Allegheny Ludlum
An Allegheny Technologies Company

MATERIAL SAFETY DATA SHEET

1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT(S): STEEL - A50, 301, 301L, 302, 302B, 304, 304H, 304L, 304LN, 304N, 305, 316, 316L, 316LN, 316TI, 317, 317L, 317LX, 317LXN, 317XN, 321, 321H, 347, 348, 370, 388 Ze-Cor™ , A610, A611, 850, 13-8 PH , 307

MSDS CATEGORY: I-B

MANUFACTURER:
ALLEGHENY LUDLUM
RIVER ROAD
BRACKENRIDGE, PA 15014

DESCRIPTION: Solid product, various forms and uses
EMERGENCY PHONE: 724-226-5555
INFO. PHONE: 724-226-6384 (M-F, 9 a.m.-4:30 p.m. EST)
CHEMTREC: 800-424-9300
DATE OF APPROVAL: 09-15-2002

2 - COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS NUMBER	PERCENTAGE BY WEIGHT	OSHA PEL	ACGIH TLV
Iron	7439-89-6	52 - 78	10 mg/m^3, Iron Oxide form, fume	5 mg/m^3, Iron Oxide form, dust and fume
Chromium	7440-47-3	12 - 24	1 mg/m^3, metal and insoluble salts 0.5 mg/m^3, Cr (III) compounds 0.1 mg/m^3, Cr (VI) compounds	0.5 mg/m^3, metal and Cr (III) compounds 0.05 mg/m^3, Cr (VI) water soluble compounds 0.01 mg/m^3, Cr (VI) water insoluble compounds
Nickel	7440-02-0	6.0 - 19	1 mg/m^3, metal and insoluble compounds	1.5 mg/m^3, metal 0.1 mg/m^3, soluble compounds 0.2 mg/m^3, insoluble compounds
Molybdenum	7439-98-7	0 - 5.0	5 mg/m^3, soluble Mo compounds (as Mo) 15 mg/m^3, insoluble Mo compounds, total dust (as Mo)	5 mg/m^3, soluble Mo compounds (as Mo) 10 mg/m^3, insoluble Mo compounds (as Mo)
Silicon	7440-21-3	0 - 6	15 mg/m^3, total dust 5 mg/m^3, respirable fraction	10 mg/m^3, total dust
Manganese	7439-96-5	0 - 2.0	5 mg/m^3 Ceiling, Mn compounds and Mn fume (as Mn)	0.2 mg/m^3, elemental and inorganic compounds (as Mn)
Tungsten	7440-33-7	0 - 1.8	15 mg/m^3, total dust (PNOR) 5 mg/m^3, respirable fraction (PNOR) (not regulated)	1 mg/m^3, 3 mg/m^3 STEL soluble W compounds (as W) 5 mg/m^3, 10 mg/m^3 STEL insoluble W compounds (as W)
Aluminum	7429-90-5	0 - 1.5	15 mg/m^3, metal, total dust (as Al) 5 mg/m^3, metal, respirable fraction (as Al)	10 mg/m^3, metal dust 5 mg/m^3, welding fume
Columbium	7440-03-1	0 - 1.0	15 mg/m^3, total dust (PNOR) 5 mg/m^3, respirable fraction (PNOR) (not regulated)	10 mg/m^3, total dust (PNOC) (not classified)
Titanium	7440-32-6	0 - 0.7	15 mg/m^3, Titanium Dioxide form, total dust	10 mg/m^3, Titanium Dioxide form, total dust
Copper	7440-50-8	0 - 0.75	0.1 mg/m^3, fume (as Cu) 1 mg/m^3, dust and mist (as Cu)	0.2 mg/m^3, fume (as Cu) 1 mg/m^3, dusts and mists (as Cu)

Cobalt	7440-48-4	0 - 1.0	0.1 mg/m^3, metal, dust, and fume (as Co)	0.02 mg/m^3, elemental and inorganic compounds (as Co)

NOTE: 1) All exposure limits are 8-hour TWAs unless otherwise specified. 2) As defined by OSHA, STEL (Short Term Exposure Limit) is an employee's fifteen-minute, time-weighted average exposure which must not be exceeded during a workday. 3) All commercial metals may contain small amounts of various elements in addition to those specified. These small quantities (less than 0.1%), frequently referred to as "trace" or "residual" elements, generally originate in the raw material used. These elements may include, but are not limited to the following: Sulfur, Phosphorous, Nitrogen, Aluminum, Arsenic, Boron, Cadmium, Calcium, Lead, Tin, Titanium, Vanadium, and Zirconium. Abbreviations and acronyms are defined in Section 16.

