ATTN: PAUL FRENCH

Material Safety Data Sheet (MSDS)

MSDS SC-000-002 REV. 8
DATE 8/00

Vendor name and address: Remelt Sources, Inc.
27151 Tungsten Road
Cleveland, OH 44132

Conforms to requirements of OSHA standard 1910.1200
"Hazard Communication" and to various state "Employee Right to Know" Laws

Emergency phone number 216-289-4555

HIGH ALLOYED CAST STEELS

SECTION I — PRODUCT IDENTIFICATION

This MSDS supplied for: High Alloyed Cast Steels

ASTM No.	ACI alloy designation (Grades)
A297/A297M-84	HE, HF, HH, HI, HK, HL, HN, HT, HU, HW, HX, HP
A351/A351M-84	CF3,CF3A, CF8, CF8A, CF3M, CF3MA, CF8M, CF8C, CF-10, CF-10M, CH8, CH10, CH20, CK20, HK30, HK40, HT30, CF10MC, CN7M, CG6MMN, CG8M
A447/A447M-84	I, II
A451-80	CPF3, CPF3A, CPF3M, CPF8, CPF8A, CPF8M, CPF10, MC, CPH10, CPF8C, CPH8, CPK20, CPH20
A494/A494M-84	CY-40, CW-12MW, CW-7M, CW-2M, CW-6MC
A560/A560-84	50 Cr-50 Ni-Cb, 50 Cr-50 Ni, 60 Cr-40 Ni
A608-79	HE35, HF30, HH30, HH33, HI35, HK30, HK40, HL30, HL40, HN40, HT50, HU50, HW50, HX50
A743/A743M-84	CF-8, CG-12, CF-20, CF-8M, CF-8C, CF-16F, CH-20, CK-20, CE-30, CF-3, CF-3M, CG6MMN, CG-8M, CN-7M, CN-7MS, CW-12M, CY-40
A744/A744M-84	CF-8, CF-8M, CF-8C, CF-3, CF-3M, CG-8M, CN-7M, CN-7NS, CW-12M, CY-40
Mil-S 867 A	I, II, III

SECTION II — HAZARDOUS COMPONENTS

INGREDIENT	CAS NO.	PERCENT	TLV (mg/m³)	PEL (mg/m³)
Chromium*(as Cr)	7440-47-3	10-52		
Chromium (II) Compounds (as Cr)			N/E	0.5
Chromium (III) Compounds (as Cr)			0.5	0.5
Chromium Metal (as Cr)			0.5	1.0
Chromium (VI) Insoluble Compounds			0.01	N/E
Chromic Acid and Chromates (as CrO_3)			N/E	1.0mg/10m³ (C)
Chromium (VI) Water Soluble Compounds			0.05	N/E
Cobalt* (as Co)	7440-48-4	0-2.5		
Metal Dust and Fume (as Co)			N/E	0.10
Elemental and Inorganic Compounds (as Co)			0.02	N/E
Copper* (as Cu)	7440-50-8	0-4		
Fume (as Cu)			0.2	0.1
Dust and Mist (as Cu)			1.0	1.0
Iron (as Fe_2O_3)	1309-37-1	Balance		
Iron Oxide Fume (Fe_2O_3)			N/E	10.0
Iron Oxide Dust and Fume (Fe_2O_3)			5.0	N/E
Manganese* (as Mn)	7439-96-5	0.30-6.00		
Elemental and Inorganic Compounds (as Mn)			0.2	5.0 (C)
Fume(as Mn)			N/E	5.0 (C)
Nickel* (as Ni)	7440-02-0	10-72		
Metal			1.5	1.0
Insoluble Compounds (as Ni)			0.2	1.0
Soluble Compounds(as Ni)			0.1	1.0
Niobium/Columbium	–	0-1.2	N/E	N/E

SECTION II — HAZARDOUS COMPONENTS *(cont'd.)*

INGREDIENT	CAS NO.	PERCENT	TLV (mg/m³)	PEL (mg/m³)
Silicon(as Si)	7440-21-3	0.50-3.50		
Total Dust			10.0	15.0
Respirable Dust			N/E	5.0
Tantalum(as Ta)	7440-25-7	0-1.1		
Metal and Oxide Dust			5.0	5.0
Tungsten (as W)	7440-33-7	0-5.25		
Metal & Insoluble Compounds(as W)			5.0	N/E
Metal & Insoluble Compounds (as W)			10.0 (STEL)	N/E
Soluble Compounds (as W)			1.0	N/E
Soluble Compounds (as W)			3.0 (STEL)	N/E

N/E = none established. N/A = not applicable. N/D = no data available.
TLV = American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (8-hour time weighted average).
PEL = OSHA Permissible Exposure Limit.
mg/m³ = Milligrams per cubic meter of air.
NTP = National Toxicology Program.
C = Ceiling Limit.
STEL = Short Term Exposure Limit.

