

Material Safety Data Sheet

Radnor Thoriated Tungsten Electrodes

Section 1. Chemical product and company identification

Common name : Thoriated Tungsten Electrodes
Trade name : EWTh-1 or EWTh-2; Thoria Tungsten Electrodes; TIG Welding Electrodes; GTA Welding Electrodes
Supplier : Radnor Products, PO Box 6675, Radnor, PA 19087

In case of emergency : (866) 734 3438

Section 2. Hazards identification

Physical state : Solid.
Emergency overview : WARNING
CANCER HAZARD.
CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:
BONES ,BLOOD, RESPIRATORY TRACT, SKIN, EYE, LENS OR CORNEA.
Risk of cancer depends on duration and level of exposure.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects
Eyes : Dust particules or fumes may cause eye irritation.
Skin : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Potential chronic health effects : Carcinogenic effects: Classified 1 (Known to be human carcinogens.) by NTP [Thorium oxide].
Mutagenic effects: Not available.
Teratogenic effects: Not available.

Medical conditions aggravated by over-exposure : Repeated or prolonged exposure to the substance can produce target organ damage.
Prolonged or repeated contact may cause skin irritation.

See toxicological information (section 11)

Section 3. Composition, Information on Ingredients

| | CAS number | % by weight | Classification | | | | |
|----------------------|------------------|-------------|----------------|----------|----------|----------------|--------------------|
| United States | | | | | | | |
| Tungsten | 7440-33-7 | 70 - 100 | | | | | |
| Thorium oxide | 1314-20-1 | 1 - 3 | | | | | |
| Canada | | | | | | | |
| Tungsten | 7440-33-7 | 70 - 100 | | | | | |
| Thorium oxide | 1314-20-1 | 1 - 3 | | | | | |
| Mexico | | | | | | | |
| | UN number | IDLH | H | F | R | Special | |
| Tungsten | Not regulated. | - | 1 | 1 | 0 | | 7440-33-7 70 - 100 |
| Thorium oxide | Not regulated. | - | 1 | 1 | 0 | | 1314-20-1 1 - 3 |

This material is classified hazardous under OSHA regulations in the United States, the WHMIS Controlled Product Regulation in Canada and the NOM-018-STPS-2000 in Mexico.

See Sections 8, 11 and 14 for details.

Section 4. First aid measures

- Eye contact** : Check for and remove any contact lenses. In case of contact with eyes, rinse immediately with plenty of water. Get medical attention if symptoms occur.
- Skin contact** : Wash with soap and water. Get medical attention if symptoms occur.
- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms appear.
- Ingestion** : Do not induce vomiting. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.
- Notes to physician** : No specific antidote. Medical staff must contact Poison Control Center.

Section 5. Fire fighting measures

- Flammability of the product** : Non-flammable.
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.
- Welding arcs and sparks can ignite combustibles. Refer to ANSI Z49.1 "SAFETY IN WELDING AND CUTTING" published by the American Welding Society for fire prevention and protection information during welding.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.
- Environmental precautions** : Avoid dispersal of spilled material, runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : If emergency personnel are unavailable, vacuum or carefully scoop up spilled material and place in an appropriate container for disposal by incineration. Avoid creating dusty conditions and prevent wind dispersal.

Section 7. Handling and storage

- Handling** : Wash thoroughly after handling.
- Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area. Nobody should be permanent or not longer than necessary in a close area to the stored electrodes, because of the beta and gamma radiation and probably additional measurements should be taken to protect from the beta and gamma radiation.

Section 8. Exposure controls, personal protection

- Engineering controls** : Use process enclosures, local exhaust ventilation or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fumes or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. If dust is generated and ventilation is inadequate, use NIOSH certified respirator that will protect against dust/mist.
- Personal protection**
- Eyes** : Wear helmet or use a face shield with the appropriate filter lens. Provide protective screens and flash goggles, if necessary to shield others. Consult ANSI Z49.1



Thoriated Tungsten Electrodes

Respiratory : A NIOSH approved respirator should be worn when airborne dust and fume concentrations exceed the applicable limits for Thorium, Tungsten or other welding materials. A NIOSH approved fume respirator when welding in confined spaces. All appropriate requirements set forth in 29 CFR 1910.134 should be met. Under extreme exposure conditions when airborne concentrations may be above the protection factor of an air-purifying respirator, use a positive-pressure, air-supplied respirator. Appropriate standards for use of respiratory protection (such as 29 CFR 1910.134 and Z49.1) should be consulted.



Hands : Leather gloves.



Skin/Body : Head, hand and body protection to prevent injury from arc radiation, sparks and electrical shock must be worn. Consult ANSI STD Z49.1



Personal protection in case of a large spill : Safety glasses, goggles or face shield. Impervious gloves. Full suit. Boots. Wear NIOSH-approved self-contained breathing apparatus or equivalent and full protective gear.

Product name

Exposure limits

United States

Tungsten (VI) Oxide

ACGIH TLV (United States, 1/2004).

STEL: 10 mg/m³ 15 minute(s). Form: Insoluble

TWA: 5 mg/m³ 8 hour(s). Form: Insoluble

OSHA PEL 1989 (United States, 3/1989).

STEL: 10 mg/m³ 15 minute(s). Form: Insoluble

TWA: 5 mg/m³ 8 hour(s). Form: Insoluble

Canada

None assigned.

Mexico

Tungsten (VI) Oxide

NOM-010-STPS (Mexico, 9/2000).

