

MATERIAL SAFETY DATA SHEET

PRODUCT NAME : LEAK DETECTION/ION GAUGE FILAMENTS

1. Product and Company Identification

Product name: Leak detector mass spectrometer ion source primary filaments and ion gauge filaments
Synonyms: None
Item Numbers: D029-98-040; D029-98-110; D029-98-170; D029-98-390; D029-99-390; D029-99-370;
D154-05-800; D154-05-810; D154-05-811; D154-05-812; D154-05-813; D154-41-800;
D154-51-800; D154-61-800; D154-61-801; D154-61-802; D154-61-803; D154-71-800;
D154-71-805; D154-71-806; D154-71-807; D154-71-808; D154-81-801; D154-81-802;
D154-81-803

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2. Hazards Identification

EMERGENCY OVERVIEW

Thorium oxide filament coating is an irritant for eyes and skin. Thorium compounds are mildly radioactive: it is possible that long term cumulative effects of thorium compounds in the body may increase the risk of cancer.

For short and long term exposure effects see Section 11 Toxicological data.

Eye Effects: Toxic by contact if eye is cut or abraded. Thorium oxide is an irritant.

Skin Effects: Toxic by skin contact if skin is cut or abraded. Thorium oxide is an irritant and can cause dermatitis after repeated contact.

Ingestion/Oral Effects: Thorium nitrate and thorium oxide are very toxic if ingested. Once deposited in the body, thorium remains for a long period of time and may increase the risk of induced cancer in the tissues where it is deposited.

Inhalation Effects: Thorium nitrate is very toxic if inhaled. May be a respiratory irritant. Inhaled thorium oxide tends to remain in the lungs and may increase the risk of cancer due to alpha and gamma radiation emission.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: May aggravate pre-existing eye, skin, and respiratory conditions.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME : LEAK DETECTION/ION GAUGE FILAMENTS
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NFPA Hazard codes		HMIS Hazard codes		Rating System
Health	2	Health	2	0 = No Hazard
Flammability	0	Flammability	0	1 = Slight Hazard
Instability	0	Reactivity	0	2 = Moderate Hazard
				3 = Serious Hazard
				4 = Severe Hazard

3. Composition/Information on Ingredients

Ingredient	% Weight	CAS No	Hazard class*	Risk phrase*
Filament coating - Thorium oxide (ThO ₂)	< 10 ⁻²	1314-20-1	Not classified	R22
Filament coating - Thorium nitrate (ThN ₆ O ₁₂)	< 10 ⁻³	13823-29-5	Not classified	R22
Iridium wire (Ir)	Remainder	Not allocated	Not classified	Not applicable

*Hazard class & Risk phrase. These columns are only completed for ingredients which are classified as hazardous under EU Directive No 1272/2008 (as amended) and are present in sufficient concentration to make the overall substance hazardous. In all other situations, the column will be completed as "Not applicable".

4. First Aid Measures

Eyes:	Irrigate thoroughly with water for 15 minutes. If discomfort persists, obtain medical attention.
Skin:	Flush with soap and water. Check for breaks in the skin surface and continue to flush with water until sure that no radioactive particles remain.
Ingestion/Oral:	Give victim plenty of water. Do <u>not</u> induce vomiting. Call a physician.
Inhalation:	Remove to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, begin artificial respiration. Call a physician.
Other Information:	None.

5. Fire Fighting Measures

Extinguishing Media:	Thorium oxide is non-flammable.
Fire and Explosion Hazard:	Thorium oxide is mildly radioactive. Thorium nitrate may evolve toxic fumes.
Special Protective Equipment for Fire Fighters:	Fire fighters should wear a self-contained breathing apparatus (SCBA) which meets appropriate standards operated in positive pressure mode, and full personal protective equipment when fighting fires where radioactive material may be present.

For Flammability Properties - see Section 9.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME : LEAK DETECTION/ION GAUGE FILAMENTS

6. Accidental Release Measures

Dry coated filaments pose no danger due to their low levels of coating. Handle coated components using gloves.

7. Handling and Storage

Handling: No special precautions are needed due to the very small quantity of thorium oxide/thorium nitrate present (about 0.001 mg per filament). Good vacuum practice and safe handling of the material require that filaments are not handled directly. Tweezers are a convenient and safe way of transferring or manipulating filament assemblies.

Storage: Store away from radiation sensitive equipment.

8. Exposure Controls/Personal Protection

Exposure Limits:

Ingredient	ACGIH - TLV -	OSHA - PEL	Occupational Exposure Limits EH40 (UK)
See note below	See note below	See note below	See note below

Note: Thorium oxide : Nuclear Regulatory Commission maximum permissible concentration : $6 \times 10^{-11} \mu \text{Ci/ml}$.

Exposure limits: Annual dose limit: 50 mSv EDE+CDE; 500 mSv DE (skin).

Personal Protection:

Engineering Measures: Local exhaust is recommended for all handling of thorium compounds. Ventilation systems should be filtered.

Respiratory Protection: Not required for dry coated filaments.

Hand/Skin Protection: Wear neoprene gloves.

Eye/Face Protection: Wear safety glasses.

Hygiene Measures: Avoid contact with skin. Do not eat or smoke whilst handling the product. Wash hands before eating or smoking.