SARA Title III Information

*This constituent, a toxic chemical, makes this product subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. Quantity threshold amounts are 25,000 pounds for manufacturing, importing or processing and 10,000 pounds for otherwise using the listed chemical. Chemicals marked ** are reportable only if in the form of dust or fume.

CARCINOGEN CLASSIFICATION

INGREDIENT	OSHA	NTP	IRAC	EPA	TARGET ORGAN
Chromium (Hexavalent)	N	K	1	A-K	Lung
Cobalt	N	N	2B	N	Lung
Copper	N	N	N	N	-
Iron	N	N	3	N	Lung
Manganese	N	N	N	D	Central Nervous System
Nickel	N	R	2B	N	Lung, Nasal
Niobium/Columbium	N	N	N	N	-

OSHA—U.S. OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
N= Not listed as a Human Carcinogen
Y= Listed as a Human Carcinogen

SECTION II — HAZARDOUS COMPONENTS *(cont'd.)*

NTP—NATIONAL TOXICOLOGY PROGRAM
K= Known to be a Human Carcinogen
R= Reasonably anticipated to be a Human Carcinogen (RAHC)
N= Not listed as a Human Carcinogen

IARC—INTERNATIONAL AGENCY FOR RESEARCH ON CANCER
1= Carcinogen to Humans
2B= Possibly Carcinogenic to Humans
3= Unclassified as Carcinogenicity in Humans
N= Not listed as a Carcinogen

EPA—U.S. ENVIRONMENTAL PROTECTION AGENCY
A= Human Carcinogen
K= Known Human Carcinogen
D= Not classified as to Human Carcinogenicity. No data available
B1= Probable Human Carcinogen. Sufficient evidence from Epidemiologic Studies
L= Likely to produce Cancer in Humans
B2= Probable Human Carcinogen. Sufficient evidence from Animal Studies
N= Not listed as a Human Carcinogen

SECTION III — OVERVIEW

There are no chemical hazards from these castings in solid form.

Machining, grinding, flame cutting or welding the casting will put contaminants in the air. Since the majority of the casting contains chromium and/or nickel, most of the airborne contaminants will be chromium and nickel dust and fume.

Welding or flame cutting may convert a fraction of the chromium to the water insoluble hexavalent (carcinogenic) form.

Water insoluble hexavalent chromium is classified as a human carcinogen by the ACGIH. Approximately 66% of the total chromium in welding fume is hexavalent, and only 5% of that is insoluble. Overexposure to hexavalent chromium is not likely if general welding fume is controlled. (The alloy and its dust does not contain insoluble hexavalent chromium.)

Some forms of nickel have been found to cause cancer in animals. One form, nickel subsulfide, which was present in an old smelting process that is no longer used, apparently caused nasal cancer in humans. Since then, studies have shown that the potential for ordinary forms of nickel and its oxides to cause cancer in humans is very weak, if it exists at all.

SECTION III — OVERVIEW *(cont'd.)*

Long-continued over-exposure to manganese dust or fume causes a number of symptoms which can become quite serious. On the other hand, manganese is an essential trace element for human metabolism and an average daily intake of 2 to 5 mg, mostly in food, is necessary for health.

Excessive manganese affects the central nervous system, with the following symptoms in order of increasing exposure: apathy, loss of appetite, uncontrolled laughter, insomnia followed by sleepiness, headache, leg cramps, speech disturbances, mask-like facial appearance, clumsy movement, difficult walking, frequent falling, tremors, salivation, sweating, mental detachment.

Because of this potential hazard from metal dust and fumes, machining, grinding, welding operations, etc., should be done under local exhaust ventilation. If ventilation is not adequate, wear a NIOSH approved dust and fume respirator.

Grinding castings that have not been cleaned or that contain embedded sand may generate significant amounts of dust containing free silica, which can cause silicosis. The use of ventilation for control of metal dust and fume will also control airborne silica. IARC has listed crystalline silica as Class 2A, probably can cause lung cancer.

The other metals in high alloy steel castings are present in small amounts compared to the nickel and chromium. If airborne concentrations of chromium and nickel are controlled to levels below their respective TLVs and PELs, these minor constituents would also be adequately controlled.

SECTION IV — PHYSICAL DATA

PHYSICAL DESCRIPTION:	Solid, silver gray in color, no odor
BOILING POINT:	Variable depending on casting grade
VAPOR PRESSURE:	N/A
VAPOR DENSITY:	N/A
SOLUBILITY IN WATER:	N/A
SPECIFIC GRAVITY:	8.9 for nickel
PERCENT VOLATILE BY VOLUME:	N/A
EVAPORATION RATE:	N/A

SECTION V — FIRE AND EXPLOSION DATA

Castings will not burn or explode.

SECTION VI — HEALTH HAZARD DATA

EYES: Metal particles in the eyes may cause irritation if not removed. Contact lenses should be worn with caution in a metalcasting environment. Obey work rules concerning contact lenses.

SKIN: Cobalt: Skin irritation, dermatitis; **Nickel**: Dermatitis; **Niobium/Columbium**: Skin irritation; **Silicon**: Skin irritation; **Tantalum:** Dermatitis.

