

Tungsten Ores and Concentrates



Safety Data Sheet

Section 1: Identification

1.1 Product Identifier

Product Name:	Tungsten Ores and Concentrates (Non-Radioactive)
Product Form:	Solid
Chemical Family:	Metal
CAS Number:	7440-33-7
Molecular Formula:	W
Molecular Weight:	183.85

1.2 Other Means of Identification

Synonyms:	Tungsten, Wolfram, Tungsten Element, W, 00229908, RTECS Y0717500
-----------	--

1.3 Recommended Uses

Recommended Use:	Variety of mechanical and industrial applications
------------------	---

1.4 Manufacturer, Importer, or Responsible Party

Responsible Party:	Defense Logistics Agency Strategic Materials 8725 John J. Kingman Road Fort Belvoir, Virginia 22060-6223 (571) 767-5525
--------------------	--

1.5 Emergency Phone Number

Emergency Phone Number:	(800) 424-9300 (CHEMTREC) (703) 527-3887 (CHEMTREC INTERNATIONAL)
-------------------------	--

Section 2: Hazard(s) Identification

2.1 Classification of Chemical per OSHA CFR 1910.1200

Skin Irritation:	Category 2
Eye Irritation:	Category 2A
Respiratory Sensitization:	Category 1B
Target Organ - Prolonged:	Category 2 (Lungs)

2.2 Label Elements

Signal Word:	DANGER
--------------	--------



Symbol(s):

Hazard Statements:

Causes skin irritation. Causes serious eye irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause damage to the

Precautionary Statements: lungs through prolonged or repeated exposure.
Prevention: Wear protective gloves. Wear eye protection/face protection. Wash thoroughly after handling. Do not breathe dust. In case of inadequate ventilation, wear respiratory protection.
Response: If on skin, wash with plenty of water. If skin irritation occurs, get medical advice/attention. Take off contaminated clothing and wash it before reuse. If in eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. If inhaled and breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms, call a doctor. Get medical advice/treatment if you feel unwell.
Storage: No specific storage requirements.
Disposal: Dispose of contents/container in accordance with federal, state, and local regulations.

2.3 Other Hazards

Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.

2.4 Unknown Acute Toxicity

Does not apply to this product.

Section 3: Composition / Information on Ingredients

3.1 Chemical Name

Chemical Name: Tungsten (as oxide)
 Composition: 62.48%-77.86% WO₃

The health and physical hazards information provided in this SDS are for its major component. Tungsten Ores and Concentrates [wolframite (including ferberite and huebnerite) and sheelite (natural and synthetic)] contain other elements in addition to WO₃. For concentrations of other components, see the Certificates of Analysis for each lot.

3.2 Common Names/Synonyms

Synonyms: See **Section 1.2** for common names and synonyms.

3.3 CAS Number/Unique Identifiers

CAS Number: 7440-33-7
 EC Number (EINECS): 231-143-9

3.4 Impurities/Stabilizing Additives

No data available.

Section 4: First-Aid Measures

4.1 Description of First-Aid Measures

Inhalation: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

Skin Contact: Wash skin with soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eye Contact: Flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.

Ingestion: Rinse mouth and administer water for dilution if the patient can swallow, has a strong gag reflex, and does not drool. Get medical attention.

4.2 Most Important Symptoms/Effects, Acute and Delayed

Inhalation (Acute):	May cause irritation.
Inhalation (Chronic):	May cause lung damage.
Skin Contact (Acute):	May cause irritation.
Skin Contact (Chronic):	May cause dermatitis.
Eye Contact (Acute):	May cause irritation.
Eye Contact (Chronic):	May cause conjunctivitis.
Ingestion (Acute):	May cause irritation of gastrointestinal tract, nausea, vomiting.
Ingestion (Chronic):	No information on significant adverse effects.

4.3 Indication of Immediate Medical Attention/Special Treatment

Get immediate medical attention if inhaled, exposed to eyes, and/or ingested.

Section 5: Fire-Fighting Measures

5.1 Suitable Extinguishing Media

Dolomite, dry powder for metal fires, dry sand, graphite, soda ash, and sodium chloride.