CCT: 10 mg/m³ 15 minute(s). Form: All forms

CPT: 5 mg/m³ 8 hour(s). Form: All forms

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Physical state : Solid.
Color : Gray.
Odor : Odorless.
Boiling/condensation point : 5660°C (10220°F)
Melting/freezing point : >3400°C (6152°F)
Specific gravity : 19 (Water = 1)
Dispersibility properties : Not dispersible in cold water, hot water.
Solubility : Insoluble in cold water, hot water.

Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Incompatible with some strong acids.
- Hazardous polymerization** : Will not occur.

Section 11. Toxicological information

Acute Effects

- Eyes** : Dust particules or fumes may cause eye irritation.
- Skin** : No known significant effects or critical hazards.
- Inhalation** : No known significant effects or critical hazards.
- Ingestion** : No known significant effects or critical hazards.
- Potential chronic health effects** : Carcinogenic effects: Classified 1 (Known to be human carcinogens.) by NTP [Thorium oxide].
Mutagenic effects: Not available.
Teratogenic effects: Not available.
- Target organs** : Contains material which causes damage to the following organs: blood, upper respiratory tract, skin, eye, lens or cornea.
- Special remarks on other toxic effects on humans** : Thorium dioxide is a naturally occurring radioactive element. It is primary an alpha emitter and as such its primary hazard lies in the inhalation of dusts and fumes. Normal handling of these electrodes is not expected to result in any significant external radiation exposure. Considerable experience in refining and use of Thorium has not revealed any adverse effects from industrial exposure.

Section 12. Ecological information

- Products of degradation** : Some metallic oxides.

Section 13. Disposal considerations

- Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material, runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional and local authority requirements.

Consult your local or regional authorities.

Section 14. Transport information

Classification

| Mexico/TDG/DOT/IMDG/IATA: | UN number | Proper shipping name | Class | Packing group |
|---------------------------|-----------|--|-------|---------------|
| | UN2909 | RADIOACTIVE MATERIAL, EXCEPTED PACKAGE-ARTICLES MANUFACTURED FROM NATURAL URANIUM [OR] DEPLETED URANIUM [OR] NATURAL THORIUM | 7 | - |

NAERG : 161

Label

Not applicable.

Additional information

Section 15. Regulatory information

United States

HCS Classification : Carcinogen
Target organ effects

U.S. Federal regulations : TSCA : All components listed.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Tungsten; Thorium oxide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Tungsten: Immediate (acute) health hazard, Delayed (chronic) health hazard; Thorium oxide: Delayed (chronic) health hazard
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.
Clean Air Act (CAA) 112 accidental release prevention: No products were found.
Clean Air Act (CAA) 112 regulated flammable substances: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

| | Product name | CAS number | Concentration |
|--|---------------------|-------------------|----------------------|
| Form R - Reporting requirements | : Thorium oxide | 1314-20-1 | 1 - 3 |
| Supplier notification | : Thorium oxide | 1314-20-1 | 1 - 3 |

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

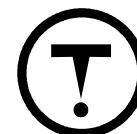
State regulations : Pennsylvania RTK: Tungsten: (generic environmental hazard); Thorium oxide: (special hazard, environmental hazard, generic environmental hazard)
Massachusetts RTK: Tungsten; Thorium oxide
New Jersey: Tungsten; Thorium oxide

WARNING: This product contains a chemical known to the State of California to cause cancer.

| Ingredient name | Cancer | Reproductive | No significant risk level | Maximum acceptable dosage level |
|------------------------|---------------|---------------------|----------------------------------|--|
| Thorium oxide | Yes. | No. | No. | No. |

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).



Canadian Environmental Protection Act (CEPA): This product is on the Domestic Substances List (DSL) and is acceptable for use under the provisions of CEPA.: Thoriated Tungsten Electrodes

CEPA DSL: All components listed.

Mexico

Thoriated Tungsten Electrodes

Classification :



Health 1 Flammability 0
Reactivity 0
Special

International regulations

International lists : All components listed are listed on major international inventories or exempted from being listed in Australia (AICS), Europe (EINECS/ELINCS), Korea (TCCL), Japan (METI/MOL), Philippines (RA6969).

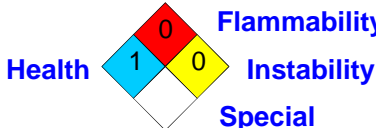
Section 16. Other information

Label requirements : CANCER HAZARD.
CONTAINS MATERIAL WHICH CAN CAUSE CANCER.
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:
BONES ,BLOOD, RESPIRATORY TRACT, SKIN, EYE, LENS OR CORNEA.

Hazardous Material Information System (U.S.A.) :

| | | |
|---------------------|---|---|
| Health | * | 1 |
| Fire hazard | | 0 |
| Reactivity | | 0 |
| Personal protection | | X |

National Fire Protection Association (U.S.A.) :



Health 1 Flammability 0
Instability 0
Special

References : ANSI Z400.1, MSDS Standard, 2004. - Manufacturer's Material Safety Data Sheet. - 29CFR Part1910.1200 OSHA MSDS Requirements. - 49CFR Table List of Hazardous Materials, UN#, Proper Shipping Names, PG. - Canada Gazette Part II, Vol. 122, No. 2. Registration SOR/88-64, 31 December 1987. Hazardous Products Act "Ingredient Disclosure List" - Canadian Transport of Dangerous Goods, Regulations and Schedules, Clear Language version 2005. - Official Mexican Standards NOM-018-STPS-2000 and NOM-004-SCT2-1994.

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Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.