

Material Safety Data Sheet

Tungsten Base High Density Material

MSDS No. 7.112

Date of Preparation: 8/14/2007

Revision No. 2

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Tungsten Base High Density Material
Chemical Family: Metal-Metal Alloy Composite
Trade Name: Gyromet® 1100, Anviloy® 1100, Anviloy® 1150
Manufacturer: CMW Inc. **Telephone:** 317-634-8884
 70 S. Gray St. **FAX:** 317-638-2706
 Indianapolis, IN 46201 **Website:** www.cmwinc.com

Section 2 - Composition/Information on Ingredients

Ingredient Name	CAS Number	% Weight
Tungsten (W)	7440-33-7	90
Nickel (Ni)	7440-02-0	4
Molybdenum (Mo)	7439-98-7	4
Iron (Fe)	7439-89-6	2

Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH IDLH
	TWA	STEL	TWA	STEL	TWA	STEL	
Tungsten	none estab.	none estab.	5 mg/m ³	10 mg/m ³	5 mg/m ³	5 mg/m ³	none estab.
Nickel	1 mg/m ³	none estab.	1.5 mg/m ³	none estab.	0.015 mg/m ³	none estab.	10 mg/m ³
Molybdenum	10 mg/m ³ (vacated 1989 limit)	none estab.	10 mg/m ³ inhalable	none estab.	0.015 mg/m ³	none estab.	5000 mg/m ³
Iron	none estab.	1 mg/m ³ vacated 1989 limit	5 mg/m ³	none estab.	5 mg/m ³	none estab.	none estab.

Section 3 - Hazards Identification

Hazard Rating Systems:

HMIS:	Health 1	Flammability 0	Reactivity 0
NFPA:	Health 1	Flammability 0	Reactivity 0

★★★★ Emergency Overview ★★★★★

Solid material presents no significant health hazard. Grinding or heating may result in airborne particles or fumes. Dusts can form explosive mixtures in air. Avoid breathing dust. Nickel itch or sensitization may result from exposure to dust or fine particles. Iron may cause conjunctivitis, "rust ring" on cornea.

Potential Health Effects

Tungsten:

Primary Entry Routes: Inhalation, skin contact

Target Organs: Insoluble compounds: skin, respiratory system; Soluble compounds: skin, respiratory system, central nervous system (CNS), gastrointestinal (GI) tract.

Acute Effects:

Inhalation: The dust may cause upper respiratory tract irritation.

Eye: The dust may cause eye discomfort and irritation due to mechanical abrasion.

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

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

Carcinogenicity: IARC, NTP and OSHA do not list tungsten as a carcinogen.

Medical Conditions Aggravated by Long-Term Exposure: None established.

Chronic Effects: No human data available.

Nickel:

Primary Entry Routes: Inhalation, skin contact, ingestion

Target Organs: Nasal cavities, lungs, skin

Acute Effects:

Inhalation: Dust, mist and fumes may be irritating to the upper respiratory tract. Inhalation of fumes may cause metal fume fever, characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, headache, nausea, general malaise. Breathing nickel dusts and fumes may cause a hole to form in the nasal septum.

Eye: May cause eye irritation.

Skin: Exposure may cause contact dermatitis. Nickel is a potent contact allergen and sensitizer.

Ingestion: Not normally a hazard due to the physical form of the material. May cause gastrointestinal irritation.

Carcinogenicity: NTP-Class 2A, anticipated human carcinogen, IARC-Group 2B, possibly carcinogenic to humans., OSHA-possible select carcinogen, NIOSH-potential occupational carcinogen, ACGIH-not listed.

Medical Conditions Aggravated by Long-Term Exposure: Persons with pulmonary conditions, emphysema, chronic bronchitis may be subject to further disability if excessive concentrations of dusts or fumes are inhaled.

Chronic Effects: Prolonged or repeated skin contact may cause contact dermatitis and possible destruction or ulceration. May cause respiratory tract cancer.

Molybdenum:

Primary Entry Routes: Inhalation, ingestion, skin or eye contact

Target Organs: Eyes, skin, respiratory and nervous system, liver, kidneys and blood.

Acute Effects:

Inhalation: Dust or fumes may cause upper respiratory tract irritation.

Eye: The dust may cause eye discomfort and irritation due to mechanical abrasion.

Skin: None reported.

Ingestion: Not normally a hazard due to the physical form of the material.

Carcinogenicity: IARC, NTP, OSHA, NIOSH, ACGIH, EPA do not list molybdenum as a carcinogen.

Medical Conditions Aggravated by Long-Term Exposure: Susceptibility to gout. Excessive molybdenum can interfere with copper absorption in humans.

Chronic Effects: Long term exposure may result in anemia, hyperthyroidism and abnormal liver function tests. Headache, muscle an/or joint pain, weakness, fatigue, anorexia, impaired pulmonary function, renal disfunction, skin or hair changes, dry cough and chest pains have been reported following long term inhalation exposure.

Iron:

Primary Entry Routes: Eyes, inhalation, ingestion

Target Organs: Eyes, respiratory system, liver, pancreas

Acute Effects:

Inhalation: Dust is abrasive to the upper respiratory tract, may cause breathing difficulty and upper respiratory tract damage.

Eye: Dust may cause eye irritation and inflammation. Iron is capable of causing conjunctivitis; corneal injury may develop. Iron particles embedded in the eye may discolor the cornea and the iris, and cause poor reaction to light.

Skin: Dust can irritate skin.

Ingestion: Not normally a hazard due to the physical form of the material. May cause gastrointestinal irritation.

Carcinogenicity: NTP, IARC, OSHA, NIOSH, ACGIH, EPA do not list iron as a carcinogen.

