



SAFETY DATA SHEET
(Tungsten Heavy Alloy Sintered Articles)

Date: April 10, 2015

1: Identification of the article and of the company

1.1: Product identifier

Product Name	Tungsten Heavy Alloy (WHA), High Density Tungsten, Heavy Metal Tungsten Alloy, scrap
Chemical Name	Tungsten (W) with Nickel (Ni), and Iron (Fe) or Copper (Cu), Tungsten (W) with Nickel (Ni), Iron (Fe), and Copper or Molybdenum (Mo)
CAS No.	Not applicable for articles
EINECS No.	Not applicable for articles
Molecular weight	Not applicable for articles
REACH Registration number	Not applicable for articles

1.2: Relevant identified uses of the article and uses advised against

Identified Uses	Weights and counterbalances, rotating Inertia members, boring bars and grinding quills, radiation shielding, ordnance components, and high temperature tooling.
Uses advised against	NA

1.3: Details of the supplier of the article information data sheet

Name	Mi-Tech Metals, Incorporated
Address	4701 Massachusetts Avenue, Indianapolis, Indiana 46218
Phone	(317) 549-4290, 1-800-624-1895
Fax	(317) 549-4295
E-mail of competent person responsible for the Article Information Data	rstahl@mi-techmetals.com

1.4 : Emergency telephone number

Emergency No.	1-800-624-1895
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2: Hazards Identification

Fragmentation hazard: Always wear safety equipment and keep machine guards in place

Breathing hazard: Wet or dry grinding may produce hazardous dust or mist. Use ventilation control and/or respiratory protection.

Skin: May cause skin irritation after prolonged or repeated exposure to particulates or dust.

Ingestion: Not normally a hazard due to the physical form of the article. Large amounts of particulates or dust may cause gastrointestinal effects.

2.1: Classification of the article

Not applicable for articles.

2.2: Label elements

Hazard pictogram(s):	Not applicable for articles
Signal word:	Not applicable for articles
Hazard Statement(s):	Not applicable for articles
Precautionary statement(s):	Not applicable for articles.

2.3: Other Hazards

PBT or vPvB	Not applicable for articles
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3: Article Composition

3.1: Information on article constituents

Substance Name	EINECS Number	CAS Number	Concentration range, % by weight	Classification DSD/CLP
Tungsten Metal	231-143-9	7440-33-7	88-98	Tungsten metal (particle size >1.5 µm) is not classified under DSD/CLP.
Nickel	231-111-4	7440-02-0	2-8	CLP: Carc. Cat. 2, STOT RE Cat. 1, Skin Sens. Cat. 1, Aquatic Chronic Cat. 3 DSD: Carc. Cat. 3; R40, T;R48/23, R43, R52-53
Iron	231-096-4	7439-89-6	0-3	Iron is not classified under DSD/CLP.
Copper	231-159-6	7440-50-8	0-4	Copper is not classified under DSD/CLP.
Molybdenum	7439-98-7	231-107-2	0-4	Molybdenum is not classified under DSD/CLP.

4: First aid measures

4.1: Description of first aid measures

WHA sintered articles, exposure to high volumes of powder/dust is not anticipated under normal conditions and use. If article is ground may produce exposure to dusts of hazardous substances, which may be inhaled, ingested or come in contact with eyes and skin.

Eyes	Rinse opened eye for at least 15 minutes under running water. Consult a doctor if required.
Inhalation	Remove to fresh air. Seek medical attention if required.
Ingestion	Rinse mouth with water and drink plenty of water afterwards. Seek medical advice if required.
Skin	Remove contaminated clothing. Immediately wash with soap and water and rinse thoroughly. Seek medical attention if required.
General advise	After first aid, get appropriate medical attention.

4.2: Most important symptoms and effects, both acute and delayed

WHA sintered articles, exposure to high volumes of powder/dust is not anticipated under normal conditions and use. Inhalation of powder or dust may cause mechanical eye and skin irritation or mild respiratory tract irritation.

4.3: Indication of any immediate medical attention and special treatment needed

None known

5: Firefighting measures

5.1: Extinguishing media

WHA sintered articles as provided are not a fire hazard. Use suitable extinguishing media for surrounding material and type of fire.

