

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 277
SRM Name: Tungsten Concentrate
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is a tungsten concentrate primarily derived from wolframite ores through commercial refining processes and is intended for use in the validation of chemical and instrumental methods of analysis. A unit of SRM 277 consists of a bottle containing approximately 100 g of powder, of which 100 % passes a sieve size of 0.15 mm.

Company Information

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 Standard Reference Materials Program
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2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Not classified.
Health Hazard: Acute toxicity, Oral Category 4

Label Elements

Symbol



Signal Word

WARNING

Hazard Statement(s):

H302 Harmful if swallowed.

Precautionary Statement(s):

P264 Wash hands thoroughly after handling.
 P270 Do not eat, drink or smoke when using this product.

P301+P312 If swallowed: Call a doctor if you feel unwell.

P330 Rinse mouth.

P501 Dispose of contents and container according to local regulations.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Wolframite

Other Designations: Ferroan huebnerite; manganooan ferberite

NOTE: This material contains small amounts of naturally occurring radioactivity as an impurity.

Wolframite ores contain significant amounts of iron and manganese oxides (along with other trace metals) in addition to the tungsten oxide. Tungsten oxide has been concentrated within wolframite for this SRM. The health and physical hazards information provided in this SDS are for wolframite and its major component, tungsten oxide. For concentrations of the other components, see the Certificate of Analysis for this SRM.

| Hazardous Component(s) | CAS Number | EC Number (EINECS) | Nominal Mass Concentration (%) |
|--------------------------------|------------|--------------------|--------------------------------|
| Wolframite | 1332-08-7 | 215-567-1 | 100 |
| <i>Individual Component(s)</i> | | | |
| Tungsten Oxide | 1314-35-8 | 215-231-4 | 67.5 |

4. FIRST AID MEASURES

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

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

Eye Contact: Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

Ingestion: If a large amount is swallowed, get medical attention.

Most Important Symptoms/Effects, Acute and Delayed: May cause irritation; harmful if ingested.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard. Avoid generating dust. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Use extinguishing agents appropriate for surrounding fire.

Unsuitable: None listed.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1

Fire = 0

Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures: Avoid generating dust. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

Methods and Materials for Containment and Clean up: Collect spilled material in appropriate container for disposal. Clean up residue with a high-efficiency particulate filter vacuum. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

Safe Handling Precautions: Minimize dust generation and accumulation on surfaces. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. See Section 8, "Exposure Controls and Personal Protection". Avoid contact with incompatible materials (see Section 10 "Stability and Reactivity").

Storage: Store and handle in accordance with all current regulations and standards.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

| Exposure Limits | | | |
|---|--|--|--|
| Components | OSHA (PEL) | ACGIH (TLV) | NIOSH (REL) |
| Wolframite, as Mn (related to Manganese compounds) | Ceiling: 5 mg/m ³ | No occupational exposure limits established. | TWA: 1 mg/m ³ STEL: 3 mg/m ³ IDLH: 500 mg/m ³ |
| Tungsten oxide, as W (tungsten metal and insoluble compounds) | No occupational exposure limits established. | No occupational exposure limits established. | TWA: 5 mg/m ³ STEL: 10 mg/m ³ |

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

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

| Descriptive Properties | Wolframite (100 %) | Tungsten Oxide (67.5 %) |
|--|----------------------|--|
| Appearance (physical state, color, etc.) | gray to black powder | yellow powder |
| Molecular Formula | varies | WO ₃ |
| Molar Mass (g/mol) | not applicable | 231.86 |
| Odor | not available | odorless |
| Odor threshold | not available | not available |
| pH | not available | not available |
| Evaporation rate | not available | 0 (butyl acetate=1) |
| Melting point/freezing point | not available | 1473 °C (2683.4 °F) |
| Specific Gravity (water=1) | 7 to 7.54 | 7.2 |
| Vapor Pressure (mmHg) | not available | not available |
| Vapor Density (air = 1) | not available | not available |
| Viscosity (cP) | not available | not available |
| Solubility(ies) | not available | insoluble in water and acids; soluble in caustic alkali |
| Partition coefficient (n-octanol/water) | not available | not available |
| Particle Size | ≤0.15 mm | ≤0.15 mm |

| | Wolframite (100 %) | Tungsten Oxide (67.5 %) |
|--|-------------------------------|------------------------------------|
| Thermal Stability Properties | | |
| Autoignition Temperature | not available | not available |
| Thermal Decomposition | not available | not available |
| Initial boiling point and boiling range | not available | decomposes |
| Explosive Limits, LEL (Volume %) | not available | not available |
| Explosive Limits, UEL (Volume %) | not available | not available |
| Flash Point | not available | not flammable |
| Flammability (solid, gas) | not available | not available |

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: None listed.

Incompatible Materials: Metals, halogens, oxidizing materials.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition will produce miscellaneous compounds.