3 - HAZARDS IDENTIFICATION

GENERAL HAZARD STATEMENT: Solid metallic products distributed by Allegheny Ludlum are generally classified as "articles" and do not constitute a hazardous material in solid form under the terms of the OSHA Hazard Communication Standard. Any articles manufactured from these solid products would be generally classified as non-hazardous. However, some metallic elements contained in these products have been determined to be toxic and are subject to regulatory controls. These elements can be emitted as airborne contaminants under certain processing conditions such as burning, melting, cutting, sawing, brazing, grinding, milling, machining.

Certain materials and equipment utilized in processing of steel products (cutting/machining fluids, coatings, processing lubricants, cleaning/pickling chemicals, welding fluxes, torch and plasma cutting systems) may constitute a health hazard and should be treated accordingly.

EMERGENCY OVERVIEW: Odorless solid product in various forms, silver-gray color. This formed solid metal product poses little or no immediate health or fire hazards. Product may be coated - refer to appropriate coating MSDS for physical and health hazards. When product is subjected to welding, burning, melting, sawing, brazing, grinding, or other similar processes, potentially hazardous airborne particulate and fumes may be generated. These operations should be performed in well-ventilated areas, and if appropriate, respiratory protection and other PPE should be utilized.

PRIMARY ROUTE OF ENTRY: Inhalation of dust or fume during welding, burning, melting, cutting, brazing, grinding, machining and other operations.

NOTE: The composition of fumes from welding are dependent not only on the metal being welded, but also on the welding process and electrodes used. A full health hazard assessment should be performed by a competent health and safety professional for all welding and other operations performed on this product.

Acute Effects of Overexposure:

INHALATION:
- Exposures to high concentrations of metallic fumes or dusts may result in irritation of the respiratory tract and/or sensitization of the lungs and other mucous membranes.
- Excessive inhalation of fumes from many metals can produce an acute reaction known as "metal fume fever" (symptoms shown below under *SIGNS AND SYMPTOMS OF OVEREXPOSURE*).

EYE:
- Exposure to high concentrations of fumes or dusts may cause irritation and/or sensitization.

SKIN:
- Exposure to dust may cause irritation or sensitization, possibly leading to dermatitis.

INGESTION:
- Ingestion of harmful amounts of product as distributed is unlikely due to its solid, insoluble form. Ingestion of dust may cause nausea and/or vomiting. Serious effects may occur if large amounts of dust are swallowed.

Chronic Effects of Overexposure:

EXCESSIVE AND REPEATED EXPOSURES TO FUME OR DUST GENERATED DURING PROCESSING MAY CAUSE:
- Allergic sensitization - dermatitis and asthma
- Lung inflammation and damage - pneumonitis, pneumonia, bronchitis, siderosis (benign lung disease caused by inhaling iron particles), diffuse pulmonary fibrosis

- Nasal perforation and nasal cavity damage
- Eye inflammation
- Central nervous system damage, possibly permanent
- Kidney damage
- Liver damage
- Gout - inflammation of the joints (associated with some metals)

CARCINOGENICITY:

- The carcinogenicity of this solid product as a whole has not been tested.• Individual components and some compounds of these elemental metals may have been associated with carcinogenicity by NTP and IARC.
- No component greater than 0.1% by weight within this solid product is regulated by OSHA within 29 CFR 1910 Subpart Z as a carcinogen.