5.2: Special hazards arising from the article use

During normal operation and usage WHA sintered articles are not a fire hazards. Fine dust generated during machining or grinding may ignite if allowed to accumulate and are exposed to an ignition source. Cover burning material with an inert powder such as sand or limestone. Class D dry type for dry powder. May emit metal oxide fumes under fire conditions.

5.3: Advice for firefighters

Will oxidize above 1300 degrees F.

6: Accidental release measures

6.1: Personal precautions, protective equipment and emergency procedures

WHA sintered articles as provided do not present hazards that require accidental release measures. However, wet or dry grinding of WHA sintered articles may produce hazardous dust or mists. Avoid inhalation and contact with skin and eyes. Use personal protective equipment (i.e. gloves, safety goggles, dust respirator) as specified in Section 8 of this article information data sheet. Ventilate area if necessary.

6.2: Environmental precautions

In the case of generation of dust/mist, avoid release into the environment.

6.3: Methods and material for containment and cleaning up

WHA sintered articles should be recycled. Recycler must comply with Federal, State, and Local regulations.

6.4: Reference to other sections

See sections 8 and 13 for exposure controls and disposal considerations.

7: Handling and storage

WHA sintered articles as provided do not present hazards requiring precautions for safe handling and storage. However, operations such as grinding may generate dusts or mists which may require special handling procedures. The procedures described below relate to these operations.

7.1: Precautions for safe handling

Under normal operating conditions, the use of WHA sintered articles do not require special safety precautions beyond normal safety procedures such as safety glasses and gloves. Wash hands thoroughly after handling. Minimize generation of powder/dust and avoid dispersion of dust in air.

7.2: Conditions for safe storage, including any incompatibilities

WHA sintered articles as provided do not present hazards requiring precautions for safe storage. Avoid storage near strong acids and alkalis.

7.3: Specific end use(s)

Weights and counterbalances, boring bars and grinding quills, crankshaft balancing, rotating inertia members, radiation shielding, ordnance components, vacuum and high temperature tooling applications.

8: Exposure control / Personal protection

The exposure control parameters listed below are for operations with WHA sintered articles that generate dusts or fumes from grinding.

8.1 : Control parameters

Material	OSHA PEL mg/m3		ACGIH TLV mg/m3		NIOSH REL mg/m3	
	TWA	STEL	TWA	STEL	TWA	STEL
Tungsten	5 (insoluble) 1 (soluble)	10	5 (insoluble) 1 (soluble)	10 (insoluble) 3 (soluble)	5	10
Nickel	1 (soluble & insoluble)		1.0 (insoluble) 0.1 (soluble)			
Copper	0.1 (fume), 1 (dusts & mists)		0.2 (fume), 1 (dust & mists)		1	
Iron	Na		Na		na	
Molybdenum	15 (insoluble) 5 (soluble)		10 (insoluble) 3 (soluble)			

8.2: Exposure controls

Appropriate engineering controls:

In the case of dust generation during wet or dry grinding of WHA sintered articles, engineering controls may include local ventilation systems with dust filters depending on degree of process automation and containment (eg closed vs. open processes).

Individual protection measures:

Eye/face protection	Use of safety glasses as appropriate and reasonably necessary.
Skin protection	Use of butyl rubber, neoprene or PVC gloves and work clothes as appropriate and reasonably necessary.
Respiratory protection	In the case of dust generation, use of respiratory protection as appropriate and reasonably necessary (e.g. P-Series particulate respirators suitable for protection against particulates that may contain oil).
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.

9: Physical and chemical properties

No physical chemical information is available on the tungsten metal, nickel, iron, copper, and molybdenum mixture. Therefore, individual physical chemical information is presented on tungsten metal, nickel, iron, copper, and molybdenum.

