MATERIAL SAFETY DATA SHEET

Hazardous Material as Defined in 29 CFR 1910.1200 OSHA Limit

SECTION 1: COPPER ALLOY

Alloy Number & Name Cast Iron Gray

SECTION 2: ELEMENTS

Chemical Exposure Limits

Alloying Elements 1% or Greater

Element	CAS Number		(1984-1985) OSHA Limit 8-hr TWA	ACGIH 8-hr TWA
Aluminum	(7429-90-5)	(Dust)	—	10.0 mg/m³
		(Fume)	—	5.0 mg/m³
Beryllium	(7440-41-7)	(3)	.002 mg/m³	(3) .002 mg/m³
Chromium	(7440-47-3)		1.0 mg/m³	0.5 mg/m³
Cobalt	(7440-48-4)		0.1 mg/m³	0.1 mg/m³
Copper	(7440-50-8)	(Dust)	1.0 mg/m³	1.0 mg/m³
		(Fume)	0.1 mg/m³	0.2 mg/m³
Iron	(1309-37-1)		10.0 mg/m³	5.0 mg/m³ (As iron oxide fume)
Lead	(7439-92-1)		0.05 mg/m³	0.15 mg/m³
Manganese	(7439-96-5)	(Dust)	5.0 mg/m³*	5.0 mg/m³*
		(Fume)	—	1.0 mg/m³
Nickel	(7440-02-0)		1.0 mg/m³	1.0 mg/m³
Niobium			No Established Limits	
Silicon	(7440-21-3)		(1)	(2)
Silver	(7440-22-4)		0.01 mg/m³	0.01 mg/m³
Tin	(7440-31-5)		2.0 mg/m³ (Inorganic, except oxides)	2.0 mg/m³
Zinc	(7440-66-6)	(Fume)	5.0 mg/m³	5.0 mg/m³

* Ceiling Limit

(1) (1% Quartz, 15 mg/m³ of total dust, or 5 mg/m³ respirable dust.

(2) (1% Quartz, 10 mg/m³ of total dust, or 5 mg/m³ respirable dust.

(3) Beryllium 0.005 mg/m³, except maximum peak 0.025 mg/m³ for a 30-minute period.

SECTION 3: PHYSICAL DATA

Physical Form:	Solid
Boiling Point:	2750°
Freeze Melt Temperature:	N/A
Vapor Pressure:	N/A
Specific Gravity:	7.86
Density:	N/A lbs/in³
Solubility in Water:	N/A
Color:	Silver Gray
Odor:	None

SECTION 4: FIRE AND EXPLOSION DATA

Flashpoint: N/A Auto Ignition Temp: N/A

Flammability Limits: N/A

In the solid form, there are no fire or explosion hazards with these alloys. Fine chips or dust may ignite and should be stored in a well-ventilated area. In case of fire, use extinguishing agents appropriate for the surroundings or materials. Dry chemicals or sand should be used to extinguish fires. Fire fighters should wear full protective clothing and where conditions warrant NIOSH-approved, self-contained breathing apparatus, see sections 6 and 7.

SECTION 5: REACTIVITY DATA

Copper alloys are stable under normal conditions of transport, use, and storage.

SECTION 6: HEALTH HAZARD DATA

Primary Routes of Entry: Inhalation of dust or fumes.

BERYLLIUM = Beryllium and its compounds are severe pulmonary and primary skin irritants, as well as skin sensitizers. Principal symptom of acute exposure is Dyspnea. Chronic inhalation causes "Berylliosis" or chronic granulomatosis.

COPPER and MANGANESE: Under normal handling and use, exposure to the solid form of copper alloy presents few health hazards. Thermal cutting, melting, machining/grinding may produce fumes or dust containing the compound elements, and breathing these fumes or dust may present significant health hazards. The exposure limits in Section 2 are relevant to fumes and dust. Fumes of copper and manganese may cause metal fume fever with flu-like symptoms, and copper may cause skin and hair discoloration. Overexposure to manganese can cause chronic manganese poisoning.

IRON OXIDE: Chronic overexposure to iron oxide fumes may cause an apparent benign pneumoconiosis: this overexposure is called siderosis.

LEAD – Short-Term Exposure: Lead is an accumulative poison. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, constipation, abdominal pains, and decreasing appetite. The effects are reversible and complete recovery is possible. Inhalation of large amounts of lead may lead to seizures, coma, and death.

LEAD – Long-Term Exposure: Long-term exposure to lower levels can result in a build-up of lead in the body and more severe symptoms. Prolonged exposure may also result in kidney damage. Continuous exposure can result in decreased fertility, and exposure of the mother during pregnancy can cause birth defects.

NICKEL: Nickel dust and fumes can cause lung irritation, shortness of breath, coughing and wheezing.

TIN: Chronic overexposure to tin fumes may cause an apparent benign pneumoconiosis: this is called stannosis.

ZINC: Overexposure to zinc oxide fumes can cause "Metal Fume Fever."