

# MATERIAL SAFETY DATA SHEET

REV: 01/01/12

U.S. OSHA HAZARD COMMUNICATION STANDARD,  
29 CFR 1910.1200/ILL TSDA Pa 38-20

## SECTION 1

MANUFACTURER NAME H. KRAMER & CO.		EMERGENCY TELEPHONE NO. (312) 226-6600
ADDRESS (Number, Street, City, State, and Zip Code) 1345 W. 21st STREET, CHICAGO, ILLINOIS 60608		
CHEMICAL NAME and SYNONYMS Manganese Bronze ( 58-39-1-1-1 )		TRADE NAME and SYNONYMS 421 - 65,000 Tensile Mang. Bronze
CHEMICAL FAMILY Metal Alloy	FORMULA ASTM C86500	

## SECTION II - HAZARDOUS INGREDIENTS

ELEMENT	CAS NUMBER	PERCENTAGE	PEL OSHA 8-HR TWA MG/M3	TLV ACGIH 8-HR TWA MG/M3
Copper	7440-50-8	55.00 - 60.00	0.1 (Fume)	0.1 (Fume)
Tin	7440-31-5	1.00 Max	2	2
Lead	7439-92-1	.30 Max	0.05 (Fume)	0.05 (Fume)
Zinc	7440-66-6	36.00 - 42.00	5 (Oxide Fume)	5 (Oxide Fume)
Iron	1309-37-1	.40 - 2.00	10 (Oxide Fume)	5 (Fume)
Nickel	7440-02-0	.80 Max	1	1
Aluminum	7429-90-5	.50 - 1.50	5 (Dust)	5 (Dust)
Manganese	7439-96-5	.10 - 1.50	5 (Fume)	1 (Fume)

## SECTION III - PHYSICAL DATA

<b>BOILING POINT (F°)</b>	<b>SPECIFIC GRAVITY (H<sub>2</sub>O=1)</b>	8.30
Copper	4703	Molten state operating temperature is 1800 to 2200 F
Tin	4120	
Lead	3137	
Zinc	1663	
Iron	5430	
Nickel	4900	
Aluminum	4442	
Manganese	3806	
<b>APPEARANCE &amp; ODOR:</b> Odorless yellow metal		

## SECTION IV - FIRE and EXPLOSION HAZARD DATA

FLASH POINT (Method used)	N/A	FLAMMABLE LIMITS (%V)	LEL N/A	USI N/A
EXTINGUISHING MEDIA	Dry chemicals or sand should be used with molten metals.			
SPECIAL FIRE FIGHTING PROCEDURES	Fire Fighters should wear full protective clothing.			
UNUSUAL FIRE AND EXPLOSION HAZARDS	DO NOT USE WATER ON MOLTEN METALS.			

**SECTION V - HEALTH HAZARD DATA**

ROUTE(S) OF ENTRY	INHALATION	SKIN	INGESTION
	YES	NO	YES
EFFECTS OF OVEREXPOSURE	SEE ATTACHMENT ITEMS 8, 17, 10, 18, 9, 13, 1, 12		
EMERGENCY AND FIRST AID PROCEDURES	SEE ATTACHMENT ITEMS 8, 17, 10, 18, 9, 13, 1, 12		

**SECTION VI - REACTIVITY DATA**

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	N/A
INCOMPATIBILITY (MATERIALS TO AVOID)	STRONG OXIDIZERS		
HAZARDOUS DECOMPOSITION PRODUCTS	N/A		
HAZARDOUS	MAY OCCUR		CONDITIONS TO AVOID
POLYMERIZATION	WILL NOT OCCUR	X	N/A

**SECTION VII - SPILL OR LEAK PROCEDURES**

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Special care should be taken when handling molten metal. Always wear proper safety equipment.
Accumulations of dust should be vacuumed or wet-swept to prevent airborne exposure.
WASTE DISPOSAL METHOD
Metal turnings, chips, risers, grindings, etc. are recycled. If not recycled, dispose of material in accordance with the requirements of 40 CFR subtitle C and other applicable federal, state, and local regulations.