SYNERGISTIC MATERIALS: Inhalation of high concentrations of Iron Oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

SIGNS AND SYMPTOMS OF OVEREXPOSURE:

- Redness, swelling, itching, and/or irritation of skin and eyes
- Respiratory difficulties - coughing, wheezing, shortness of breath, dyspnea, decreased pulmonary function
- Metal fume fever - symptoms consist of chills and fever (very similar and easily confused with flu symptoms), a metallic taste in the mouth, dryness and irritation of the throat. The symptoms occur a few hours after excessive exposures and usually last from 12 to 48 hours. Long term effects from metal fume fever have not been noted in the literature.
- Central nervous system effects may show languor, sleepiness, weakness, emotional disturbances, spastic gait, paralysis.
- Kidney damage may be seen as changes in urine output and appearance, lower back pain, and edema (swelling from fluid retention).
- Liver damage may be seen by loss of appetite, jaundice (yellowish skin color) and occasional pain in the upper abdomen on the left side.
- Anorexia and Weight loss

NOTE: For specific toxicological and other chronic effects information concerning the components of this solid steel product, *refer to SECTION 11.0, TOXICOLOGICAL INFORMATION.*

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: For airborne fume and dust, preexisting diseases of the lungs, skin, eyes, and other mucous membranes. Inhalation of high concentrations of Iron Oxide may possibly enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens.

4 - FIRST AID MEASURES

INHALATION: If overexposure occurs, immediately remove victim from the adverse environment to fresh air and seek medical attention. If breathing has stopped, certified individuals should perform CPR. Keep affected person warm and at rest.

EYE: Immediately flush with large amounts of running water for several minutes. Seek prompt medical attention.

SKIN: If dust gets on skin, wash contaminated area with soap and water. Remove and wash contaminated clothing. If a persistent rash or irritation occurs, seek medical attention.

INGESTION: Get medical attention immediately.

5 - FIRE FIGHTING MEASURES

FLASH POINT (Method Used): N/A
AUTOIGNITION TEMPERATURE: N/A
FLAMMABILITY CLASSIFICATION: N/A

FLAMMABLE LIMITS: N/A
GENERAL FIRE HAZARD: None for solid formed product

EXTINGUISHING METHOD: For solid formed product, as appropriate for surrounding fire. A fire involving finely divided particles should be treated as a Class D combustible metal fire. Fire should be extinguished by a properly trained and experienced firefighter. Proper care should be taken in applying extinguishing agent and in allowing to burn itself out.

FIRE FIGHTING EQUIPMENT: For solid formed product, as appropriate for surrounding fire. Positive pressure SCBA and structural firefighter's protective clothing should be used at a minimum for surrounding fire.

UNUSUAL FIRE OR EXPLOSION HAZARDS: This solid formed product does not constitute a fire or explosion hazard. Finely divided, suspended particulates may present a fire and explosion hazard in the presence of an ignition source. In addition, applied coatings may be combustible. For fires involving coated product, consult the appropriate coating MSDS.

Finely divided product (e.g. dust, shavings, etc.) may be combustible. May be ignited by heat, sparks, or flames. May burn rapidly with flare-burning effect. Fire may produce irritating or poisonous gases. High concentrations of airborne dust in an enclosed area can explode or burn if exposed to a source of ignition. Care should be taken to avoid the generation of airborne dust. Use of water on finely divided product may cause explosive hydrogen gas and heat to be evolved.

EXPLOSION DATA: *Sensitivity/Mechanical Impact*: N/A for solid product *Sensitivity/Static Discharge*: N/A for solid product

HAZARDOUS COMBUSTION PRODUCTS: N/A for solid formed product. Toxic metal and metallic oxide fumes may be evolved from fires involving finely divided particles and during torch-cutting operations.

6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED: Minimal problems with spills of this product would occur because of its solid form. The following precautions apply to spills involving finely divided particles:

- Shut off ignition sources; no flares, smoking or flames should be in or near hazard area.
- Do not touch or walk through spilled material. Clean up using methods which avoid dust generation.
- Compressed air should not be used to clean up spills.
- During cleanup, skin and eye contact and inhalation of dust should be avoided as much as possible.
- Provide local exhaust or dilution ventilation as required.
- Appropriate PPE should be worn during cleanup if exposure limits are exceeded (*see SECTION 8, EXPOSURE CONTROLS/PERSONAL PROTECTION*).
- Collect material in compatible and appropriately labeled containers.
- For small dry spills, place material into clean dry container with a clean shovel, and cover loosely; move container from spill area.
- Comply with federal, state, and local regulations regarding reporting of spills and waste disposal.

