

Section I - Material Identification

C18000 – CuCrNiSi (may also be specified as RWMA Class 3 or MOLD-MOR 1)

Section II - Hazardous Ingredients

Ingredient (wt %)	CAS Number		OSHA-PEL 8 - Hr TWA 1993	ACGIH-TLV 8-Hr TWA 1990-1991	ACGIH STEL 1990-1991
Copper (96.0)	(7440-50-8)	Dust	1 mg/m ³	1 mg/m ³	-----
		Fume	0.1 mg/m ³	0.2 mg/m ³	-----
Nickel (2.5)	(7440-02-0)	Metal	1 mg/m ³	0.05 mg/m ³	-----
		Soluble Compounds	0.1 mg/m ³	0.05 mg/m ³	-----
Silicon (0.6)	(7440-21-3)	Dust	Dust total=15 mg/m ³	10 mg/m ³	-----
		Respirable Dust	5 mg/m ³		-----
Chromium (0.4)	(7440-47-3)	Metal	1 mg/m ³	0.5 mg/m ³	-----
		Compounds	1 mg/m ³	0.5 mg/m ³	-----

Section III - Physical Data

Physical form:	Solid		
Boiling point:	Copper 2300 Deg C.	Specific Gravity:	8.92(Copper)
Vapor Pressure @20deg C:	N/A	Melting Point:	1083 deg. C. (Copper)
Vapor Density:	N/A	Evaporation Rate:	N/A
Solubility in Water:	Insoluble	Appearance:	Red, metallic
Odor:	No odor		

Section IV – Fire and Explosion Data

Flash Point: N/A Auto Ignition Temperature: N/A Flammable Limits(LEL-UEL): N/A

Solid masses are not combustible under normal conditions. Fire and explosion hazards are moderate when the material is in the form of dust and fine powder when exposed to heat, flame, sparks, exothermic (heat generating) chemical reactions. Accumulations of metallic dust and powders should be eliminated. Avoid the generations of ignition sources sparks, and flame in areas of dust and fine powder.

Extinguishing media: Use no water; Use powdered extinguishing agents (Class D), dry sand or dry powders for metal fires.

Special Fire fighting Procedures:

Powder extinguishing agents should be applied gently on metal fires to avoid breaking any crust, which may have formed over the metal.

Unusual Fire and Explosion Hazards:

- Never put water or liquids on molten metal; explosion will ensue.
- Powdered metal may ignite spontaneously.

Hazardous Combustion Products:

Metals involved in a fire at extremely high temperatures or in a molten state produce fume, gas, vapor, and/or dust that may be toxic and/or respiratory irritants.

Section V – Reactivity Data

Stability: Stable under normal conditions

Conditions to avoid: Molten Metal may act violently with water. During storage avoid exposure to strong acids, bases, oxidizers and the materials indicated below in the incompatibility section as it relates to composition

Hazardous Decomposition or Byproducts: Metal fume, metal oxide fume and vapors.

Hazardous Polymerization: Not applicable

Materials to avoid – incompatibility:

With Copper: Copper reacts violently and is incompatible with acetylene, chlorine, chlorates, sodium azide, halogens, halogenates, peroxides, hydrogen sulfide, bromates, hydrazoic acid, iodates, chloride, potassium oxide, ammonium nitrate, phosphorous, lead azide, fluorine, ethylene oxide, hydrazic acid, acetylene compounds, 3-bromopropene, CF_4 , hydrazine, mononitrate, oxygen difluoride, oxidizers, alkalis, alkalines, 1-bromo-2-propyne. Avoid contact with acids. Burns spontaneously in chlorine gas. Magnesium and copper dust or mist are incompatible. Remove all moisture from metal prior to any melting operations.

With Chromium: Chromium reacts violently with nitric oxide, potassium chloride, lithium, ammonium nitrate, hydrogen peroxide, and sulfur dioxide. Incompatible with oxidizers and alkalis. Chromium powder will explode spontaneously in air. Dust will burn or explode in contact with ammonium nitrate.

With Nickel: Incompatible and can react violently with fluorine, ammonium nitrate, hydrazine, hydrogen with dioxane, NH_3 , performic acid, phosphorus, selenium, sulfur, titanium with potassium perchlorate, strong acids, combustibles like wood, nickel nitrate, methanol, hydrogen, non-metals, oxidants, aluminum, hydrazoic acid, iron, chlorine, peroxides, iodates, bromates, chlorates, sodium azide, copper nitrogen dioxide, acetylene, chlorine trifluoride. Strong acids in contact with nickel produces flammable hydrogen gas.

With Silicon: Incompatible and will react with chlorine, fluorine, oxidizers, calcium, cesium carbide, alkaline carbonates, Al and PbO , Ca_2C_2 , COF_2 , IF_5 , MnF_2 , Rb_2C_2 , FNO , AgF , Na alloy, plus water or steam.

Section VI - Health Hazard Data

Health hazard data does not exist for this specific metal alloy. Data for individual ingredients is given.

Summary of Acute hazards: Respiratory tract irritation, metal fume fever, eye irritation.