BREATHING: Prolonged or repeated overexposure to dust or fumes from these castings may cause the following health effects:

Chromium, Hexavalent: Lung cancer.

Cobalt: Heart and thyroid disorders in heavy drinkers.

Copper: Nose and throat irritation, sweet or metallic taste, metal fume fever with flu-like symptoms, anemia.

Iron: Iron pigmentation of the lung, which can be seen in a chest x-ray but causes little or no disability. Siderosis-inflammation of the lungs.

Manganese: Central nervous system effects are: sleepiness, weakness in legs, spastic gait, emotional disturbances.

Nickel: Lung and nasal cancer.

Niobium/Columbium: Eye and skin irritation. Human toxicity unknown. Kidney damage in dogs and liver damage in mice. Limited animal experiments show high toxicity for salts of niobium.

Silicon: Skin, eye and nose irritation.

Tantalum: Dermatitis.

Tungsten: Respiratory irritation.

Breathing excessive amounts of silica dust for a long time can cause silicosis. Silicosis causes shortness of breath, reduced capacity to do work, and weakens the defenses against other lung diseases.

INGESTION: Hand, clothing, food and drink contact with metal dust, fume or powder can cause ingestion of particulate during hand to mouth activities such as eating, drinking, smoking, nail biting, etc.

SECTION VI — HEALTH HAZARD DATA *(cont'd.)*

NOISE: Grinding or machining castings is noisy. The OSHA limit for noise averaged over eight hours is 90 decibels (dBA). A hearing conservation program is required if exposure is over 85 dBA. If noise is at or above 90 dBA, you should wear ear muffs or ear plugs.

FIRST AID

IF IN EYES: Metal particles should be removed by a trained individual such as a nurse or physician.

IF ON SKIN: Use a mild hand cream if irritation develops.

IF BREATHED (Fumes from welding): Move to fresh air.

IF INGESTED: Consult local physician.

SECTION VII — REACTIVITY DATA

HAZARDOUS POLYMERIZATION: Will not occur.

STABILITY: Stable.

INCOMPATIBILITY: Metal dust can burn or explode and must be protected from ignition sources such as grinding sparks, etc. Under some conditions, metal dust is incompatible with oxidizers, acids and water and may ignite or explode.

SECTION VIII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

If damaged, return castings to vendor or send to scrap reclaimer.

Collected dust from machining, welding, etc., may be classed as a "hazardous waste" depending on circumstances. Consult local authorities regarding disposal.

SECTION IX — PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: Wear a NIOSH approved respirator for dusts or fumes if concentrations exceed the TLV or PEL.

VENTILATION: Provide general ventilation and/or local exhaust if necessary to maintain concentrations below the TLVs.

PROTECTIVE GLOVES: Work gloves advisable for handling castings.

EYE PROTECTION: Safety glasses with side shields and/or face shields for particles (grinding). Welding goggles or helmet for welding.

OTHER PROTECTIVE EQUIPMENT: Wear a protective apron and gauntlets if arc-air gouging or cutting, or welding castings. Safety shoes may be required during certain operations.

If noise is at or above 90 dBA, you should wear ear muffs or ear plugs.

SECTION X — SPECIAL PRECAUTIONS OR OTHER COMMENTS

STORAGE: No special precautions.

INFORMATION PRESENTED HEREIN HAS BEEN COMPILED FROM SOURCES CONSIDERED TO BE RELIABLE AND IS ACCURATE AND RELIABLE TO THE BEST OF OUR KNOWLEDGE AND BELIEF BUT IS NOT GUARANTEED TO BE SO.

Hazard Communication Label

Label information for MSDS SC-000-002 REV. 8 DATE 8/00

The following hazard information is required for labels under OSHA Standard 1910.1200 and applicable instructions. Other label information may be added.

HIGH ALLOYED CAST STEELS

CAUTION

Grinding, welding, or arc gouging of this casting creates dust or fumes containing substances listed below with corresponding possible health effects after prolonged or repeated overexposure:

Chromium, Hexavalent: Lung cancer.

Cobalt: Skin irritation, dermatitis, heart and thyroid disorders in heavy drinkers.

Copper: Nose and throat irritation, sweet or metallic taste, metal fume fever with flu-like symptoms, anemia.

Iron: Iron pigmentation of the lung, which can be seen in a chest x-ray but causes little or no disability. Siderosis-inflammation of the lungs.

Manganese: Central nervous system effects are: sleepiness, weakness in legs, spastic gait, emotional disturbances.

Nickel: Dermatitis, lung and nasal cancer.

Niobium/Columbium: Eye and skin irritation. Human toxicity unknown. Kidney damage in dogs and liver damage in mice. Limited animal experiments show high toxicity for salts of niobium.

Silicon: Skin, eye and nose irritation.

Tantalum: Dermatitis.

Tungsten: Respiratory irritation.

Wear eye protection. Wear an approved dust and fume respirator if exposures exceed safe limits.