7 - HANDLING AND STORAGE

HANDLING: Avoid breathing of and contact with fumes and dusts during processing. No specific requirements for solid formed steel product.

STORAGE: Keep away from incompatible materials (*see SECTION 10, STABILITY AND REACTIVITY*). No other specific storage procedures are required for solid formed steel product.

8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Local and/or general exhaust ventilation should be used to keep worker exposure below applicable exposure limits (*see SECTION 2, COMPOSITION/INFORMATION ON INGREDIENTS, for PELs and TLVs*) during welding, brazing, grinding, machining, and other processes which may generate airborne contaminants.

RESPIRATORY: When engineering or administrative controls cannot maintain exposures below permissible limits during welding, brazing, machining, and other processes which may generate airborne contaminants or while being instituted, use an appropriate NIOSH/MSHA approved respirator. If respiratory protection is required, all appropriate requirements as set forth in 29 CFR 1910.134 must be met. A competent health and safety professional should be consulted for respirator selection, fit testing, and training. Use a NIOSH-approved positive-pressure, air-supplied respirator if exposure levels are unknown, or any other circumstance where an air-purifying respirator would not be adequate.

GLOVES: Suitable for protection against physical injury and skin contact during handling and processing.

EYE: Safety glasses or goggles when there is a reasonable probability of flying particles or high levels of airborne dust or fume.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Adequate footwear (safety shoes if necessary) and clothing that protects skin from prolonged or repeated contact. Change clothing if there is a reasonable probability of contamination.

9 - PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: NIF for steel product(Fe-5432/Cr-3992/Ni-5252 °F)
Vapor Pressure (mm Hg, @ 68 °F): Negligible
Vapor Density (AIR = 1): N/A
Melting Point: NIF for steel product(Fe-2797/Cr-3452/Ni-2651 °F)
Appearance and Odor: Silver-gray metallic solid form, odorless

Specific Gravity (H_2O = 1): 7 –
Evaporation Rate: N/A
Solubility in water: Insoluble
pH: N/A

10 - STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions of use, storage and transport for solid formed product.

CONDITIONS TO AVOID: Contact with incompatible materials. Avoid creating finely divided, concentrated airborne particulates in the presence of ignition sources.

INCOMPATIBLE MATERIALS: Oxidizers. Reacts with strong acids to form explosive hydrogen gas and heat.

HAZARDOUS DECOMPOSITION PRODUCTS: Extreme heat from fire or processing (e.g. welding, brazing, machining, etc.) may produce toxic or irritating airborne particulate, including metal and metallic oxide fumes. Reaction of some metals with water, steam, acids, etc. can evolve hydrogen, which is a highly dangerous fire and explosion hazard.

HAZARDOUS POLYMERIZATION: Will not occur

11 - TOXICOLOGICAL INFORMATION

Iron: Excessive exposure of eyes to airborne iron dust can cause conjunctivitis, choroiditis, and retinitis. Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in development of a benign pneumoconiosis, called siderosis, which is observable via x-ray. No physical impairment of lung function has been associated with siderosis. Inhalation of excessive concentrations of iron oxide may enhance the risk of lung cancer development in workers exposed to pulmonary carcinogens. LD50 (oral, rat) - 30 gm/kg; LC50 - NIF.

Chromium: The health hazards associated with exposure to chromium are dependent on its oxidation state. The metal form (chromium as it exists in this product) is of low toxicity. The hexavalent form and some trivalent forms are toxic. Adverse effects of the hexavalent form on the skin may include ulcerations, dermatitis, and allergic skin reactions. Inhalation of hexavalent chromium compounds can result in ulceration and perforation of the mucous membranes of the nasal septum, irritation of the pharynx and larynx, asthmatic bronchitis, bronchospasms and edema. Respiratory symptoms may include coughing and wheezing, shortness of breath, and nasal itch. LD50 (oral) - NIF; LC50 - NIF.