Hazardous Polymerization: Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: May cause irritation; harmful if ingested.

Potential Health Effects (Acute, Chronic, and Delayed)

Inhalation: Inhalation of generated dust may cause coughing, respiratory tract irritation and dyspnea. Repeated or prolonged exposure to the dust may cause "tungstosis" with symptoms such as pulmonary fibrosis, rapid weight loss, fine rales in the lung, and exertional dyspnea. The severity may be increased by the presence of other metal dusts, such as that of cobalt.

Skin Contact: May cause irritation. Repeated or prolonged exposure may cause the erythematous, papular type of dermatitis, usually limited to those parts of the body receiving heavy exposure, such as the sides of the neck, flexor portions of the forearms, and backs of the hands.

Eye Contact: May cause irritation and conjunctivitis.

Ingestion: May cause nausea, vomiting, diarrhea, abdominal cramps and weakness.

Numerical Measures of Toxicity

Acute toxicity: Category 4, Oral

 Wolframite: No data available.

 Tungsten oxide: Rat Oral LD50 1059 mg/kg

Skin Corrosion/Irritation: No data available; not classified.

Serious Eye Damage/Eye irritation: No data available; not classified.

Respiratory Sensitization: No data available; not classified.

Skin Sensitization: No data available; not classified.

Germ Cell Mutagenicity: No data available; not classified.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen Yes X No

 Wolframite and tungsten oxide are not listed by IARC, NTP, or OSHA as a carcinogen/potential carcinogen.

Reproductive Toxicity: No data available; not classified.

Specific Target Organ Toxicity, Single Exposure: No data available; not classified.

Specific Target Organ Toxicity, Repeated Exposure: No data available; not classified.

Aspiration hazard: Not applicable.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: No data available.

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: This material is not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

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

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

| | |
|-----------------|----|
| ACUTE HEALTH: | No |
| CHRONIC HEALTH: | No |
| FIRE: | No |
| REACTIVE: | No |
| PRESSURE: | No |

State Regulations:

California Proposition 65: Not listed.

U.S. TSCA Inventory: Not listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations: WHMIS Information is not provided for this material.

16. OTHER INFORMATION

Issue Date: 04 November 2014

Sources: ChemAdvisor, Inc., SDS *Tungsten Oxide*, 10 September 2014.

ChemAdvisor, Inc., SDS *Wolframite*, 10 September 2014.

Hazardous Substances Data Bank (HSDB), National Library of Medicine's TOXNET system, *Tungsten Trioxide CAS No. 1314-35-8*; available at <http://toxnet.nlm.nih.gov> (accessed Nov 2014).

CDC; NIOSH; *NIOSH Pocket Guide to Chemical Hazards*; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; *Tungsten*, 18 November 2010; available at <http://www.cdc.gov/niosh/npg/npgd0645.html> (accessed Nov 2014).

U.S. National Library of Medicine, DHHS, Toxnet, ChemIDplus, *Tungsten Trioxide CAS No. 1314-35-8*; available at <http://chem.sis.nlm.nih.gov/chemidplus/> (accessed Nov 2014).

Key of Acronyms:

| | | | |
|--------|---|-------|--|
| ACGIH | American Conference of Governmental Industrial Hygienists | NRC | Nuclear Regulatory Commission |
| ALI | Annual Limit on Intake | NTP | National Toxicology Program |
| CAS | Chemical Abstracts Service | OSHA | Occupational Safety and Health Administration |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act | PEL | Permissible Exposure Limit |
| CFR | Code of Federal Regulations | RCRA | Resource Conservation and Recovery Act |
| DOT | Department of Transportation | REL | Recommended Exposure Limit |
| EC50 | Effective Concentration, 50 % | RM | Reference Material |
| EINECS | European Inventory of Existing Commercial Chemical Substances | RQ | Reportable Quantity |
| EPCRA | Emergency Planning and Community Right-to-Know Act | RTECS | Registry of Toxic Effects of Chemical Substances |
| IARC | International Agency for Research on Cancer | SARA | Superfund Amendments and Reauthorization Act |
| IATA | International Air Transportation Agency | SCBA | Self-Contained Breathing Apparatus |
| IDLH | Immediately Dangerous to Life and Health | SRM | Standard Reference Material |
| LC50 | Lethal Concentration, 50 % | STEL | Short Term Exposure Limit |
| LD50 | Lethal Dose, 50 % | TLV | Threshold Limit Value |
| LEL | Lower Explosive Limit | TPQ | Threshold Planning Quantity |
| MSDS | Material Safety Data Sheet | TSCA | Toxic Substances Control Act |
| NFPA | National Fire Protection Association | TWA | Time Weighted Average |
| NIOSH | National Institute for Occupational Safety and Health | UEL | Upper Explosive Limit |
| NIST | National Institute of Standards and Technology | WHMIS | Workplace Hazardous Materials Information System |

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at <http://www.nist.gov/srm>.