORMATION**

Not applicable

**13.0 DISPOSAL CONSIDERATIONS**

**WASTE DISPOSAL METHODS:**

According to local, state, and federal regulations.

**14.0 TRANSPORT INFORMATION**

Not applicable

**15.0 REGULATORY INFORMATION**

**GLOBAL INVENTORIES**

	COPPER	TIN
TSCA: United States	Included	Included
DSL: Canada	Included	Included
EINECS: European Union:	Included	Included

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### SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):

These alloys are not regulated under Section 302 of SARA and 40 CFR 355.

### SARA TITLE III SECTION 311/312 HAZARDOUS CATEGORIZATION (40 CFR 370):

OSHA defines these alloys as hazardous under 29 CFR 1910.1200(d).

### SARA TITLE III SECTION 313 TOXIC CHEMICALS (40 CFR 372):

These alloys may contain the following toxic chemical(s) subject to reporting requirements under this section of SARA and of 40 CFR 372:

COMPONENT	CAS #	% BY WEIGHT
Copper	7440-50-8	87.5 – 88.5

### OTHER LISTS

Chemical Name	CA Prop 65 Chemical	MA Toxic Substance List	MI Critical Materials Register	NJ Hazardous Substances List	PA Right-to-Know List
Copper	No	Yes	Yes	Yes	Yes
Tin	No	Yes	No	No	Yes

### 16.0 OTHER INFORMATION

#### REFERENCES

ACGIH® Threshold Limit Values (TLV®) (2004)  
Agency for Toxic Substances and Disease Registry (ATSDR):  
    Toxicological Profile for Copper, September 2002  
    Draft Toxicological Profile for Tin, September 2003  
International Agency for Research on Cancer (IARC) Monographs  
National Library of Medicine (NLM) Databases:  
    ChemID  
    Integrated Risk Information (IRIS)  
    International Toxicity Estimates for Risk (ITER)  
    Chemical Carcinogenesis Risk Information System (CCRIS)  
    Hazardous Substances Data Bank (HSDB)  
National Toxicology Program (NTP) Reports  
NIOSH Pocket Guide to Chemical Hazards (2003)  
NIOSH/OSHA Occupational Health Guideline for Copper Fume  
NIOSH/OSHA Occupational Health Guideline for Copper Dusts and Mists

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NIOSH/OSHA Occupational Health Guideline for Inorganic Tin Compounds (as Tin)

OSHA General Industry Standards (29 CFR 1910)

Registry of Toxic Effects of Chemical Substances (RTECS®)

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