MATERIAL SAFETY DATA SHEET

I PRODUCT IDENTIFICATION

Trade Name: Thorium Oxide
Formula: ThO_2
Synonyms: Thorium dioxide, thorianite, thoria, thorotrast, thortrast.
Chemical Nature: Metal oxide
CAS #: 1314-20-1
Molecular Weight: 264.04

II HAZARDOUS INGREDIENTS

Hazardous Component	%	OSHA/PEL	ACGIH/TLV
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	

Sec. 302 (EHS)	Sec. 304 RQ	Sec. 313
No	No	Yes

III PHYSICAL DATA

Boiling Point: 4400 °C
Vapor Density: N/A
% Volatiles: N/A
Appearance and Odor: White, heavy, crystalline powder , no odor.
Melting Point: 3170 - 3270 °C
Vapor Pressure: N/A
Solubility in H_2O: Insoluble
Specific Gravity (Water = 1): 9.86 gm/cc

IV FIRE AND EXPLOSION HAZARDS DATA

Flash Point: N/A
Flammable Limits: **Upper**: N/A **Lower**: N/A
Autoignition Temperature: 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 ThO_2, 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 anglosarcoma, 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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