IBC Advanced Alloys

MATERIAL SAFETY DATA SHEET

Date Issued: April 13, 2010

1. PRODUCT AND COMPANY IDENTIFICATION: This material data sheet (MSDS) provides information on a specific group of manufactured metal products. As these metal alloy products share a common physical nature and constituents, the data presented are applicable to all alloys identified.

This MSDS identifies the following alloys: C18000, C18150, C18200 and C18020.

MANUFACTURER:
IBC ADVANCED ALLOYS, INC. NONFERROUS DIVISION; 401 Arvin Road, P. O. Box 349; Franklin, IN 46131

ON THE WEB: www.ibcadvancedalloys.com

EMERGENCY PHONE NUMBERS: 1-800-423-5612

2. HAZARD IDENTIFICATION AND POTENTIAL HEALTH EFFECTS

ELEMENT	CAS#	OSHA / P. E. L. [1]
COPPER (Cu) [4]	**7440-50-8**	**1.0 dust & mists, 0.1 fume**

- Dust and fumes from melting, grinding and cutting may present a potential health hazard. Fumes may cause a metal fume fever with flu-like symptoms and damage or ulceration of the nasal passages. There may also be skin and hair discoloration. Dermatitis due to sensitization may occur in some individuals.

IRON (Fe)	**7439-89-6**	**10 oxide fume**

- The inhalation of iron oxide fumes or dust may cause an apparent benign pneumoconiosis which is called siderosis. Shortness of breath and coughing are common.

NICKEL (Ni) [4] [5]	**7440-02-0**	**1 nickel metal**

- Often causes allergic dermatitis know as “nickel itch”. Inhalation can cause hypertrophic rhinitis and nasal sinusitis. In extreme cases it is suspected of causing cancer of the nasal cavities, lungs and other organs.

CHROMIUM (Cr) [4] [5]	**7440-47-3**	**1.0 chrome metal**

- The uptake of too much chromium (III) can cause health effects as well, for instance skin rashes. International Agency for Research on Cancer (IARC) has listed chromium (III) metal and its trivalent compounds within Group 3 (The agent is not classifiable as to its carcinogenicity to humans.)

SILICON (Si)	**7440-21-3**	**10 Total Dust**

- May be responsible for benign pneumoconiosis, but is not considered to be dangerous in the cold state.

TIN (Sn) **7440-31-5** **2 inorganic compounds**

- Acute exposure to tin oxide may result in mild irritation to the skin, eyes, and mucous membranes. Chronic exposure may result in benign pneumoconiosis that may be apparent in distinctive changes in progressive chest X-rays during the time of the exposure.

LEAD (Pb) [2] [5] **7439-92-1** **0.05 ug inorganic**

- Lead is an accumulative poison. Short term exposure symptoms may include stomach cramps, fatigue, constipation, and decreasing appetite. Inhalation of large amounts of lead may lead to seizures, coma, and death. Long term exposure symptoms are nausea, vomiting, severe anemia, paralysis of the wrist joint and kidney damage. Exposure can result in decreased fertility and/or increased chances of miscarriage or birth defects.

COBALT (Co) [5] **7440-48-4** **0.05 dust & fume**

- Cobalt has been reported as causing hyper sensitization type dermatitis in some individuals. Excessive and prolong over exposure of cobalt may cause an asthma-like disease with cough and dyspnea.

ZINC (Zn) [4] **7440-66-6** **10 oxide dust**

- Even as an oxide, zinc is low in toxicity but inhalation of fumes may cause “metal fume fever”. Onset of symptoms may be delayed 4-12 hours and can include irritation of the nose, mouth and throat, cough, stomach pains, headaches, nausea, vomiting, metallic taste, chills, fever, muscle and joint pain, thirst, bronchitis or pneumonia and a bluish tint to the skin. These symptoms go away in 24-48 hours and leave no lasting effect.

ZIRCONIUM (Zr) **7440-67-7** **5 Zirconium Compounds**

- Zirconium is a grayish-white, lustrous, odorless metal; when powdered, it is bluish black. It is available commercially in powder, sponge, plate, strip, bar, wire, briquette, and foil forms. Combustible, but solid form is difficult to ignite; however, powder form may ignite SPONTANEOUSLY and can continue burning under water.