Carcinogenicity - Chromium and most trivalent chromium compounds have been listed by NTP as having inadequate evidence for carcinogenicity in experimental animals. According to NTP, there is sufficient evidence for carcinogenicity in experimental animals for the following hexavalent chromium compounds: calcium chromate, chromium trioxide, lead chromate, strontium chromate, and zinc chromate. IARC has listed chromium metal and its trivalent compounds within Group 3 (The agent is not classifiable as to its carcinogenicity to humans). Chromium is not regulated as a carcinogen by OSHA (29 CFR 1910 Subpart Z). ACGIH has classified chromium metal and trivalent chromium compounds as A4, not classifiable as a human carcinogen. Water soluble hexavalent chromium compounds have been classified by ACGIH as A1, confirmed human carcinogen.

Nickel: Nickel fumes are respiratory irritants and may cause pneumonitis. Exposure to nickel and its compounds may result in the development of a dermatitis known as "nickel itch" in sensitized individuals. The first symptom is usually itching, which occurs up to 7 days before skin eruption occurs. The primary skin eruption is erythematous, or follicular, which may be followed by skin ulceration. Nickel sensitivity, once acquired, appears to persist indefinitely. LC50 - NIF; LD50 (oral) - NIF.

Carcinogenicity - Nickel and certain nickel compounds have been listed by NTP as being reasonably anticipated to be carcinogens. IARC has listed nickel compounds within group 1 (there is sufficient evidence for carcinogenicity in humans) and nickel within group 2B (agents which are possibly carcinogenic to humans). Nickel is not regulated as a carcinogen by OSHA (29 CFR 1910 Subpart Z). Based upon epidemiological data, ACGIH (1998) has designated elemental nickel as category A5, not a suspected human carcinogen.

Molybdenum: Based on animal experiments, molybdenum and its compounds are highly toxic. Some evidence of liver dysfunction with hyperbilirubinemia have been reported in workmen chronically exposed in a Soviet Mo-Cu plant. In addition signs of gout have been found in factory workers and among inhabitants of Mo-rich areas of Armenia. The main features were joint pains in the knees, hands, feet, articular deformities, erythema, and edema of the joint areas. LD50 (oral) - NIF; LC50 - NIF.

Silicon: Elemental silicon is an inert material which appears to lack the property of causing fibrosis in lung tissue. However, slight pulmonary lesions have been reported in laboratory animals from intratracheal injections of silicon dust. Silicon dust has little adverse affect on lungs and does not appear to produce significant organic disease or toxic effects when exposures are below permissible limits. Silicon may cause chronic respiratory effects. Crystalline silica (silicon dioxide) is a potent respiratory hazard. However, the likelihood of crystalline silica generation during normal processing is very remote. LD50 (oral) - 3160 mg/kg rat; LC50 - NIF.

Manganese: Chronic manganese poisoning may result from prolonged inhalation of manganese dust and fumes. The central nervous system is the chief site of damage from the disease, which may result in permanent disability. Symptoms include languor, sleepiness, weakness, emotional disturbances, spastic gait, recurring leg cramps, and paralysis. A high incidence of pneumonia and other upper respiratory infections has been found in workers exposed to dust or fume of manganese compounds. Manganese compounds are experimental equivocal tumorigenic agents. LD50 (oral, rat) - 30 gm/kg; LC50 - NIF; TCLo - 2300 $\mu g/m^3$ (man).

Tungsten: Tungsten has been shown to act by antagonizing the action of the essential trace element, Molybdenum. Tungsten metal powder administered to animals has been shown in several studies as not totally inert. One study found that guinea pigs treated orally or intravenously with tungsten suffered from anorexia, colic, incoordination of movement, trembling, dyspnea and weight loss. Long industrial experience has indicated no pneumoconiosis to develop among workers exposed solely to tungsten or its insoluble compounds (at air concentrations of the order of 5 mg/m^3). In NIOSH's criteria document, two Russian studies were cited which indicated and incidence of 9-11% pulmonary fibrosis among employees exposed to tungsten without cobalt co-exposure. LD50 (intraperitoneal) - 5 g/kg rat; LC50 - NIF.

