



MATERIAL SAFETY DATA SHEET

SECTION 1: MATERIAL IDENTIFICATION

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|--------------------------|--------------------------------------|
| Chemical Name: | Tungsten metal |
| Trade name and synonyms: | Wolfram |
| Chemical Family: | Refractory Metal (non-ferrous metal) |
| Formula: | W |
| CAS Number: | 7440-33-7 |

SECTION 2: HAZARDOUS INGREDIENTS

The terms "hazardous" and "hazardous materials" as used within this MSDS should be interpreted as defined by, and in accordance with, the OSHA Hazard Communication Standard (29 CFR Part 1910, 1200) including cited Appendices, Lists, References, etc., all of which are hereby incorporated by reference and stated below as appropriate.

| Material | Percent by Weight | OSHA PEL | ACGIH TLV | ACGIH STEL |
|----------|-------------------|----------|---------------------|----------------------|
| Tungsten | > 99% | --- | 5 mg/m ³ | 10 mg/m ³ |

Values are for airborne powder and dust.

SECTION 3: PHYSICAL DATA

| | | | |
|--|--------------------|-----------------------------|-----------|
| Melting Point: | 3410°C | Vapor Density (Air=1) | NA |
| Boiling point: | 5900°C | Evaporation Rate: | NA |
| Specific Gravity (H ₂ O=1): | 19.3 | Solubility in Water: | Insoluble |
| Vapor Pressure (mm Hg): | NA | Percent Volatile by Volume: | 0 |
| Appearance and odor: | Gray metal/no odor | | |

SECTION 4: FIRE AND EXPLOSION DATA

| | |
|-------------------|----|
| Flash Point: | NA |
| Flammable Limits: | NA |

Extinguishing Media: Class D. Tungsten Dust (for example, from grinding) may present a moderate fire hazard if allowed to accumulate and exposed to an ignition source. Cover burning material with and inert powder, such as dry sand or limestone, to exclude oxygen. Wrought products do not readily burn.

Special Fire Fighting Procedures: For a powder fire confined to a small area, use a respirator approved for toxic dusts and fumes. For a large fire involving this material, firefighters should use self-contained breathing apparatus.

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

of particle size, dispersion, and strong ignition source. When tungsten is heated in air above 750°C, tungsten trioxide sublimates (TLV 5mg/m³).

SECTION 5: HEALTH HAZARD DATA

Routes of Exposure: Dust, mist and/or fumes generated during physical or metallurgical treatment may be inhaled, swallowed or come in contact with skin or eyes.

Effect of Overexposure: Dust, mist and fumes generated during physical or metallurgical treatment may cause mild irritation of the nose and throat. With the exception of two Russian studies that found early signs of pulmonary fibrosis in some workers exposed to tungsten trioxide, tungsten metal and tungsten carbide, most studies have shown tungsten to be toxicologically inert. Skin and eye contact may cause irritation due to abrasive action of the dust. Current scientific evidence indicates no adverse effects are likely from accidental ingestion of small amounts of tungsten.

Emergency and First Aid Procedures: Applicable for pure tungsten Dust, Mist and Fumes

Inhalation: If any symptoms of pulmonary involvement develop, remove from exposure and seek medical attention. Aid breathing if necessary.

Skin Contact: If irritation occurs, thoroughly wash affected area with mild soap and water and prevent further contact. If irritation persists, seek medical attention.

Eye Contact: If irritation occurs, flush with copious amounts of water for 15 minutes. If irritation persists, seek medical attention.

Ingestion: If substantial quantities of dusts are swallowed, give person, if conscious, a large amount of water, induce vomiting and seek medical attention.

Carcinogenic Assessment (NTP annual report, IARC Monographs, other) Tungsten has not been identified as known or suspected carcinogens by NTP, IARC or OSHA.

SECTION 6: REACTIVITY DATA

Stability: Tungsten is stable.

Incompatibility (materials to avoid): Tungsten is very slightly soluble in nitric acid, sulfuric acid, and aqua regia. It is soluble in a mixture of hydrofluoric acid and nitric acid. Avoid oxidizers. Vigorous reaction with bromine trifluoride. Lead oxide mixed with tungsten becomes incandescent upon heating. Tungsten becomes incandescent in cold fluorine. Iodine pentafluoride reacts spontaneously with tungsten with incandescence.

Hazardous Decomposition Products: None

Hazardous Polymerization: Will not occur

SECTION 7: SPILL OR LEAK PROCEDURE

For dust: Ventilate area of spill. Clean-up using methods which avoid dust generation such as vacuuming (with appropriate filter to prevent airborne dust levels which exceed the TLV or PEL), wet dust mop or wet clean-up. If airborne dust is generated, use an appropriate NIOSH approved respirator.

Waste Disposal Method: Dispose of the material following all Federal, State, and Local Regulations. Tungsten scrap, dust, and recovered fume have value.

SECTION 8: SPECIAL PROTECTION INFORMATION

Respiratory Protection: None needed for wrought products. When cutting, heating in air, grinding, etc., use an appropriate NIOSH approved respirator if airborne concentrations exceed the TLV or PEL. All appropriate

requirements set forth in 29 CFR 1910.134 should be met.

Ventilation: Use local exhaust ventilation which is adequate to limit personal exposure to levels which do not exceed the TLV or PEL. If such equipment is not available, use respirators as specified above. No ventilation is required for wrought products as supplied.

Protective Gloves: Gloves are recommended when contact is likely.

Eye protection: Safety glasses or goggles are recommended.

Other protective equipment: NA

SECTION 9: SPECIAL PRECAUTIONS

Precautions To Be Taken In Handling and Storage: Maintain good housekeeping procedures to prevent accumulation of dust from grinding, etc. Use clean-up methods which minimize dust generation such as vacuuming or wet clean-up.

Other Precautions: Mists from wet grinding or cutting may contain tungsten particles; if TLV is exceeded, wear NIOSH approved respirator. Wash hands thoroughly after handling dust, before eating or smoking. Wash skin exposed to dust at the end of work shift. Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or vacuuming (with appropriate filters) the clothing, rags, or other items.

NOTE: Reported in EPA TSCA inventory, 1980.

Periodic medical examinations are recommended for individuals regularly exposed to dust.

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