**SECTION VIII - SPECIAL PROTECTION INFORMATION**

RESPIRATORY PROTECTION (SPECIFY TYPE)	NIOSH Certified (3M 9920, etc.)	
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (GENERAL)	OTHER
PROTECTIVE GLOVES	Industrial Type	EYE PROTECTION
		Safety Glasses/Goggles/Shields
OTHER PROTECTIVE EQUIPMENT	Compliance with OSHA Regulations and other accepted safety and hygiene practices.	

**SECTION IX - SPECIAL PRECAUTIONS**

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Material in storage can become wet from condensation. It must be thoroughly dried before adding to molten metal. See other sections, references and sources.

## MATERIAL SAFETY DATA SHEET ATTACHMENT

1. **ALUMINUM**..... EFFECTS OF EXPOSURE: Fumes are a low health risk by inhalation. Defined as a nuisance by (ACGIH)  
EMERGENCY & FIRST AID TREATMENT: No medical treatment necessary.
2. **ANTIMONY**..... EFFECTS OF EXPOSURE: May cause irritation to skin/contact dermatitis. Inhalation can cause inflammation of the upper and lower respiratory tracts. Chronic poisoning symptoms are dryness of throat, nausea, headaches, sleeplessness, loss of appetite and dizziness. In acute severe poisoning there may be death from circulatory or respiratory failure or toxic hepatitis.  
EMERGENCY & FIRST AID TREATMENT: Remove from exposure and have biological monitoring under direction of physician.
3. **BISMUTH**..... EFFECTS OF EXPOSURE: No reported or recognized ill effects have been traced to bismuth metal. All reported toxicity data has been determined on soluble bismuth pharmaceuticals that are no longer used.  
EMERGENCY & FIRST AID TREATMENT: Remove from exposure. Place individual under care of a physician.
4. **BERYLLIUM**..... EFFECTS OF EXPOSURE: Enters the body almost entirely by inhalation and can cause systemic disease of long duration. Symptoms are weakness, easy fatigue and weight loss.  
EMERGENCY & FIRST AID TREATMENT: Remove from exposure. On overexposure obtain prompt medical care by a physician.
5. **CADMIUM**..... EFFECTS OF EXPOSURE: Inhalation may lead to chemical pneumonitis and in severe cases pulmonary edema. Symptoms are influenza-like similar to metal-fume fever and generally occur within an 8 hour period. In severe cases death can occur after 4 to 7 days. It should be stressed that cadmium induced kidney damage is irreversible.  
EMERGENCY & FIRST AID TREATMENT: Remove from exposure and give oxygen therapy if necessary. Obtain prompt medical care.
6. **CHROMIUM**..... EFFECTS OF EXPOSURE: Can cause skin and mucous membrane irritation, dermatitis, chrome ulceration, perforation of the nasal septum, bronchial carcinoma, and adenocarcinoma. Listed NTP and IARC monographs.  
EMERGENCY & FIRST AID TREATMENT: Wash skin thoroughly after contact. Obtain medical care for chrome ulceration.
7. **COBALT**..... EFFECTS OF EXPOSURE: Inhalation of fume will produce systemic poisoning with myocardial disorders and irritant effects on the airways, eyes and digestive tract. Symptoms range from shortness of breath to coughing.  
EMERGENCY & FIRST AID TREATMENT: No antidote exists. Monitoring by a physician with particular attention to the cardiovascular system advisable.
8. **COPPER**..... EFFECTS OF EXPOSURE: Industrial exposure to copper fumes results in metal fume fever with atrophic changes in nasal mucous membranes. Chronic poisoning results in Wilson's disease, characterized by a hepatic cirrhosis, brain damage, demyelination, renal disease and copper deposition in the cornea.  
EMERGENCY & FIRST AID TREATMENT: Remove from exposure.
9. **IRON**..... EFFECTS OF EXPOSURE: Inhalation of oxide or dust can result in siderosis which causes a shortness of breath and coughing tendencies.  
EMERGENCY & FIRST AID TREATMENT: Remove from exposure and obtain medical attention.
10. **LEAD**..... EFFECTS OF EXPOSURE: Short term exposure symptoms may include stomach cramps, persistent vomiting, severe anemia, peripheral neuropathy and acute encephalopathy followed by coma, cardiorespiratory arrest and death. Long term exposure symptoms are the above with a metallic taste in mouth. Weakness of extensor muscles of the wrist and ankles is noticeable in serious cases.  
EMERGENCY & FIRST AID TREATMENT: No immediate first aid is generally necessary. Biological monitoring under the direction of a physician is required in accordance with OSHA regulations.