Other/General Protection: None.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME : LEAK DETECTION/ION GAUGE FILAMENTS

9. Physical and Chemical Properties

The data below is for thorium oxide. Note that thorium nitrate is soluble in water.

Appearance and Odour	White crystalline powder/ coating. No odour	Boiling point	No data available	°C/°F
pH (as supplied)	No data available	Freezing Point	3050 / 5522	°C/°F
Solubility in Water	Insoluble	Auto Ignition	Not applicable	°C/°F
Volatile Content by Volume	Not applicable	Flash Point	Non flammable	°C/°F
Specific Gravity	9.86			
Vapour Pressure (mbar)	No data available	Vapour Pressure (Torr)	No data available	

10. Stability and Reactivity

The following data is for thorium oxide.

Stability:	Stable.
Material/Conditions to Avoid:	Strong acids and oxidisers.
Hazardous Decomposition:	Mildly radioactive waste.
Hazardous Polymerisation:	Will not occur.

11. Toxicological Information

For a comprehensive description for the various toxicological (health) effects which may arise if the user comes into contact with the substance or preparation refer to Section 2 Hazards Identification.

Animal data:

LD50 value:	Thorium nitrate: 48 mg/kg (IVN rat).	Thorium oxide: 400 mg/kg (IMS mice).
LC50 value:	No information available.	

Annual limit of intake (human): 200 Bq.

Carcinogenicity:

Thorium compounds should be treated as suspected carcinogens which may cause adverse mutagenic effects, especially when in an untreated form.

12. Ecological Information

No information available.

No hazards are expected if the disposal guidelines set out in Section 13 are followed.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME : LEAK DETECTION/ION GAUGE FILAMENTS

13. Disposal Considerations

Dry coated filaments may be disposed of in normal rubbish bins, provided that not more than 5 filaments are disposed of at any one time. If disposal above this level is required, consult a Radiation Protection Advisor.

14. Transport Information

This product is not classified as dangerous under transport regulations.

PARAMETER	EUROPEAN	CANADIAN TDG	UNITED STATES DOT
Proper Shipping Name	Not applicable	Not applicable	Not applicable
Hazard Class	Not applicable	Not applicable	Not applicable
Identification Number	Not applicable	Not applicable	Not applicable
Shipping Label	Not applicable	Not applicable	Not applicable

15. Regulatory Information

European Regulatory Information

This product has been classified in accordance with EU Regulation No 1272/2008 (as amended) on the Classification, Labelling and Packaging of Substances and Mixtures.

Classified as dangerous to supply: No.

Risk Phrases: R22 Harmful if swallowed.

Safety Phrases: S37 Wear suitable gloves.

S46 If swallowed seek medical advice immediately.

Symbols: None.

United States Regulatory Information

SARA TITLE III - SECTION 313 SUPPLIER INFORMATION:

This product constitutes an "article" and, as such is exempt from SARA 313 reporting requirements. (40 CFR Part 372.38, Paragraph B).

Product is a manufactured article not subject to TSCA listing.

California Proposition 65: This product contains chemicals (thorium oxide) known to the State of California to cause cancer.

Canadian Regulatory Information

WHMIS Classification: Product is a manufactured article not subject to WHMIS regulations.

Product is a manufactured item not subject to DSL listing.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME : LEAK DETECTION/ION GAUGE FILAMENTS

16. Other Information

This MSDS is compiled in accordance with ANSI Z400.1 and Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Sources of information for this data sheet:

- BOC Edwards "Leak Detection/Ion Gauge Filaments" Material Safety Data Sheet. Publication P120-10-000 Issue C. Date: November 2007.

Glossary:

ACGIH - American Conference of Governmental Industrial Hygienists; **ANSI** - American National Standards Institute; **Canadian TDG** - Canadian Transportation of Dangerous Goods; **CAS** - Chemical Abstracts Service; **CDE** - Committed Dose Equivalent; **Chemtrec** - Chemical Transportation Emergency Center (US); **DE** - Dose Equivalent; **DSL** - Domestic Substances List; **EDE** - Effective Dose Equivalent; **EH40 (UK)** - HSE Guidance Note EH40 Occupational exposure limits; **HMIS** - Hazardous Material Information Service; **IMS** - Intramuscular; **IVN** - Intravenous; **LC** - Lethal Concentration; **LD** - Lethal Dose; **NFPA** - National Fire Protection Association; **OSHA** - Occupational Safety and Health Administration, US department of Labour; **PEL** - Permissible exposure limit; **SARA (Title III)** - Superfund Amendments and Reauthorization Act; **SARA 313** - Superfund Amendments and Reauthorization Act, Section 313; **TLV** - Threshold Limit Value; **TSCA** - Toxic Substances Control Act Public Law 94-469; **WHMIS** - Workplace Hazardous Materials Information System; **US DOT** - US Department of Transportation.

Revisions:

November 2010 - Data Sheet reviewed for compliance with correct regulatory and manufacturer safety information.

Although the information and recommendations in this data sheet are to the best of our knowledge correct, it is recommended that you make your own determination of the material's suitability for your purpose before you use it. The information contained in this data sheet has been reproduced from the manufacturers data; the accuracy of this information is the responsibility of the manufacturer. Edwards accept no responsibility for damage of any nature resulting from the use of, or the reliance upon, this data sheet.