(1) Permissible Exposure Limits are expressed in milligrams per cubic meter of air (mg/m^3), unless noted.
(2) ug = microgram (one millionth of a gram; 10^{-6} gram)
(3) CL = Ceiling limit, not to be exceeded
(4) Is listed as a toxic chemical and requires reporting under Section 313 of the Community Right-To-Know Act.
(5) Item is suspected carcinogens in humans.

3. COMPOSITION/INFORMATION ON INGREDIENTS

UNS #	Description	Cu	Fe	Ni	Cr	Si	Pb	Other
C18000	---	Bal	0.15	1.8 -3.0[3]	0.10-0.80	0.40-0.80	-	-
C18150[5]	---	Bal	-	-	0.50-1.50	-	-	0.005-0.25 Zr
C18200[4]	Chromium Copper	Bal	0.10	-	0.6-1.2	0.10	0.05	-
C18020	---	Bal [1]	-	-	.10-.30	.05	-	.05-.25 Sn .10-.30 Zn

(3) includes Co
(4) Cu+Sum of Named Elements, 99.5% min.
(5) Cu+Sum of Named Elements, 99.7% min.

4. ACUTE HEALTH HAZARDS/FIRST AID MEASURES

ROUTES OF EXPOSURE: Direct eye or skin contact with metal dust or particles, and breathing metal fume or dust.

SYMPTOMS: Eye or skin particulate contact may cause irritation.

CONTACT WITH EYES: Metal particles should be removed by trained individuals such as a nurse or physicians

MEDICAL CONDITIONS EXAGGERATED BY OVEREXPOSURE: Allergy (sensitivity) to copper.

INGESTION: Induce vomiting immediately as directed by medical personnel.

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CONTACT WITH SKIN: Use a mild hand cream if irritation develops.

INHALATION: Breathing dust or fume may cause nose and throat irritation and a sweet or metallic taste. Breathing high levels of fumes may cause metal fume fever which has flu-like symptoms. Copper, manganese or nickel exposure may cause asthma- like symptoms or skin rashes or dermatitis in people sensitive (allergic) to these metals.

Move to fresh air if overexposed to fumes.

5. FIRE FIGHTING MEASURES

- Metal solids will not burn or explode; however, finely divided metal dust can form explosive mixture in air.
- Explosive mixtures can form in areas with high concentrations of dust such as in process vessels, dust collectors and bulk loading operations.
- In case of a fire, isolate the fire and use class “D” fire extinguishing materials such as Lith-X, Dry Graphite, etc.
- DO NOT use water to extinguish fires around operations involving molten meal due to the potential for steam explosions.

6. ACCIDENTAL RELEASE

- If this material is a particulate, establish a restricted entry zone based on the severity of the spill. If dust or fume is collected and spilled, respiratory protection, dust masks or cartridge respirators with high efficiency particulate air filtration (HEPA) and protective clothing appropriate for the severity of the release should be used in cleaning up the spill.
- Clean up spills with a vacuum system utilizing a high efficiency particulate air (HEPA) filtration system followed by wet cleaning methods.
- Caution should be used to minimize airborne generation of particulates and avoid contamination of air and water.

7. HANDLING AND STORAGE

HAND AND BODY PROTECTION: Particulates may enter the body through cuts, abrasions or other wounds on the surface of the skin. Use appropriate work gloves when handling castings. Use protective apron and gauntlets if arc-air gouging, cutting or welding this material.

STORAGE: Store in a dry area.

8. EXPOSURE CONTROLS, PERSONAL PROTECTIVE EQUIPMENT

8.1 VENTILATION:

- Use sufficient ventilation to keep concentrations of dust and fumes below safe exposure guidelines (TWA / PEL). Whenever possible, the use of local exhaust ventilation or other engineering controls is the preferred method of controlling exposure to airborne particulate.
- Where utilized, exhaust inlets to the ventilation system should be positioned as close as possible to the source of airborne generation. Avoid disruption of the airflow in the area of a local exhaust inlet by equipment such as a man-cooling fan. Check ventilation equipment regularly to ensure it is functioning properly. Provide training on the use and operation of ventilation to all users.

8.2 RESPIRATORS: If safe exposure guidelines are not met, use approved respirators for dusts or fumes; see OSHA Standards for Industry, 29 CFR 1910.134 for Respiratory Protection Program requirements.

