



Thorium Oxide

(CERAC, Inc.)

MATERIAL SAFETY DATA SHEET

Ionization Gauge Tubes - VARIAN Part Numbers
563 Glass BA - K2466301, 302, 303, 304, 305, 306, 307, 311
564 Glass BA - K2500301, 302, 303, 304, 310, 311
571 Glass BA - K2471301, 302, 303, 304, 305, 306, 307, 311
580 Nude BA - L5150302, L5150303, L5151301,
UHV24 & UHV24p - 9715007, L6651302, 9715015, 9710028
MBA -100 - R1170301, 302, 303,
Eyesys Mini-BA Gauges - R015XXXX
Ion Sources - 82850302, GG82850302

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**VARIAN VACUUM TECHNOLOGIES
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MATERIAL SAFETY DATA SHEET

I PRODUCT IDENTIFICATION

Trade Name: Thorium Oxide	Chemical Nature: Metal oxide
Formula: ThO ₂	CAS #: 1314-20-1
Synonyms: Thorium dioxide, thorianite, thoria, thorotrast, thortrast.	Molecular Weight: 264.04

II HAZARDOUS INGREDIENTS

<u>Hazardous Component</u>	<u>%</u>	<u>OSHA/PEL</u>	<u>ACGIH/TLV</u>
Thorium Dioxide	0-100	N/E	N/E
NRC maximum permissible dose for occupational exposure	0-100	5000 mrem/yr	
NRC maximum permissible dose for non-occupational exposure	0-100	100 mrem/yr	

<u>Sec. 302 (EHS)</u>	<u>Sec. 304 RQ</u>	<u>Sec. 313</u>
No	No	Yes

III PHYSICAL DATA

Boiling Point: 4400 °C	Melting Point: 3170 - 3270 °C
Vapor Density: N/A	Vapor Pressure: N/A
% Volatiles: N/A	Solubility in H₂O: Insoluble
Appearance and Odor: White, heavy, crystalline powder , no odor.	Specific Gravity (Water = 1): 9.86 gm/cc

IV FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A	Autoignition Temperature: N/A
Flammable Limits: Upper: N/A Lower: N/A	Flammability: Non-flammable

Extinguishing Media: Use suitable extinguishing media for surrounding materials and type of fire.

Special Firefighting Procedures: Firefighters must wear full face, self-contained breathing apparatus with full protective clothing to prevent contact with skin and eyes. Fumes from fire are hazardous and may be radioactive. Isolate runoff to prevent environmental pollution.

Unusual Fire and Explosion Hazards: Radiation hazard. May emit toxic and radioactive fumes if involved in a fire.

V HEALTH HAZARD INFORMATION

Routes of Entry: Inhalation, skin, eyes and ingestion.

Effects of Overexposure: Thorium is a suspected carcinogen. Taken internally as ThO₂, it has proven to be carcinogenic due to its radioactivity.

Acute Effects:

Inhalation: May cause mild irritation to the respiratory system.

Ingestion: May cause nausea and vomiting.

Skin: May cause irritation.

Eye: May cause irritation.

Chronic Effects:

Inhalation: Confirmed human carcinogen producing angiosarcoma, liver and kidney tumors, lymphoma and other tumors of the blood system.

Ingestion: No chronic health effects recorded.

Skin: May cause dermatitis.

Eye: No chronic health effects recorded.

Target Organs: May affect the liver, kidneys and blood.

Medical Conditions Generally Aggravated by Exposure: Pre-existing respiratory disorders.

Carcinogenicity: NTP: Yes **IARC Monographs:** No **OSHA Regulated:** No

Signs and Symptoms of Exposure:

Inhalation: May cause sneezing, shortness of breath, coughing and changes in the blood.

Ingestion: May cause nausea, vomiting, changes in the blood and urine.

Skin: May cause redness, itching, burning sensation and inflammation.

Eye: May cause redness, itching, burning, watering and inflammation.

Thorium Oxide Other Toxicity Data:

par-wmn TDLO: 1 g/kg: CAR, LIV

iat-hmn TDLO: 490 mg/kg: CAR

unr-ham TDLO: 2 g/kg: CAR

par-hmn TD: 700 mg/kg: NEO, LIV, BLD

iat-man TD: 1190 mg/kg: CAR, LIV, BLD

unr-hmn TDLO: 2880 mg/kg: NEO, LIV

ivn-rat TDLO: 160 mg/kg: ETA

par-hmn TD: 1260 mg/kg: NEO, LIV, BLD

par-wmn TD: 2350 mg/kg: CAR, KID

iat-hmn TD: 1302 mg/kg: CAR, LIV

EMERGENCY AND FIRST AID PROCEDURES:

INHALATION: Remove victim to fresh air; keep warm and quiet; give oxygen if breathing is difficult and seek medical attention.

INGESTION: Give 1-2 glasses of milk or water and induce vomiting; seek medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing; brush material off skin; wash affected area with mild soap and water; check for radioactive contamination; seek medical attention if symptoms persist.

EYES: Flush eyes with lukewarm water, lifting upper and lower eyelids, for at least 15 minutes. Seek medical attention immediately.

VI REACTIVITY DATA

Stability: Stable

Conditions to avoid: None

Incompatibility (Material to Avoid): Strong acids and oxidizing agents.

Hazardous Decomposition Products: Thorium oxide dust; thoron daughters, alpha, beta and gamma radiation.

Hazardous Polymerization: Will not occur

VII SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled: Wear appropriate respiratory and protective equipment specified in section VIII. Isolate spill area and provide ventilation. Vacuum up spill using high efficiency particulate absolute (HEPA) air filter and place in a closed container for proper disposal. Take care not to raise dust.

Waste Disposal Method: Consult federal, state and local regulations for proper disposal.

VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH/MSHA approved radionuclides and acid gas respirator.

Ventilation: Use local exhaust with a filtered ventilation system to maintain concentration at low exposure levels. Mechanical exhaust not recommended. Prevent discharge of radioactivity.

Protective Gloves: Butyl and polycarbonate

Eye Protection: Face shield and chemical splash goggles.

Other Protective Equipment: Protective gear suitable to prevent contamination.

Work/Hygienic/Maintenance Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before smoking or eating. Do not blow dust off clothing or skin with compressed air.

IX SPECIAL PRECAUTIONS

Precautions to Be Taken in Handling and Storage: Radioactive: store away from radiation sensitive equipment and devices. Store in cool, dry area in a tightly sealed container. Wash thoroughly after handling.

HMIS Ratings (0-4): Health: 3 (chronic health hazard) **Flammability:** 0 **Reactivity:** 0

HMIS Protective Equipment: J: goggles, gloves, apron, respirator. RADIATION HAZARD.

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