Aluminum: Inhalation of finely divided aluminum and aluminum oxide powder has been reported as a cause of pulmonary fibrosis and lung damage. This effect, known as Shaver's Disease, is complicated by the presence in the inhaled air of silica and oxides of iron. May also be implicated in Alzheimer's disease. LD50 (oral) - NIF; LC50 - NIF.

Columbium: Interferes with calcium as an activator of enzyme systems. LD50 (oral) - NIF; LC50 - NIF.

Titanium: Elemental titanium and titanium dioxide is of a low order of toxicity. Laboratory animals (rats) exposed to titanium dioxide via inhalation have developed small localized areas of dark-colored dust deposits in the lungs. Excessive exposure in humans may result in slight changes in the lungs. LD50 (oral) - NIF; LC50 - NIF.

Copper: Industrial exposure to copper fumes, dusts, or mists may result in metal fume fever with atrophic changes in nasal mucous membranes. Chronic copper poisoning results in Wilson's Disease, characterized by a hepatic cirrhosis, brain damage, demyelination, renal disease, and copper deposition in the cornea. Copper fume (respirable) has appeared on the ACGIH Notice of Intended Changes (1996 & 1997). The intended ACGIH TLV for respirable copper fume is 0.05 mg/m^3. LD50 (oral) - NIF; LC50 - NIF.

Cobalt: Cobalt dust may cause an asthma-like disease with symptoms ranging from cough, shortness of breath and dyspnea to decreased pulmonary function, nodular fibrosis, permanent disability, and death. Exposure to cobalt may cause weight loss, dermatitis, and respiratory hypersensitivity. LD50 (oral, rat) - 6171 mg/kg; LC50 - NIF.

Carcinogenicity - IARC has listed cobalt and cobalt compounds within group 2B (agents which are possibly carcinogenic to humans). ACGIH has placed cobalt and inorganic compounds in category A3 (Experimental animal carcinogen - the agent is carcinogenic in experimental animals at a relatively high dose, by route(s), histologic type(s), or by mechanism(s) that are not considered relevant to worker exposure. Cobalt has been classified by the Federal Republic of Germany to be carcinogenic to experimental animals.

12 - ECOLOGICAL INFORMATION

N/A for solid steel product in its as shipped form. Articles produced from solid product are not an ecological hazard. NIF on specific product to establish its effect if released into the environment in finely divided form. It is believed that finely divided product, based on its components, will be hazardous to fish, animals, plants and the environment if released, the degree of which would depend on the

particle size and quantity released. In addition, if particles are small enough, material may be ingested by wildlife, with possible toxic effects. The solid product is not expected to migrate easily into soil or groundwater based upon its insoluble form, however, finely divided material can become mobile in water and contaminate soil and groundwater. This material may persist in the environment for long periods, based upon its corrosion resistant, insoluble, and non-biodegradable properties. In addition, heavy metals may contaminate the food chain and ultimately be consumed by humans. Some components will react with oxygen to form metallic oxides; the rate of oxidation depends upon prevailing conditions. Iron oxidizes most rapidly in moist air. Metallic particulate discharged to a POTW may pass-through or contaminate sewage sludge, may interfere with the treatment system process, and may be non-compliant with a POTW permit or other regulations.

13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: If product as shipped becomes a solid waste, it would not be classified as a hazardous waste, and should be recycled. Product dusts from processing may be classified as a hazardous waste, depending on various properties of the dust (e.g. toxicity, solubility, flammability), which are defined further within 40 CFR 261 and possibly more restricting state and/or local regulations. Solid waste generated from product processing should be classified by a competent environmental professional and disposed, processed, or recycled in accordance with federal, state and local regulations.

14 - TRANSPORT INFORMATION

HAZARDOUS MATERIALS DESCRIPTION/PROPER SHIPPING NAME: N/A for solid formed product.
HAZARD CLASS: N/A for solid formed product.
IDENTIFICATION NO.: N/A for solid formed product.