9.1: Information on basic physical and chemical properties

Appearance	Grey powder
Odor	Odorless
Odor threshold	Not applicable as substances are odorless
pH	Not relevant due to physical form (powder)
Melting point/freezing point	3390-3423 °C (W) 1455 °C (Ni) 1538 °C (Fe) 2616 °C (Mo) 1083 °C (Cu)
Initial boiling point/boiling range	5555-5700 °C (W) 2730 °C (Ni) 2861 °C (Fe) 4639 °C (Mo) 2562 °C (Cu)
Flash point	Not relevant as the substances are inorganic
Evaporation rate	Not relevant due to physical form (powder)
Flammability	Non-Flammable
Upper/lower flammability or explosive limits	Not relevant as the substances are not flammable
Vapor pressure	Not relevant due to physical form
Vapor density	Not relevant due to physical form
Relative density	16.85-18.75 g/cm ³
Solubility in water	Insoluble (W, Ni, Fe, Mo, Cu)
Partition coefficient (n-octanol/water)	Not relevant as the substances are inorganic

Auto-ignition temperature	Tungsten metal is not a self-heating substance at particle sizes >0.9 um.
Decomposition temperature	3390-3423 °C (W melting point) 1455 °C (Ni melting point) 1538 °C (Fe melting point) 2616 °C (Mo melting point) 1083 °C (Cu melting point)
Viscosity	Not relevant due to physical form (powder)
Explosive properties	Not explosive
Oxidizing properties	Not oxidizing

10: Stability and reactivity

10.1: Reactivity

WHA sintered articles are not reactive.

10.2: Chemical stability

WHA articles are chemically stable.

10.3: Possibility of hazardous reactions

Not applicable.

10.4: Conditions to avoid

Avoid creating or accumulating fine dust.

10.5: Incompatible materials

Avoid strong acid and alkalis. Avoid contact with oxidizers

10.6: Hazardous decomposition products

Metal oxide fumes.

11: Toxicological information

WHA sintered articles as provided do not present an environmental hazard. During dry grinding, some dust containing hazardous substances are produced which may be inhaled, swallowed or come into contact with the skin or the eyes. The toxicity section described below relate to these operations.

Carcinogenicity: the Department of Health and Human Services (NTP 2002) has determined that metallic nickel may reasonably be anticipated to be a human carcinogen and that nickel compounds are known to be human carcinogens. Similarly, IARC (1990) classified metallic nickel in group 2B (possibly carcinogenic to humans) and nickel compounds in group 1 (carcinogenic to humans). EPA has classified nickel refinery dust and nickel sub-sulfide in Group A (human carcinogen) (IRIS 2005).

STOT- Repeated Exposure:

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.

Airborne nickel contaminating dusts are regarded as carcinogenic by inhalation. Ingestion of large doses of nickel compounds (1-3mg/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.

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

Chronic exposure to copper dust can irritate the respiratory tract, nose, mouth, and eyes, and can cause headaches, dizziness, nausea, and diarrhea. Ingestion of excessive amounts of copper may cause gastrointestinal distress. Chronic ingestion may cause damage to the liver and kidneys.

Ingestion of excessive amounts of molybdenum may cause iron or copper deficiency leading to anemia or skeletal ossification.

12: Ecological information

WHA powder as provided does not present an environmental hazard.

12.1: Persistence and degradability

Not applicable.

12.2: Bioaccumulative potential

Not applicable.

12.3: Mobility in soil

Not applicable.

12.4: Results of PBT and vPvB assessment

Tungsten, nickel, iron, copper, and molybdenum are inorganic substances, and therefore the PBT and vPvB assessment is not required.

12.5: Other adverse effects

None known

13: Disposal considerations

Responsibility for proper waste disposal of WHA articles with the owner of the waste.

Owners are encouraged to take advantage of recycling programs. WHA sintered articles are valuable articles that should be sent to an appropriate reclamation facility, if available. If material cannot be sent to a reclaim facility, dispose of all waste product and containers in accordance with local, state/provincial, federal, and national regulations.

14: Transport information

WHA sintered articles are not classified or regulated.

15: Regulatory information

15.1: Safety, health and environmental regulations/legislation specific for the article

National Regulations: This product may be subject to the reporting requirements of Section 313 of SARA Title III if the following de minimis concentrations are exceeded. See 40 CFR 372 for reporting requirements.

Substance	de minimis Concentration
Copper	1.0
Nickel	0.1

TSCA: This components in this material are registered under the regulation of the Toxic Substance Control Act

15.2: Chemical safety assessment

Chemical safety reports (CSR)/chemical safety assessments (CSA) are not required for articles.

16: Other information

Revision(s): April 10, 2015 New SDS

References:

End of Product Data Sheet

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