8. 3 EYE PROTECTION: Wear safety glasses, goggles, face shield, hood or welder's helmet when risk of eye injury is present, particularly during melting, casting, machining, grinding, welding, powder handling, etc. See OSHA Standards for Industry, 29 CFR 1910.133 for Eye and Face Protection Program requirements.

8.4 HEARING PROTECTION: Wear hearing protection if noise levels are at or above 90 dBA. See OSHA Standards for Industry, 29 CFR 1910.95 for Hearing Conservation Program requirements.

8.5 WORK PRACTICES:

- Develop work practices and procedures that prevent particulate from coming in contact with worker skin, hair, or personal clothing. Provide appropriate cleaning/washing facilities.

- Procedures should be written that clearly communicate the facility's requirements for protective clothing and personal hygiene. These clothing and personal hygiene requirements help keep particulate from being spread to non-production areas or from being taken home by the worker.

- Fabrication processes may leave a residue of particulate on the surface of parts, products or equipment that could result in employee exposure during subsequent material handling activities. As necessary, use vacuum systems with high efficiency particulate air (HEPA) filters to clean loose particulate from parts between processing steps.

- Do not use compressed air, brooms or conventional vacuum cleaners to remove particulate from surfaces as this activity can result in elevated exposures to airborne particulate. As a standard hygiene practice, always wash hands before eating or smoking.

8.6 OTHER PROTECTIVE EQUIPMENT:

- Protective over garments or work clothing should be worn by persons who may come in contact with particulates during activities such as machining, furnace rebuilding, air cleaning equipment filter changes, maintenance, furnace tending, etc.

- Contaminated work clothing and over garments must be managed in a controlled manner to prevent secondary exposure to workers of third parties, to prevent the spread of particulates to other areas, and to prevent particulate from being taken home by workers. This would include protective gloves and the correct eye protection determined by the exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE: Solid Metal
COLOR: Red
ODOR: No odor
MELTING POINT (°F) 1590°F - 1976°F

WATER SOLUBILITY: Not Soluble
SPECIFIC GRAVITY: 8.26 – 8.89
BOILING POINT: N/A
EVAPORATION RATE: N/A
VAPOR DENSITY: N/A
VAPOR PRESSURE: N/A

10: STABILITY AND REACTIVITY

General Reactivity	The material is stable
Incompatibility (materials to avoid)	Copper is potentially explosive with acetylinic compounds, 3-bromopropene, ethylene oxide, lead azide,and ammonium nitrate. Ignites on contact with chlorine, fluorine, and hydrazinemononitrate. Reacts violently with sodium azide, halogenates, peroxides, hydrogen sulfide, hydrozoic acid, bromates, chlorates, iodates, chloride andpotassium oxide. Avoid contact with strong acids.
Hazardous Decomposition Products	High temperatures associated with smelting or welding releases metal oxide fumes.
Hazardous polymerization	Will not occur

11. TOXICOLOGICAL INFORMATION, CARCINOGEN STATUS:

Copper: Is not listed as a known or potential carcinogen, (cancer causing material).
Copper may cause sensitivities (allergies) with symptoms such as skin rashes and dermatitis.
Prolonged overexposure to dusts of metals in this alloy are reported to cause toxic effects, including anemia, central nervous damage, liver and kidney damage; symptoms may include apathy, lack of appetite and weakness.

Iron: This product is not considered a carcinogen by IARC, NTP, ACGIH or OSHA

Nickel: The International Agency for Research on Cancer (IARC) lists nickel as a Group 2B – Possibly Carcinogenic to Humans. However, IARC found there was inadequate evidence that metallic nickel is carcinogenic to humans but since there was sufficient evidence that it is carcinogenic to animals, IARC concluded that metallic nickel is possibly carcinogenic to humans.

Chromium: Chromium (III) is an essential nutrient for humans and shortages may cause heart conditions, disruptions of metabolisms and diabetes. But the uptake of too much chromium (III) can cause health effects as well, for instance skin rashes. International Agency for Research on Cancer (IARC) has listed chromium metal and its trivalent compounds within Group 3 (The agent is not classifiable as to its carcinogenicity to humans.)

Silicon: May be responsible for benign pneumoconiosis symptoms but is not listed by the EPA as a carcinogen**.**

Lead: Human studies are inconclusive regarding lead exposure and an increased cancer risk. Four major human studies of workers exposed to lead have been carried out; two studies did not find an association between lead exposure and cancer, one study found an increased incidence of respiratory tract and kidney cancers, and the fourth study found excesses for lung and stomach cancers. However, all of these studies are limited in usefulness because the route(s) of exposure and levels of lead to which the workers were exposed

were not reported. In addition, exposure to other chemicals probably occurred EPA considers lead to be a Group B2, probable human carcinogen.