15 - REGULATORY INFORMATION

SARA TITLE III HAZARD CATEGORIZATION: Product (dust and fume) is categorized as an immediate (acute) health hazard and a delayed (chronic) health hazard as defined by 40 CFR 370.
SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (EHSs): No components are listed as extremely hazardous substances.
SARA TITLE III SECTION 313 REPORTABLE SUBSTANCES: Nickel, Chromium, Cobalt, Aluminum (fume or dust), and Manganese are subject to reporting requirements (Copper is less than the 1% de minimis level).
CERCLA HAZARDOUS SUBSTANCES: Nickel* (threshold 100 lbs.), Chromium* (threshold 5000 lbs.), and Copper* (threshold 5000 lbs.). *Note: CERCLA reporting only if diameter of particles released is less than 100 micrometers.
PENNSYLVANIA R-T-K LIST: Listed components (greater than 0.1 % by weight) - Aluminum (E), Manganese (E), Molybdenum, Nickel (E,S), Silicon, Chromium (E,S), Cobalt (E), Copper (E), and Tungsten. E - environmental hazard, S - special hazardous substance.
NEW JERSEY R-T-K ENVIRONMENTAL HAZARDOUS SUBSTANCE LIST: Listed components - Aluminum (as dust and fume), Chromium, Cobalt, Copper, Manganese, and Nickel.
CALIFORNIA PROPOSITION 65: Listed possible trace (much less than 0.1% by weight) elements known by the state to cause cancer - Arsenic (inorganic), Cadmium, Lead; Listed possible trace elements known by the state to cause reproductive toxicity - Lead; Listed components known by the state to cause cancer - Nickel, Cobalt (metal powder); Listed components known by the state to cause reproductive effects - None.

16 - OTHER INFORMATION

NFPA RATING (for solid formed product):	Health: 1	Flammability: 0	Reactivity: 0	
HMIS RATING (for solid formed product):	Health: 1	Flammability: 0	Reactivity: 0	PPE: B

ABBREVIATIONS/ACRONYMS:

ACGIH	- American Conference of Governmental Industrial Hygienists	NIF	- No Information Found
CAS	- Chemical Abstracts Service	NIOSH	- National Institute for Occupational Safety and Health
CFR	- Code of Federal Regulations	NTP	- National Toxicology Program
CPR	- Cardiopulmonary Resuscitation	OSHA	- Occupational Safety and Health Administration
EST	- Eastern Standard Time	PEL	- Permissible Exposure Limit

HMIS	- Hazardous Materials Identification System	PNOR	- Particulate Not Otherwise Regulated
IARC	- International Agency for Research on Cancer	PNOC	- Particulate Not Otherwise Classified
mg/m3	- milligram per cubic meter of air	POTW	- Publicly Owned Treatment Works
mppcf	- million particles per cubic foot	PPE	- Personal Protective Equipment
MSDS	- Material Safety Data Sheet	ppm	- parts per million
MSHA	- Mine Safety and Health Administration	SCBA	- Self-contained Breathing Apparatus
N/A	- Not Applicable	STEL	- Short-term Exposure Limit
NFPA	- National Fire Protection Association	TLV	- Threshold Limit Value

NIA - No Information Available TWA- Time-weighted Average

NOTE: The percent composition in Section 2 reflects the range that is possible within this GROUP of products. These are not the technical specifications for a particular product. Also, specific grades may not include all of the hazardous ingredients in Section 2.

DISCLAIMER: All information, recommendations, and suggestions appearing herein concerning the product are based upon data believed to be reliable. It is the user's responsibility to determine the safety, toxicity, and suitability for their own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied is made by AM Health and Safety, Inc. (AMH&S-acting consultant) and Allegheny Ludlum as to the effects of such use, the results to be obtained, or the safety and toxicity of the product, nor does AMH&S or Allegheny Ludlum assume any liability arising out of use by others of the product referred to herein. AMH&S and Allegheny Ludlum shall not in any event be liable for special, incidental or consequential damages in connection with this MSDS. This MSDS is not intended as a license to operate under, or recommendation to infringe on, any patents. Appropriate warnings and safe handling procedures should be provided to handlers and users.

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PREPARED BY AM Health and Safety, Inc. (acting consultant)	**REVISION NO.**: 10	**APPROVAL DATE**: September 15, 2002
MFR. CONTACT: J.R. Dierdorf (724-226-6384)	**SUPERSEDES MSDS DATED**: December 2, 1999	