Medical Conditions Aggravated by Long-Term Exposure: Persons with pulmonary conditions, emphysema, chronic bronchitis may be subject to further disability if excessive concentrations of dusts or fumes are inhaled. Persons with the inherited disorder hemochromatosis may be at risk from long term exposure to iron particles.

Chronic Effects: Nose and throat irritation, possible lung deterioration, possible eye disorders, possible liver and pancreatic damage.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air. Seek medical attention if respiratory irritation develops or breathing becomes difficult.

Eye Contact: Flush eyes with water for at least 15 minutes. Seek medical attention if irritation persists.

Skin Contact: Wash affected areas with soap and water. Seek medical attention if irritation persists.

Ingestion: Rinse mouth with water. Seek medical attention if irritation persists.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Section 5 - Fire-Fighting Measures

Flash Point: N/A

Burning Rate: N/A

Autoignition Temperature: N/A

LEL: N/A

UEL: N/A

Extinguishing Media: Do NOT use water. Sand or dry powder extinguishers should be used to smother dust fires.

Unusual Fire or Explosion Hazards: If the metal is reduced to powder form it may burn. Blanket material to exclude air and do not disturb until completely extinguished and cool. Explosion may result if burning dust is stirred into a cloud, by providing oxygen to a large surface area. Avoid reaction with strong acids, oxidizing agents, halogens and phosphorus.

Fire-fighting instructions: Do not release runoff from fire control methods to sewers or waterways. Contact fire department and tell them location and nature of hazard. Tungsten in metallic form is not combustible.

Fire-fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

Section 6 - Accidental Release Measures

Small Spills: Clean up all spills immediately. Avoid contact with skin and eyes.

Wear impervious gloves and safety glasses. Use dry clean-up procedures and avoid generating dust. Vacuum up or sweep up. Place spilled material in clean, dry sealable, labeled container.

Large Spills: Clear area of personnel and move upwind. Use dry clean-up procedures. Avoid generating dust. If inhalation risk of exposure exists, wear NIOSH-approved dust respirator. Collect recoverable material into labeled containers for recycling.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1010.220)

Section 7 - Handling and Storage

Handling Precautions: Limit all unnecessary personal contact. Use in a well-ventilated area. When handling, DO NOT eat, drink or smoke. Always wash hands with soap and water after handling.

Storage Methods: Store in a cool, dry, well-ventilated area away from incompatibles.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls/Personal Protection

Engineering Controls: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses or goggles.

Hands: Recommend hand protection when handling metals for prevention of cuts from slivers and edges.

Respiratory Protection: Use NIOSH-approved respirator if TLV is exceeded or over-exposure is likely.

Section 9 - Physical and Chemical Properties

Appearance/General Information: Dull grey metal. Odorless. Very slightly soluble in nitric acid, sulfuric acid and aqua regia. Soluble in a mixture of hydrofluoric acid and nitric acid.

Vapor Pressure (kPa): N/A

Vapor Density (Air=1): N/A

Volatile Component (% Vol): 0

Specific Gravity (H₂O=1, at 4°C): 17.25 gms/cc

Water Solubility: Insoluble

pH: N/A

pH (1% Solution): N/A

Boiling Point Range: Tungsten- 5900 °C (10652 °F) Nickel- 2730 °C (4946 °F)
Molybdenum- 4825 °C (8717 °F) Iron- 3000 °C (5432 °F)

Melting Point Range: Alloy Phase: 1380 °C
Tungsten-3410 °C (6171 °F) Nickel-1455 °C (2651 °F)
Molybdenum- 2622 °C (4752 °F) Iron-1535 °C (2795 °F)

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Tungsten base high density material is considered stable. Hazardous polymerization will not occur. Melting may generate harmful fumes.

Storage incompatibilities: Segregate from strong acids, oxidizing agents, halogens and phosphorus.

Section 11 - Toxicological Information

Tungsten:

Toxicity: Unknown route (rat) LD₅₀: 2000 mg/kg

Substance has been investigated as a reproductive effector in female rodents-Oral TD_{Lo} 1.16 mg/kg.

Irritation: Skin (rabbit) 500mg/24 hr-mild

Eyes (rabbit) 500mg/24 hr-mild

Nickel: Toxicity: Oral (rat) LD₅₀: 5000 mg/kg

Molybdenum: Toxicity: Low order of toxicity and is rapidly excreted from the body.

Acute Inhalation Effects: Rat, inhalation: 19500 ug/m³

Iron: Toxicity: Oral (rat) LD₅₀: 98600 mg/kg

Section 12 - Ecological Information

Tungsten, Nickel, Iron:

Environmental Fate: No data available **Ecotoxicity:** No data available

Molybdenum:

Environmental Fate: In water molybdenum will precipitate out with natural calcium. Soil levels should not exceed 50 ppm to avoid problems with livestock. Sorption is most likely in soils of low pH and high organic content.

Ecotoxicity: Fathead minnow, LC₅₀: 370 mg/L/96 hrs. Terrestrial plants can contain enough molybdenum to be toxic to animals but still grow normally

Section 13 - Disposal Considerations

Disposal: Material is recyclable. Follow applicable local, state and federal regulations.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101)

Shipping Name: None **Hazard Class:** None **ID No.** None **Packing Group:** None

Label: No class label assigned **Placards:** None

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed

CERCLA 40 CFR 302.4: Listed per CWA Section 307(a) 100 lb Ni

SARA 40 CFR 372.65: Listed **SARA EHS 40 CFR 355:** Not listed **TSCA:** Listed

This material contains Nickel

Nickel is subject to the reporting requirements of Section 313 Title III and CFR Part 373

Section 16 - Other Information

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