

MATERIAL SAFETY DATA SHEET

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

Product identifier: Thoriated Tungsten Electrodes

Product use: Electrodes and inserts for electrodes other than air plasma gas

Supplier name and address:

Thermal Dynamics Corporation

82 Benning Street
West Lebanon, NH 03784, USA
Phone: (603) 298-5711

Manufacturer's name and address:

OSRAM Sylvania Inc.

Hawes street
Towanda, PA 18848-0504, USA
Phone: (717) 268-5000

24 Hour Emergency Telephone #: (CHEMTREC) (800) 424-9300 USA / Canada
(703) 527-3887 International

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

<u>Ingredients</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>OSHA</u>	<u>ACGIH</u>	<u>LC₅₀(rat, inh) (mg/m³/4hr)</u>	<u>LD₅₀(mg/kg)</u>	
			<u>PEL</u>	<u>TLV</u>		<u>rat, oral</u>	<u>dermal, rabbit</u>
Tungsten	7440-33-7	98-99	5 mg/m ³ (Final Rule)	5 mg/m ³	>5400	N/Av	N/Av
Thorium Dioxide	1314-20-1	1-2	N/Av	N/Av	N/Av	N/Av	N/Av

SECTION 3 — HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Gray metal solid. No odour.

Caution! May cause mild eye or skin irritation. Fumes may cause irritation of the respiratory tract.

Contains material that may cause cancer.

POTENTIAL HEALTH EFFECTS

Target organs: Eyes, skin, respiratory system, gastrointestinal system, blood, liver, kidneys.

Signs and symptoms of short-term (acute) exposure:

Inhalation: Overexposure to cutting and welding fumes may result in mild irritation, cough, sore throat and wheezing.

Thorium dioxide is a naturally occurring radioactive element. It is an alpha emitter and, as such, its primary hazard lies in inhalation of dust or fumes. Normal handling of these electrodes are not expected to result in any significant external radiation exposure.

Skin contact: Adverse skin reactions from contact with electrodes are unlikely. Burns may occur from touching hot metal.

Radioactive alpha particles normally cannot penetrate the upper layers of skin tissue.

Eye contact: Fumes and/or gases produced during cutting or welding may cause mild irritation.

Ingestion: No health effects expected from small amounts. Large amounts may cause gastrointestinal discomfort.

Effects of long-term (chronic) exposure: Contains Thorium dioxide, which may cause blood system, liver or kidney damage.

Prolonged or repeated skin contact may cause drying and cracking of the skin (dermatitis).

Other important hazards: Contains material that may cause cancer. See TOXICOLOGICAL INFORMATION, Section 11.

SECTION 4 — FIRST AID MEASURES

Inhalation: If breathing difficulties occur, remove victim to fresh air and obtain medical attention immediately.

Skin contact: Wash skin thoroughly with mild soap and running water. Obtain medical attention if irritation develops. Launder clothing before reuse. Seek medical attention for burns resulting from the cutting or welding process.

Eye contact: Immediately flush eyes with gently running water for at least 15 minutes. Obtain medical attention if pain or irritation persists.

Ingestion: Contact a physician or Poison Control Centre. DO NOT induce vomiting. Never give anything by mouth to an unconscious or convulsing person.

SECTION 5 — FIRE FIGHTING MEASURES

Fire hazards/conditions of flammability: Product is non-flammable. Cutting and welding procedures may ignite combustible materials in the work area if proper safety precautions are not followed. May emit low levels of toxic and radioactive fumes if involved in a fire.

Flash point: N/Av

Auto-ignition temperature: N/Av

Lower flammable limit (% by volume): N/Av

Upper flammable limit (% by volume): N/Av

Explosion data: *Sensitivity to mechanical impact / static discharge:* Not expected to be sensitive to mechanical impact or static discharge under normal conditions.

Oxidizing properties: N/Av

Suitable extinguishing media: Use media appropriate for surrounding materials.

Special fire-fighting procedures/equipment: Firefighters should wear proper protective equipment and a self-contained breathing apparatus. Move containers from fire area if it can be done without risk. Water spray may be useful in minimizing or dispersing vapours and cooling equipment exposed to heat and flame.

Hazardous combustion products: Tungsten oxide and other irritating fumes and smoke.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Personal precautions: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically protective equipment. Keep all other personnel upwind and away from the spill/release. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

Environmental precautions: Ensure spilled product does not enter drains, sewers, waterways, or confined spaces.

Spill response/Cleanup: Wear appropriate protective equipment. Eliminate all sources of heat and flame. Ventilate area of release. Stop leak if you can do so without risk. Pick up material immediately using non-sparking tools. Use methods which do not generate dusts. Transfer to clean, dry, suitable containers for later disposal (see Section 13). Notify the appropriate authorities as required.

Prohibited materials: None known.

SECTION 7 — HANDLING AND STORAGE

Safe handling procedures: Wear appropriate protective equipment during handling. Use with adequate ventilation. Avoid inhaling vapours. Avoid contact with eyes, skin and clothing. Keep away from heat and flame. Keep away from incompatibles. Keep containers tightly closed when not in use. Wash thoroughly after handling.

