



Material Safety Data Sheet

Date Last Revised: Feb 8, 2017

SECTION 1. CHEMICAL IDENTIFICATION

Name:	Tungsten Heavy Alloy
Synonyms:	High Density Tungsten Alloy; Tungsten Alloy containing Nickel and Iron; Tungsten Alloy containing Copper; Tungsten Alloy containing Nickel and Cobalt; Tungsten Alloy containing Nickel, Iron and Cobalt
CAS #:	7440-33-7 (Tungsten), 7440-02-0 (Nickel), 7440-50-8 (Copper), 7440-48-4 (Cobalt)

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Family: Refractory Metal Alloy
Chemical Formula: W+Ni+Fe, W+Cu, W+Ni+Cu, W+Ni+Co, W+Ni+Fe+Co

Material	%	OSHA TWA	ACGIH TWA	ACGIH STEL
Tungsten	70 to 99	5 (insoluble) 1 (soluble)	5 (insoluble) 1 (soluble)	10 (insoluble) 3 (soluble)
Nickel	0 to 21	1 (soluble. & insoluble.)	1.0 (insoluble) 0.1 (soluble)	
Iron	0 to 9	n/a	n/a	n/a
Copper	0 to 25	0.1 (fume), 1 (dusts & mists)	0.2 (fume) 1 (dust & mists)	n/a
Cobalt	0 to 4	0.1	0.05	0.02

(all exposure limits in mg/m³)

SECTION 3. HAZARDS IDENTIFICATION

The terms "hazardous" and "hazardous materials" as used within this MSDS should be interpreted as by, and in accordance with, the OSHA Hazard Communication Standard (29CFR1910.1200) including cited appendices, lists, references, etc.

Primary routes of entry:	Inhalation, ingestion, skin or eye contact (for dusts, mists, powder and fume)
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Effects of overexposure:	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.
Carcinogenic assessment:	Cobalt - IARC 2B; Nickel - IARC 2B, NTP 2;

Note: IARC 2B - The agent is possibly carcinogenic to humans. This category is generally used for agents for which there is limited evidence in humans in the absence of sufficient evidence in experimental animals. It may also be used when there is inadequate evidence of carcinogenicity in experimental animals. NTP 2 - Substances or groups of substances which may reasonably be anticipated to be carcinogens. "Reasonably anticipated to be carcinogens" defines carcinogens for which there is limited evidence of carcinogenicity in humans and/or sufficient evidence of carcinogenicity in experimental animals.

SECTION 3. HAZARDS IDENTIFICATION

Tungsten	Industrially this element does not constitute an important health hazard.
Nickel	Considered a carcinogen by IARC and NTP. Poisonous by ingestion, intratracheal, intraperitoneal, subcutaneous, and intravenous routes. Hypersensitivity to nickel is common and can cause allergic contact dermatitis (nickel itch), pulmonary asthma and conjunctivitis.
Iron	The inhalation of large amounts of iron dust may result in pneumoconiosis (arc welder's lung).
Copper	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.
Cobalt	Considered possibly carcinogenic to humans by the IARC. Moderately toxic by ingestion. Inhalation of the dust may cause pulmonary damage. The powder may cause dermatitis.

SECTION 4. FIRST - AID MEASURES (for dusts, mists and fume)

Eye contact:	If irritation occurs, flush with large amounts of water for at least 15 minutes. If irritation persists, seek medical attention.
Skin contact:	Wash with soap and water. If irritation or rash occurs, thoroughly wash affected area with soap and water and isolate from exposure. If rash persists, seek medical attention.
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:	If ingested, get medical attention. Give large quantities of water and induce vomiting. DO NOT MAKE AN UNCONSCIOUS PERSON VOMIT.

Other:	In the event of wound contamination with nickel, the wound should be promptly and thoroughly cleaned. All contaminated wounds should be thoroughly cleaned.
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SECTION 5. FIRE FIGHTING MEASURES

Extinguishing media:	Use Class D fire extinguishing agents (dry powder)
Special procedures:	Use self contained breathing apparatus.
Unusual hazard:	Dusts may present a fire or explosion hazard under rare favoring conditions of particle size, dispersion, and strong ignition source. However, this is not expected to be a problem under normal handling conditions.

SECTION 6. ACCIDENTAL RELEASE MEASURES

If material is released or spilled, ventilate the area of the spill. Clean up using methods which avoid the generation of dusts. Such methods include wet mopping or vacuuming (assuring that the vacuum is equipped with the proper filter to prevent airborne dust levels which exceed the PEL or TLV). If airborne dust is generated, use the appropriate NIOSH approved respiratory protection.

SECTION 7. 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 byproducts. 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.

SECTION 8. EXPOSURE CONTROL/PERSONAL PROTECTION

Respiratory protection:	Use an appropriate NIOSH approved respirator if airborne dust concentrations exceed the appropriate PEL or TLV. All requirements set forth in 29CFR1910.134 must be met.
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.
Ventilation:	Use local exhaust ventilation which is adequate to limit personal exposure to airborne dust to levels which do not exceed the appropriate PEL or TLV. If such equipment is not available, use respiratory protection as specified above.
Eye protection:	Safety glasses with side shields or goggles are recommended.

Other 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.
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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Melting pt.:	n/a
Boiling pt.:	n/a
Vapor pressure:	n/a @ 25 °C
Vapor density (air = 1):	n/a
Evaporation rate:	n/a
Solubility in water:	Insoluble
Specific gravity(H ₂ O=1):	16.7 to 19.3
Molecular weight:	n/a
% volatile by vol.:	n/a
Appearance:	Gray powder, tin-white metal, high copper containing alloys will have a copper sheen.
Odor:	none

SECTION 10. STABILITY AND REACTIVITY

Incompatibilities:	Contact of dust with strong oxidizers may cause fire or explosion. Avoid strong acids. Extremely fine powders may be pyrophoric under some conditions.
Stability:	These metals are stable.
Hazardous decomposition products:	None
Hazardous polymerization:	None

SECTION 11. TOXICOLOGICAL INFORMATION

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. The feeding of 2, 5 and 10% of diet as tungsten metal over a period of 70 days has shown no marked effect upon the growth of rats, as measured in terms of gain in weight. 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 contaminating dusts are regarded as carcinogenic by inhalation. Ingestion of large doses of nickel compounds (1-3 mg/kg) 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. The inhalation of large amounts of iron dust may result in iron 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.

SECTION 12. ECOLOGICAL INFORMATION (not available at this time.)

SECTION 13. DISPOSAL CONSIDERATIONS

This material must be disposed of in accordance with any and all applicable local, state and federal regulations. Material intended for disposal may be sold for scrap for reclaim.

SECTION 14. TRANSPORT INFORMATION

There are no special DOT regulations pertaining to the material when shipped in its solid form.

SECTION 15. REGULATORY INFORMATION

This product may be subject to the reporting requirements of Section 313 of SARA Title III if the following de minimis concentrations are exceeded:

Substance	de minimis concentration
Cobalt	1.0
Copper	1.0
Nickel	0.1

SECTION 16. OTHER INFORMATION

This material safety data sheet is offered solely for your information, consideration, and investigation. Stanford Advanced Materials provides no warranties, either express or implied, and assumes no responsibility for the accuracy or completeness of the data contained herein.