



MATERIAL SAFETY DATA SHEET

MOLAR AND BICUSPID BANDS

Document Number: MSDS-054	Revision Date: Jan 1,2015	Material Type: Molar and Bicuspid Band Material (305 SST)
Revision: A	Number of Pages: 7	

1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT(S): STEEL – 301, 301L, 302, 302B, 304, 304H, 304L, 304LN, 304N, 305, 316, 316L, 316LN, 316TI, 317, 317L, 317LX, 317LXN, 317XN, 321, 321H, 347, 348, 370, 808, 850, 13-8 PH

MSDS CATEGORY: I-B

MANUFACTURER:

ALLEGHENY LUDLUM CORPORATION
RIVER ROAD
BRACKENRIDGE, PA 15014

DESCRIPTION: Solid alloy, various forms and uses

EMERGENCY PHONE: 412-226-5059 (M-F, 9 a.m.-5 p.m. EST)

INFO PHONE: 412-226-6384 (M-F, 9 a.m.-5 p.m. EST)

CHEMTREC: 800-424-9300 (D.C. 202-483-7616)

DATE OF APPROVAL: 7-1-95

2 – COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS No:	% BY WEIGHT	OSHA PEL	ACGIH TVL
Iron	7439-89-6	52-78	10 mg/m ³ , Iron Oxide form, fume	5 mg/m ³ , Iron Oxide form, fume
Chromium	7440-47-3	12-21	1 mg/m ³ , metal and insoluble salts (as Cr) 0.5 mg/m ³ , Cr (II) and (III) compounds (as Cr)	0.5 mg/m ³ , metal (as Cr) 0.5 mg/m ³ , Cr (II) and (III) compounds (as Cr)
Nickel	7440-02-0	6.0-18	1 mg/m ³ , metal and insoluble compounds (as Ni)	1 mg/m ³ , metal and insoluble compounds (as Ni)
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	0-4.5	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)	5 mg/m ³ , Mn dust and compounds (as Mn) 1 mg/m ³ , Mn fume (as Mn) 3 mg/m ³ , STEL, Mn fume (as Mn)
Tungsten	7440-33-7	0-1.8	15 mg/m ³ , total dust (PNOR) 5 mg/m ³ , respirable fraction (PNOR)	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)	10 mg/m ³ , total dust (PNOC)
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 cmpds. (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.

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3 – HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Odorless solid alloy in various forms, silver-gray color. This formed solid metal alloy product poses little or no immediate health or fire hazards. Alloy may be coated – refer to appropriate coating MSDS for physical and health hazards. When alloy 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 not only dependent on the metal being welded, but also on the 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 alloy.

Acute Effects of Overexposure:

INHALATION:

Exposures to high concentrations of metallic fumes or dusts may result in irritation and/or sensitization of the lungs and other mucous membranes.
Excessive inhalation of fumes from many metals (e.g. Manganese and Copper) can produce an acute reaction known as “metal fume fever” (symptoms shown below).

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 alloy is unlikely due to its solid, insoluble form. Ingestion of dust may cause nausea and/or vomiting. Serious effects occur if large amounts of dust are swallowed.

Chronic Effects of Overexposure:

EXCESSIVE AND REPEATED EXPOSURES TO ALLOY FUME OR DUST MAY CAUSE :

Allergic sensitization – dermatitis and asthma
Lung inflammation and damage – pneumonia, bronchitis, siderosis (benign lung disease caused by inhaling iron particles), diffuse pulmonary fibrosis (cobalt)
Nasal perforation and nasal cavity damage
Eye inflammation
Central nervous system damage, possibly permanent (Manganese)
Kidney damage (Copper, Manganese, Molybdenum)
Liver damage (Copper, Molybdenum)
Gout – Inflammation of the joints (Molybdenum)

CARCINOGENICITY:

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

SIGNS AND SYMPTOMS OF OVEREXPOSURE:

Redness, swelling, itching, and/or irritation of skin and eyes
Respiratory difficulties – coughing, wheezing, 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.

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Central nervous system effects may show languor, sleepiness, weakness, emotional disturbances, spastic gait, paralysis (due to Manganese poisoning).
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 alloy, including a discussion of the carcinogenicity of Nickel, Chromium, and Cobalt, see *SECTION 11.0, TOXICOLOGICAL INFORMATION*.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: For alloy fume and dust, pre existing 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 the skin, wash contaminated area with soap and water. Remove and wash contaminated clothing. If rash or irritation persists, 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 alloy

EXTINGUISHING METHOD: For solid formed alloy, as appropriate for surrounding fire. A fire involving finely divided alloy 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 alloy, 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 alloy 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 alloys, consult the appropriate coating MSDS.

Finely divided alloy (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 alloy may cause explosive hydrogen gas and heat to be evolved.