Storage requirements: Store in a cool, dry, well-ventilated area away from all sources of ignition and incompatible materials. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking in the area.

Incompatible materials: Oxidizers, bromine trifluoride, chlorine trifluoride, fluorine, iodine, pentafluoride.

Special packaging materials: Always keep in containers made of the same materials as the supply container.

SECTION 8 — EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation and engineering controls: Use general ventilation or local exhaust during welding to keep fumes and gases below applicable limits.

Respiratory protection: In emergency situations or when concentrations are not known, a self-contained breathing apparatus may be required. Advice should be sought from respiratory protection specialists.

Protective gloves: Welder's gloves are required.

Eye protection: Wear helmet or face shield with appropriate lens during welding. Provide protective screens and flash goggles to screen others when necessary.

Other protective equipment: Wear body protection to prevent injury from arc radiation, sparks and electrical shock. An eyewash station and safety shower should be made available in the immediate working area. Other equipment may be required depending on workplace standards.

Permissible exposure levels: See Section 2.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Physical form, colour and odour: Gray metal solid, no odour.

Odour threshold: N/Av

Boiling point: 5660°C

Specific gravity (water=1): 19

Coefficient of oil/water distribution: N/Av

Solubility in water: Insoluble

Volatile organic compounds (VOC's): N/Av

pH: N/Av

Evaporation rate (nBuAC=1): N/Av

Melting/freezing point: 3410°C (for pure tungsten)

Vapour pressure (mm Hg @ 25°C): N/Av

Vapour density (Air=1): N/Av

Percent Volatile by Weight: 0

SECTION 10 — STABILITY AND REACTIVITY

Stability and reactivity: Stable under the recommended storage and handling conditions prescribed.

Hazardous polymerization: Will not occur.

Conditions to avoid: None known.

Materials to avoid: Incompatible materials (see Section 7).

Hazardous decomposition products: None known. Refer to 'Hazardous combustion products', Section 5.

SECTION 11 — TOXICOLOGICAL INFORMATION

Routes of exposure: Skin contact, eye contact, ingestion and inhalation.

Toxicological data: There is no available data for the product itself, only for the ingredients.

LD₅₀: See Section 2

LC₅₀: See Section 2

Carcinogenicity: This product contains Thorium dioxide. Thorium dioxide is a naturally occurring radioactive element. It is an alpha emitter. Thorium dioxide is listed as a Known carcinogen by NTP, due to its radioactivity, and as carcinogenic to humans (Group 1) by IARC when administered intravenously.

Teratogenicity, mutagenicity, other reproductive effects: This product contains Tungsten. There is some evidence from animal data which indicates Tungsten may cause developmental abnormalities and embryotoxicity or fetotoxicity.

Sensitization to material: None known.

Synergistic materials: None known.

Conditions aggravated by exposure: None known.

SECTION 12 — ECOLOGICAL INFORMATION

Ecotoxicological information: The ecological characteristics of this product have not been fully investigated. The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters. Do not discharge product unmonitored into the environment.

Chemical fate information: There is no data available on the product itself.

Aquatic toxicity: There is no data available on the product.

SECTION 13 — DISPOSAL CONSIDERATIONS

Handling for disposal: Handle waste according to recommendations in Section 7.

Methods of disposal: Containers should be disposed of in accordance with all applicable federal, provincial, state, and local regulations.

SECTION 14 — TRANSPORT INFORMATION

Canadian Transportation of Dangerous Goods Regulations (TDGR) Shipping Information:

This product is not regulated for transportation within Canada.

US DOT 49 CFR information:

This product is not regulated for transportation by ground within the continental United States.

SECTION 15 — REGULATORY INFORMATION

WHMIS information:

Canadian WHMIS Classification : Class D2A (*Materials Causing Other Toxic Effects, Very Toxic Material*); Class D2B (*Materials Causing Other Toxic Effects, Toxic Material*).

SECTION 15 — REGULATORY INFORMATION Continued

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and this MSDS contains all the information required by the CPR.

CEPA information: All ingredients are listed on the DSL.

TSCA information: All ingredients are listed on the TSCA inventory.

HMIS Rating: Health: 1*
Flammability: 0
Reactivity: 0

SECTION 16 — OTHER INFORMATION

Legend: ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Services
CEPA: Canadian Environmental Protection Act
DSL: Domestic Substances List
HMIS: Hazardous Materials Identification System
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
N/Ap: not applicable
N/Av: not available
NIOSH: National Institute of Occupational Safety and Health
OSHA: Occupational Safety & Health Administration
PEL: Permissible Exposure Limit
PSI: Pounds per Square Inch
RTECS: Registry of Toxic Effects of Chemical Substances
TSCA: Toxic Substances Control Act
TLV: Threshold Limit Values
WHMIS: Workplace Hazardous Materials Information System

References: 1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2006.
2. International Agency for Research on Cancer Monographs, searched 2007.
3. Canadian Centre for Occupational Health and Safety, CCIInfoWeb databases, 2007 (Chempendium, HSDB and RTECs).
4. Previous version of the Material Safety Data Sheet, dated November 19, 2003.

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