5.2 Specific Hazards

Negligible fire and explosion hazard in bulk form. Dust/air mixtures may ignite or explode.

5.3 Special Protective Equipment and Precautions

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area, and deny entry. Let the fire burn. Use extinguishing agents appropriate for surrounding fire. Avoid inhalation of material or combustion by-products.

Section 6: Accidental Release Measures

6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

Keep all unauthorized people away, isolate hazard area, and deny entry. Personal protective equipment is discussed in **Section 8.3**.

6.2 Methods and Materials for Containment and Cleaning Up

Collect spilled material in appropriate container for disposal.

Section 7: Handling and Storage

7.1 Precautions for Safe Handling

Handle in accordance with all current regulations and standards. Use methods to minimize dust. Utilize personal protective equipment to avoid contact with skin. Personal protective equipment is discussed in **Section 8.3**.

7.2 Conditions for Safe Storage

Store in accordance with all current regulations and standards. Keep separated from incompatible substances. Incompatible materials are identified in **Section 10.5**.

Section 8: Exposure Controls / Personal Protection

8.1 Exposure Limits

Tungsten Ores and Concentrates (Non-Radioactive):

Tungsten and Insoluble Compounds (as W):

OSHA PEL / STEL: Vacated by 58 FR 35338, 6/30/1993

ACGIH TWA: 5 mg/m³

ACGIH STEL: 10 mg/m³

Format: GHS

Language: English (US)

Revised: April 23, 2015

Version 2

NIOSH REL TWA:	5 mg/m ³
NIOSH REL STEL:	10 mg/m ³
UK WEL TWA:	5 mg/m ³
UK WEL STEL:	10 mg/m ³
Tungsten Ore (Wolframite):	
ACGIH TWA:	5 mg(W)/m ³ (insoluble compounds)
ACGIH STEL:	10 mg(W)/m ³ (insoluble compounds)
ACGIH TWA:	1 mg(W)/m ³ (soluble compounds)
ACGIH STEL:	3 mg(W)/m ³ (soluble compounds)
NIOSH REL TWA:	5 mg(W)/m ³
NIOSH REL STEL:	10 mg(W)/m ³

8.2 Appropriate Engineering Controls

Ventilation: Provide local exhaust system or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

8.3 Individual Protection Measures

Eye Protection: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Clothing: Wear appropriate chemical resistant clothing.

Gloves: Wear appropriate chemical resistant gloves.

Respirator: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

1. Any air-purifying respirator equipped with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces) except quarter-mask respirators.
2. Any supplied-air respirator.
3. Any self-contained breathing apparatus with a full facepiece.

Unknown Concentrations/IDLH:

1. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
2. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Escape:

1. Any air-purifying respirator equipped with an N100, R100, or P100 filter (including N100, R100, and P100 filtering facepieces).
2. Any appropriate escape-type, self-contained breathing apparatus.

Section 9: Physical and Chemical Properties

9.1 Appearance

Physical State: Solid
Physical Description: White to Gray or Black, Hard, Brittle Solid

9.2 Odor

Not available.

9.3 Odor Threshold

Not available.

9.4 pH

Not applicable.

9.5 Melting / Freezing Points

Melting Point: 6,134-6,206 °F (3,390-3,430 °C)
Freezing Point: No data available.

9.6 Initial Boiling Point and Boiling Range

Boiling Point 10,220 °F (5,660 °C)

9.7 Flash Point

No data available.

9.8 Evaporation Rate

Not applicable.

9.9 Flammability

No data available.

9.10 Upper / Lower Explosive Limits

No data available.

9.11 Vapor Pressure

Vapor Pressure: 1.97X10⁻⁷ mm Hg @ 2,327°C

9.12 Vapor Density

Not applicable.

9.13 Relative Density

Water = 1: 19.35

9.14 Solubility(ies)

Insoluble: Water, hydrogen fluoride, potassium hydroxide solutions
Soluble: Nitric acid/hydrofluoric acid mixtures, fused sodium hydroxide/sodium nitrate,
fused potassium hydroxide, sodium carbonate
Very Slightly Soluble: Nitric acid, aqua regia, sulfuric acid

9.15 Partition Coefficient

Not available

9.16 Auto-Ignition Temperature

No data available.