Summary of Chronic Hazards and Special Effects: See below. "Effects of Overexposure"

Copper - Melting, grinding, and cutting of copper may produce fumes or dust exposure. Breathing these fumes or dust may present potentially significant health hazards. Fumes of copper may cause metal fume fever with flu-like symptoms, diarrhea, and skin and hair discoloration. While industrial dermatitis has not been reported, keratinization of the hands and soles of the feet has been reported. Systemically, copper dust and fume cause irritation of the upper respiratory tract, metallic taste in the mouth, and nausea. Copper fragments in the cornea may cause cataracts, discoloration or loss of an eye.

Chromium - Chromium compounds act as allergens with some workers and may cause dermatitis and may produce pulmonary sensitization. Chromic acid and chromates have a direct corrosive effect on the skin and the mucous membranes of the upper respiratory tract. Although rare, there may be the possibility of skin and pulmonary sensitization. IARC has determined that there is sufficient evidence of increased lung cancer among workers in the chromate producing industry and possible chromium alloy workers. This determination is supported by sufficient evidence for carcinogenicity to animals and possible mutagenicity testing of Cr compounds.

Nickel - The most common ailment arising from contact with nickel or its compounds is allergic dermatitis, known as "nickel itch" which usually occurs when the skin is moist. Generally nickel and salts of nickel do not cause systemic poisoning, but nickel has been identified as a suspected carcinogen. Nickel intoxication may result in nasal and lung cancer.

Silicon - Accumulation in the lungs may be responsible for benign pneumoconiosis, but it is not considered to be responsible for pulmonary functional impairment or respiratory symptoms.

Section VII – Precautions for Safe Handling or Use

Chemical Exposure: Metal dust and fume exposure should be minimized when alloys are subject to grinding cutting, extreme heat or other forms of metalworking. Avoid breathing dust or fume by ensuring adequate ventilation and/or wearing personal protective equipment when necessary.

Safe Handling and Storage: Do not store near strong acids, bases or oxidizing agents or incompatible materials as described in Section V above. Prevent exposure to rain water, which may result in storm water pollution.

Steps to be Taken in Case Material is Released or Spilled: In outdoor areas, copper alloys should be collected and covered promptly to prevent exposure to storm water. Heavy metals may leach from exposed alloys and contribute to storm water pollution.

Waste Disposal: Copper and copper alloy byproducts and used components should be recycled whenever possible. If land filled, incinerated or otherwise disposed of, cadmium-bearing alloys may be classified as RCRA hazardous waste, as determined by the TCLP analytical test method. In some states, the presence of copper may classify waste as hazardous.

Section VIII- Control Measures

Respiratory Protection:

Engineering or administrative controls should be used to reduce exposures below the PEL/TLV. If exposure exceeds the PEL/TLV, use NIOSH or MSHA approved respirator protective equipment for the specific contaminant (dust/fume/mist). An industrial hygienist, safety engineer, or other qualified personnel should be consulted. Approved breathing equipment may be required for non-routine and emergency use.

Ventilation:

Local exhaust ventilation is required when dust, fumes or mists are generated. Local and general exhaust ventilation should be used to keep airborne concentrations of dust, fumes, or mists below the PEL and TLV limits.

Protective Gloves:

Required for melting, pouring, grinding, welding and handling of sharp or hot exposed metal. Select glove approved for the specific application.

Eye Protection:

Required for melting, pouring, grinding, cutting or welding. Minimum requirement of approved safety glasses with side shields or goggles are specified for these operations. Melting, pouring, and welding may require special eye or face protection including face shields, helmets or tinted glass. Grinding operations may require face shields. Safety eyewash stations should be provided near work areas.

Other Protective Clothing or Equipment:

Use both primary and secondary personal protective equipment and special heat and molten metal resistant clothing for metal splash and spilling. Full protective clothing is required as appropriate for chips, dust, powder, and high heat.

Work/Hygiene Practices:

No eating, drinking, or use of tobacco products in work areas. Wash hands and face after skin contact and before eating, drinking, or use of tobacco products and rest room use. Do not wear contaminated clothing during eating, drinking, tobacco, and rest room use. Take a shower and change clothes at the end of the shift or after very soiling conditions. All contaminated clothing must be left at the manufacturing facility. Work clothing should be laundered separately from other household laundry. Avoid inhalation and ingestion. Train employees in good work and hygiene practices. Do not use air hose to clean personnel or machines. Follow local, state, or local standards for cadmium.

Engineering Controls:

Worker exposure to hazardous conditions and airborne contaminants must be evaluated brought into compliance through the use of engineering and administrative controls. Personal protective equipment may be used as a redundant measure or utilized when engineering measures are not feasible. Use process enclosures, local, or general ventilation to maintain airborne dusts and fumes below PELs and TLVs. If ventilation is used to remove dust and fumes generated by grinding, cutting, or other operations, special ventilation procedures may be necessary to avoid explosion hazards in the ducts by maintaining dust concentrations below explosive limits.

Section IX - Additional Precautions

Handling Storage and Decontamination Procedures:

Good housekeeping must be practiced during storage, transfer, handling and use to avoid excessive dust accumulation. Apply recommendations of NFPA 49⁹ for copper alloys.