HAZARDOUS COMBUSTION PRODUCTS: N/A for solid formed alloy. Toxic metal and metallic oxide fumes may be evolved from fires involving finely divided alloy.

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. If there is a spill of alloy dust, the following precautions should be taken:

Shut off ignition sources; no flares, smoking or flames should be in or near hazard area.

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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 alloy product.

STORAGE: Keep away from incompatible materials (see SECTION 10, STABILITY AND REACTIVITY). No other specific storage procedures are required for solid formed alloy 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 can not keep exposures below exposure 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 contact with dust or fume.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Safety shoes 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 alloy (Fe-5432, Cr-3992, Ni-5252 °F)

Vapor Pressure: mm Hg, @ 68°F: Negligible

Vapor Density: (AIR=1): N/A

Melting Point: NIF for alloy (Fe-2797, Cr-3452, Ni-2651 °F)

Appearance and Odor: Silver-gray metallic solid form, odorless

Specific Gravity (H₂O=1): 7-9

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.

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, such as manganese, with water, steam, acids, etc. will evolve hydrogen, which is a highly dangerous fire and explosion hazard.

HAZARDOUS POLYMERIZATION: Will not occur.

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11 – TOXICOLOGICAL INFORMATION

Iron: Iron dust can cause conjunctivitis, choroiditis, and retinitis if it contacts and remains in the tissues. Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in development of a benign pneumoconiosis, called siderosis, which is observable as an x-ray change. 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; NIF; 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 is 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.

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). Nickel is on the ACGIH Notice of Intended Changes as a Category A1, confirmed 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 kept beneath exposure 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 µg/m³ (man).

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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 altogether 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 pneumonconiosis to develop among workers exposed solely to W or its insoluble compounds (at air concentrations of the order of 5 mg/m³). In NIOSH's criteria document, two Russian studies were cited which indicated an 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 of 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. 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 the 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 to be carcinogenic to experimental animals by the Federal Republic of Germany.

12 – ECOLOGICAL INFORMATION

N/A for solid alloy in its as shipped form. NIF on specific alloy as a whole in order to determine its effect if released into the environment in finely divided form. It is believed that finely divided alloy, 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, alloy may be ingested by wildlife, with possible toxic effects occurring. The solid alloy is not expected to migrate easily into soil or groundwater based upon its insoluble form, however, alloy can become mobile in water and contaminate soil and groundwater if particles are small enough. Alloy may persist in the environment for long periods, based upon the corrosion resistant, insoluble, and non-biodegradable properties of the alloy. In addition, heavy metals may contaminate the food chain and ultimately be consumed by humans. Over time, steel will react with oxygen to form metallic oxides, the rate of which depends on various 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. The iron component (55-75% of product) is a constituent of hemoglobin and is essential to plant and animal life, an important factor in cellular oxidation mechanisms.

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.



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14 – TRANSPORT INFORMATION

HAZARDOUS MATERIALS DESCRIPTION/PROPER SHIPPING NAME: N/A for solid formed alloy product.

HAZARD CLASS: N/A for solid formed alloy product.

IDENTIFICATION NO.: N/A for solid formed alloy 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% deminimis 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-TK 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

NAPA RATING (for solid alloy): Health: 1

Flammability: 0

Reactivity: 0

HMIS RATING (for solid alloy): Health 1

Flammability 0

Reactivity: 0

PPE: B

ABBREVIATIONS/ACRONYMS:

ACGIH	-American Conference of Governmental Industrial Hygienists	NIOSH	-National Institute for Occupational Safety and Health
CAS	-Chemical Abstracts Service	NTP	-National Toxicology Program
CFR	-Code of Federal Regulations	OSHA	-Occupational Safety and Health Administration
CPR	-Cardiopulmonary Resuscitation	PEL	-Permissible Exposure Limit
EST	-Eastern Standard Time	PNOR	-Particulate Not Otherwise Regulated
HMIS	-Hazardous Materials Identification System	PNOC	-Particulate Not Otherwise Classified
IARC	-International Agency for Research on Cancer	POTW	-Publicly Owned Treatment Works
MSDS	-Material Safety Data Sheet	PPE	-Personal Protective Equipment
MSHA	-Mine Safety and Health Administration	SCBA	-Self-Contained Breathing Apparatus
NFPA	-National Fire Protection Association	STEL	-Short-term Exposure Limit
N/A	-Not Applicable	TLV	-Threshold Limit Value
NIA	-No Information Available	TWA	-Time-weighted Average.
NIF	-No Information Found		

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 MO as to the effects of such use, the results to be obtained, or the safety and toxicity of the product, nor does MO assume any liability arising out of use by others of the product referred to herein. MO shall not in any event be liable for special, incidental or consequential damages in connection with this MSDS.

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