9.17 Decomposition Temperature

No data available.

9.18 Viscosity

No data available.

Section 10: Stability and Reactivity

10.1 Reactivity

Stable at normal temperatures and pressures. Oxidizes in air and must be protected at elevated temperatures.

10.2 Chemical Stability

Stable at normal temperatures and pressures.

10.3 Possibility of Hazardous Reactions

Alkali w/Halocarbons: May explode with heat or on impact.
Alkaline-Earth Metals w/Halocarbons: May explode with heat or on impact.
Aqua Regia: Attacked superficially.

Bromine Pentafluoride:	Violent reaction and possible ignition.
Bromine Trifluoride:	Violent reaction.
Chlorine Trifluoride:	Violent reaction and ignition.
Fluorine:	Incandescent reaction.
Hydrogen Sulfide:	Incandescent reaction.
Iodine Pentafluoride:	Incandescent reaction when heated.
Lead (IV) Dioxide:	Incandescent reaction when heated.
Nitric Acid:	Attacked superficially.
Nitryl Fluoride:	Incandescent reaction when heated.
Oxidizers (Strong):	Fire and explosion hazard.
Oxygen Difluoride:	Explodes at 400°C.
Potassium Dichromate:	Combustion attains a temperature of 1,700°C in 0.1-0.2 seconds.
Sodium Peroxide:	Incandescent reaction when heated.

10.4 Conditions to Avoid

None reported.

10.5 Incompatible Materials

Incompatibilities: Acids, halogens, reducing agents, oxidizing materials, bases

Safe storage of the material is discussed in **Section 7.2**.

10.6 Hazardous Decomposition Products

Thermal Decomposition Products: Miscellaneous Decomposition Products

Section 11: Toxicological Information

11.1 Likely Routes of Exposure

Routes of entry include inhalation, skin contact, eye contact, and ingestion.

11.2 Symptoms

See **Section 4.2** for acute and chronic short and long-term exposure symptoms.

11.3 Short and Long Term Effects

Inhalation (Acute):	May cause irritation and coughing.
Inhalation (Chronic):	Prolonged or repeated exposure has been reported to cause pulmonary fibrosis. Intratracheal injection into the lungs of experimental animals revealed the metallic dust to be inert, with the only pulmonary effect being areas of pigmentation. One conflicting study found the dust to cause interstitial pneumonitis and bronchiolitis in guinea pigs after intratracheal injection of 50 mg a week for 3 weeks. After one year, slight residual lesions in the form of minor atrophic emphysema were present.
Skin Contact (Acute):	Application of 500 mg to the skin of rabbits caused mild irritation. May cause redness.
Skin Contact (Chronic):	May cause dermatitis.
Eye Contact (Acute):	Application of 500 mg to the eyes of rabbits caused mild irritation. May cause redness and conjunctivitis.
Eye Contact (Chronic):	May cause conjunctivitis.
Ingestion (Acute):	May cause nausea, vomiting, and irritation of the gastrointestinal tract.
Ingestion (Chronic):	When rats were fed 2%, 5% or 10% powdered tungsten in their diets, the females gained 15.4% less weight than the control females; there was no difference between tungsten-fed and control males. The sex specific effect was suggested to depend on metabolic utilization of foodstuffs. Reproductive effects have been reported in animals.

11.4 Numerical Measures of Toxicity

Tungsten Ores and Concentrates (Non-Radioactive)

Irritation Data:	500 mg/24 hour(s) skin-rabbit mild 500 mg/24 hour(s) eyes-rabbit mild
Toxicity Data:	5 gm/kg intraperitoneal-rat LD ₅₀
Acute Toxicity Level:	Insufficient data.
Reproductive Effects Data:	1,210 µg/kg oral-rat TDL ₀ 35 week(s) pre pregnancy continuous 1,160 µg/kg oral-rat TDL ₀ 30 week(s) pre pregnancy/1-20 day(s) pregnant female continuous

11.5 Carcinogen Status

OSHA:	No
NTP:	No
IARC:	No

Section 12: Ecological Information**12.1 Ecotoxicity**

No data available.

