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I. PRODUCT IDENTIFICATION

Product Name: Tungsten Alloy

Synonyms: Tungsten heavy alloy, high density tungsten alloy, machinable tungsten, densalloy

II. HAZARDOUS INGREDIENTS

Hazardous

Components:	**CAS Number:**	**Percent:**	**OSHA/PEL:**	**ACGIH/TLV:**	**ACGIH/STEL:**
Tungsten	7440-33-7	70-99	5 mg/m^3	5 mg/m^3	10 mg/m^3
Nickel	7440-02-0	0-21	1 mg/m^3	1 mg/m^3	
Copper	7440-50-8	0-25	1 mg/m^3 fume)	(0.2mg/m^3 fume)	(0.1mg/m^3
Iron	7439-89-6	0-9	N/A	N/A	N/A
Cobalt	7440-48-4	0-4	0.1 mg/m^3	0.05 mg/m^3	0.02 mg/m^3

III. PHYSICAL DATA

Boiling Point: N/A

Melting Point: N/A

Specific Gravity: 16.7 to 19.3

Solubility in H_2O: Insoluble

Appearance and Odor: Gray powder, tin-white metal, high copper containing alloys will have a copper sheen. No odor.

IV. FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A

Autoignition Temperature: N/A

Flammable Limits: **Upper**: N/A **Lower**: N/A

Extinguishing Media: Use class D fire extinguishing agents (dry powder)

Special Fire Fighting Procedures: Firefighters must wear full face, self-contained breathing apparatus with full protective clothing.

Unusual Fire and Explosion Hazards: Dust may present a fire or explosion hazard under favoring conditions of particle size,

dispersion and strong ignition source. However, this is not expected to be a problem under normal handling conditions.

V. HEALTH HAZARD INFORMATION

Effects of Exposure:

No specific data, testing or information has been found for the chemical compounds that comprise this product. However, general comments are made below for the individual elements:

Tungsten compounds are considered somewhat toxic. However the element itself does not constitute an important health hazard. Exposure is related chiefly to any dust created. Heavy exposure to the dust or the ingestion of large amounts of the soluble compounds produces changes in body weight, behavior, blood cells, choline esterase activity and sperm in experimental animals.

Nickel and many of its compounds are poisons and carcinogens. All airborne nickel containing dusts are regarded as carcinogenic by inhalation. Ingestion of large doses of nickel compounds has been shown to cause intestinal disorders, convulsions and asphyxia. Hypersensitivity to nickel is common and can cause allergic dermatitis, pulmonary asthma and conjunctivitis. The most common effect resulting from exposure to nickel compounds is the development of nickel itch.

Copper may cause human systemic effects by ingestion; nausea and vomiting. As the sublimed oxide, copper may be responsible for one form of metal fume fever. Discoloration of the skin is often seen in persons handling copper, but this does not indicate any actual injury. Lung damage after chronic exposure to fumes in the industry has not been described. Copper fume causes irritation of the upper respiratory tract.

The inhalation of large amounts of iron dust may result in pneumoconiosis (arc welder's lung). Chronic exposure to excess levels of iron (>50-100 mg Fe/day) can result in pathological deposition of iron in the body tissues, the symptoms of which are fibrosis of the pancreas, diabetes mellitus and liver cirrhosis.

Cobalt is considered possibly carcinogenic to humans by the IARC. Cobalt is moderately toxic by ingestion. Inhalation of cobalt dust may cause pulmonary damage. Exposure to cobalt powder may cause dermatitis.

Acute Effects:

Inhalation: May cause irritation to the respiratory tract.

Ingestion: No acute health effects recorded.

Skin: May cause abrasive irritation.

Eye: May cause abrasive irritation.

Chronic Effects: Large overdoses may cause nervous system disturbances, and diarrhea. No other chronic health effects recorded.

Target Organs: May affect the respiratory and central nervous systems.

Medical Conditions Generally Aggravated by Exposure: Pre-existing respiratory disorders.

Carcinogenicity: **NTP**: Yes **IARC**: Yes **OSHA**: Yes

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: If large amounts of dust from this substance are inhaled, move the exposed person to fresh air and perform artificial respiration, if necessary. Seek medical attention.

INGESTION: Give 1-2 glasses of milk or water and induce vomiting, seek medical attention if symptoms persist. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing, brush material off skin, wash affected area with mild soap and water, seek medical attention if symptoms persist.

EYE: Flush eyes with lukewarm water, lifting upper and lower eyelids, for at least 15 minutes. Seek medical attention if symptoms persist.

VI. REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Extremely fine powders may be pyrophoric under some conditions.

Incompatibility (Material to Avoid): Avoid contact of dust with strong oxidizers. Bromine pentafluoride, bromine, chlorine trifluoride, potassium perchlorate, potassium dichromate, nitryl fluoride, fluorine, oxygen difluoride, iodine pentafluoride, hydrogen sulfide, sodium peroxide, lead (IV) oxide, air.

Hazardous Decomposition Products: None recorded

Hazardous Polymerization: Will not occur

VII. SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled: Ventilate area of spill. Take care not to raise dust. Use non-sparking tools. Clean-up using methods which avoid dust generation such as vacuuming (with appropriate filter to prevent airborne dust levels which exceed the TLV), wet dust mop or wet clean-up. If airborne dust is generated, use an appropriate NIOSH approved respirator.

Waste Disposal Method: Dispose of in accordance with Local, State and Federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection: Use an appropriate NIOSH approved dust, mist respirator when airborne dust concentrations exceed the appropriate PEL or TLV. Appropriate requirements set forth in 29CF19110.134 should be met.

Ventilation: Use local exhaust ventilation which is adequate to limit personal exposure to levels which do not exceed the TLV. If such equipment is not available, use respirators as specified above.

Protective Gloves: Protective gloves or barrier creams are recommended when contact with dust or mist is likely. Wash thoroughly prior to applying barrier creams or using protective gloves.

Eye Protection: Safety glasses with side shields or goggles are recommended.

Other Protective Clothing or Equipment: Full body protective clothing is advisable if contact with dust, mist or fume is expected. Work clothing should be changed daily if it is suspected that the clothing is contaminated.

IX. SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Tungsten heavy alloys are, in general, safe materials to handle and use under

almost all commonly encountered environments. Special precautions typically only apply in situations where the alloy is present as a fine powder or when operations such as machining create dust or soluble by products. Maintain good housekeeping procedures to prevent the accumulation of dust and the generation of airborne dust particles. Avoid dust inhalation and direct skin contact with the dust. Wash hands thoroughly before eating or smoking. Wash exposed skin at the end of the work shift. Periodic medical examinations are recommended for individuals regularly exposed to dust or mists.

Other Precautions: Maintain good housekeeping procedures to prevent accumulation of dust. Use clean-up methods which minimize dust generation such as vacuuming or wet clean-up. If airborne dust is generated, use an appropriate NIOSH approved respirator. Do not shake clothing or other items to remove dust. Use a vacuum. Avoid dust inhalation and direct skin contact. Do not ingest. Tungsten metal powder may ignite on contact with air. Handle and store in a controlled environment and inert gas such as argon.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating and smoking. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.