Cobalt: The International Agency for Research on Cancer (IARC) lists cobalt as a Group 2B – Possibly Carcinogenic to Humans. EPA has not classified cobalt for carcinogenicity

Tin: Inorganic tin compounds are not known to cause cancer.

Zinc: Zinc is one of the most common elements in the earth's crust. It is found in air, soil, and water, and is present in all foods. Per the EPA There are no reports on the possible carcinogenicity of zinc and compounds per se in humans. Case studies have been used to evaluate the effects of zinc administered for therapeutic reasons. There are reports which compare zinc levels in normal and cancerous tissue. Studies of occupational exposure to zinc compounds have also been conducted, but have limited value because they do not correlate exposure with cancer risk.

Zirconium: Most animal studies indicate zirconium to be of relative low toxicity. Most zirconium compounds are insoluble and are considered to be inert. Some zirconium compounds have been reported to cause radiographic changes in animals due to pulmonary retention or granulomas of the skin. The NIOSH REL and OSHA PEL for zirconium are both 5,000 micrograms/cubic meter of air.

12. ECOLOGICAL INFORMATION

This material may be recyclable. Contact your Sales Representative.

13. DISPOSAL CONSIDERATIONS

MATERIAL DISPOSAL: Return metal to reclaimer. Collected dust from machining, welding, etc. might be considered “hazardous waste” in some circumstances. Consult local, state and federal authorities regarding disposal of this material.

14. TRANSPORATION INFORMATION

DOT: Not regulated in solid form.

Hazard Communication regulations of the U.S. Occupational Safety and Health Administration require this product to be labeled.

15. REGULATORY INFORMATION

15.1. UNITED STATES FEDERAL REGULATIONS

15.1.1 Occupational Safety and Health Administration (OSHA)

Air contaminants, 29 CFR 1910.1000
Hazard Communication Standard, 29 CFR 1910.1200

15.2 Environmental Protection Agency (EPA)

AMBIENT AIR EMISSIONS: Most process air emission sources will require an air permit from a local and/or state air pollution control agency. The use of air cleaning equipment may be necessary to achieve the permissible emission. Tempered makeup air should be provided to prevent excessive negative pressure in a building. Direct recycling of cleaned process exhaust air is not recommended. Plant exhausts should be located so as not to re-enter the plant through makeup air or other inlets. Regular maintenance and inspection of air cleaning equipment and monitoring of operating parameters is recommended to ensure adequate efficiency is maintained.

WASTEWATER: Wastewater regulations can vary considerably. Contact your local and state governments to determine their requirements.

TOXIC SUBSTANCES CONTROL ACT: Component(s) of this material is/are listed on the TSCA Chemical Substance Inventory of Existing Chemical Substances

15.3 SARA TITLE III REPORTING REQUIREMENTS: On February 16, 1988, the U.S. Environmental Protection Agency (EPA) issued a final rule that implements the requirements of the Superfund Amendments and Reauthorization Act (SARA) Title III, Section 313 (53) Federal Register 4525. Title III is the portion of SARA concerning emergency planning and community right-to-know issues. Section 313 covers annual emission reporting on specific chemicals which are manufactured, processed or used at certain U.S. Industrial facilities.
Under the Section 313 category of Compounds and/or Mixtures, these mixtures contain one or more of the following reportable constituents: Copper, Chromium, Nickel, Beryllium, Lead, Iron and Silicon.
Specific chemical makeup, concentration by weight and the Chemical Abstracts Services number for each of our products is provided in Section 3. You may obtain additional information by calling the EPA SARA Title III Hotline at 1-800-535-0202 (or 703-412-9810).

16. OTHER INFORMATION
Following is the label which accompanies this product during shipment.

This material data sheet (MSDS) provides information on a specific group of manufactured metal products. Since these metal products share a common physical nature and constituents, the data presented are applicable to all alloys identified.
This information was obtained from current and reputable resources. However, data are provided without warranty, expressed or implied, regarding correctness or accuracy. It is the user's responsibility both to determine safe conditions for us of this product and to assume liability for loss, injury, damage or expense resulting from improper use of this product.