12.2 Persistence and Degradability

No data available.

12.3 Bioaccumulative Potential

No data available.

12.4 Mobility in Soil

Tungsten compounds will exist as ions or insoluble solids in the environment and therefore volatilization from moist soil surfaces will not be an important fate process. Tungsten compounds will not volatilize from dry soil surfaces based upon their ionic character and low vapor pressures. If released into water, tungsten compounds will adsorb to suspended solids and sediment based upon their range or sorption coefficients. Tungsten in natural waters is in the form of tungstate (i.e., WO₄-2) and other tungsten polyanions. Tungsten compounds will exist as ions or insoluble solids in the environment and therefore volatilization from water surfaces will not be an important fate process.

12.5 Other Adverse Effects

If released into water, tungsten compounds will adsorb to suspended solids and sediment based upon their range or sorption coefficients. Tungsten in natural waters is in the form of tungstate (i.e., WO₄-2) and other tungsten polyanions. Tungsten compounds will exist as ions or insoluble solids in the environment and therefore volatilization from water surfaces will not be an important fate process.

Section 13: Disposal Considerations

Dispose in accordance with all applicable regulations.

Section 14: Transport Information**14.1 UN Number**

Not applicable.

14.2 UN Proper Shipping Name

Not applicable.

14.3 Transport Hazard Class(es)

U.S. Department Of Transportation:	No classification assigned.
CA Transportation/Dangerous Goods:	No classification assigned.
Land Transport ADR:	No classification assigned.
Land Transport RID:	No classification assigned.

Format: GHS
Language: English (US)

Revised: April 23, 2015
Version 2

Air Transport IATA:	No classification assigned.
Air Transport ICAO:	No classification assigned.
Maritime Transport IMDG:	No classification assigned.

14.4 Packing Group

No classification assigned.

14.5 Environmental Hazards

No data available.

14.6 Transport in Bulk

No data available.

14.7 Special Precautions

No data available.

Section 15: Regulatory Information

US Regulations

CERCLA 102A/103 (40 CFR 302.4): Not regulated.

SARA Title III

Section (40 CFR 355 Subpart B): Not regulated.

Section 304 (40 CFR 355 Subpart C): Not regulated.

Sections 311/312 (40 CFR 370 .21): Yes (Fire)

Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety: Not regulated.

State Regulations:

California Proposition 65: Not regulated.

National Inventory Status

U.S. Inventory (TSCA): Listed on inventory.

TSCA 12(B) Export Notification: Not listed.

Section 16: Other Information

The information in this Safety Data Sheet meets the requirements of the United States Department of Labor OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION and regulations promulgated thereunder (29 CFR 1910.1200 et. seq.). This document is intended only as a guide to the appropriate precautionary material handling by a person trained in, or supervised by a person trained in, chemical handling. Exposure to this chemical may have serious adverse health effects. This chemical may interact with other substances. Since the potential uses are so varied, all of the potential hazards of use or interaction with other chemicals or materials cannot be identified on this Safety Data Sheet. The user should recognize that this chemical can cause injury, especially if improperly handled, precautionary measures are not followed, and personal protective equipment not worn. Read and understand all precautionary information prior to use. The Defense Logistics Agency (DLA) shall not be held liable for any damage resulting from handling or from contact with the above chemical.

References:

OHS. *Material Safety Data Sheet. Product Name: Tungsten Ores and Concentrates (Non-Radioactive)*. Revised June 16, 2005. (as provided by the Defense Logistics Agency)

American Conference of Governmental Industrial Hygienists. *2013 TLVs® and BEIs®, ACGIH® Publication #0113*. 2013.

US Department of Transportation. *Emergency Response Guidebook*. 2012

Centers for Disease Control and Prevention. *NIOSH Pocket Guide to Chemical Hazards*, <http://www.cdc.gov/niosh/npg/>.

National Institute of Health, Toxicology Data Network. <http://toxnet.nlm.nih.gov/>

NOTE: No data available: no data for this topic found using references listed.

Date of Preparation of Updated SDS: April 23, 2015