11. **MAGNESIUM**..... EFFECTS OF EXPOSURE: Heavy exposure to fume may be irritating to eyes, nose and throat. Can cause metal-fume fever.  
EMERGENCY & FIRST AID TREATMENT: Eye wash station facilities should be used immediately. No contact lenses should be worn in this area.
12. **MANGANESE**..... EFFECTS OF EXPOSURE: Dusts in high concentration can cause irritation of the eyes and throat. May cause nose to bleed. Manganese fume fever is characterized by cold-like symptoms. Chronic exposure can affect the central nervous system.  
EMERGENCY & FIRST AID TREATMENT: On irritation wash thoroughly. On ingestion induce vomiting. Obtain medical attention.
13. **NICKEL**..... EFFECTS OF EXPOSURE: Potential sensitizer and may cause allergic reactions. Inhalation can cause hypertrophic rhinitis and nasal sinusitis. Excessive inhalation of nickel fumes has been associated with respiratory cancer. Listed NTP and IARC monographs.  
EMERGENCY & FIRST AID TREATMENT: Wash affected area after contact. Annual medical monitoring by a physician is recommended in areas where concentrations are greater than 15 ugNi/M3 TWA for a 40-hour workweek.
14. **PHOSPHORUS**..... EFFECTS OF EXPOSURE: Inhalation may cause osteomyelitis of the jaw bone. Skin contact by burning phosphorus slivers will cause severe burns.  
EMERGENCY & FIRST AID TREATMENT: Douse burning slivers with a 1 – 5% solution of aqueous copper sulphate. Then remove slivers with large quantities of water. Medical advice need be sought in cases of steomyelitis.
15. **SELENIUM**..... EFFECTS OF EXPOSURE: Effects of exposure are bronchial irritation and gastrointestinal distress which may occur from overexposure to selenium dioxide fumes. Chronic overexposure may cause depression, tiredness, nervousness, dermatitis, gastrointestinal disturbances and garlic odor of breath and sweat.  
EMERGENCY & FIRST AID TREATMENT: Remove from exposure. Place individual under care of physician.
16. **SILICON**..... EFFECTS OF EXPOSURE: In a cold state silicon is not dangerous.  
EMERGENCY & FIRST AID TREATMENT: None necessary.
17. **TIN**..... EFFECTS OF EXPOSURE: Tin powder is moderately irritant to the eyes and airways.  
EMERGENCY & FIRST AID TREATMENT: Remove from exposure.
18. **ZINC**..... EFFECTS OF EXPOSURE: Exposure to zinc oxide fume can cause metal-fume fever. Symptoms resemble influenza with chills and nausea.  
EMERGENCY & FIRST AID TREATMENT: Usually lasts less than 24 hours with no known treatment or lasting ill effects.

THE ABOVE INFORMATION IS PROVIDED FOR THE SOLE PURPOSE OF COMPLYING WITH THE U.S. OSHA HAZARD COMMUNICATION STANDARD, 20 CFR 1910.1200. THE INFORMATION IS GIVEN IN GOOD FAITH AND IS BELIEVED TO BE CORRECT, BUT WITHOUT GUARANTEE. WE DO NOT ASSUME RESPONSIBILITY FOR THE RESULTS OF ITS USE.

SOME OF THE SOURCES YOU MAY WISH TO CONSULT:

- "Handbook of Hazardous Materials" (2<sup>nd</sup> Edition) . . Alliance of American Insurers
- "Encyclopedia of Occupational Health & Safety" (Vol I & II) International Labour Office
- "Threshold Limit Values for Chemical Substances in Work Environment" . . ACGIH