



SAFETY DATA SHEET

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SECTION 1 PRODUCT AND COMPANY INFORMATION

PRODUCT NAME: **Hafnium (IV) t-butoxide**
PRODUCT NUMBER: 1952
CAS NUMBER: 2172-02-3
SYNONYMS: Hafnium t-butylate; butanol, hafnium salt

MANUFACTURER:

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SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION OF SUBSTANCE OR MIXTURE

Pictogram



Signal Word

Warning

Hazard Statements

H226	Flammable liquid and vapor.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

Precautionary Phrases

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240	Ground/bond container and receiving equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/fume/gas/mist/vapors/spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

SECTION 2 HAZARDS IDENTIFICATION (Cont.)

P362	Take off contaminated clothing and wash before reuse.
P370+P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

HMIS CLASSIFICATION:

Health: 1 Fire: 2 Reactivity Hazard: 1

NFPA RATING:

Health: 1 Flammability: 2 Reactivity Hazard: 1

EYE CONTACT: If liquid contacts the eye, irritating hafnium oxide powder may form t-Butanol vapor from hydrolyzed product may cause eye irritation.

SKIN CONTACT: Dehydrating agent. Liquid may cause mild irritation of the skin.

INHALATION: T-butanol vapor may be irritating to the respiratory tract and cause headache, dizziness, and drowsiness.

INGESTION: Ingestion may cause gastrointestinal distress, nausea, vomiting, and headache.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Formula: $\text{Hf}[\text{OC}(\text{CH}_3)_3]_4$

Molecular Weight: 470.94

CHEMICAL NAME	CAS#	%
Hafnium (IV) tert-butoxide	2172-02-3	100

SECTION 4 FIRST AID MEASURES

EYE EXPOSURE: Immediately flush the eyes with copious amounts of water for at least 15 minutes. Assure flushing under eyelids. A victim may need assistance in keeping their eyelids open. Get immediate competent medical attention.

SKIN EXPOSURE: Wash affected area with plenty of water. Remove contaminated clothes if necessary. Seek medical assistance if irritation persists.

INHALATION: Remove to fresh air and keep at rest. Closely monitor the victim for signs of respiratory problems, such as difficulty in breathing, coughing, wheezing, or pain. In such cases, seek immediate medical assistance.

INGESTION: Seek medical assistance immediately. Keep the victim calm. Give the victim water (only if conscious). Induce vomiting only if directed by medical personnel.

SECTION 5 FIREFIGHTING MEASURES

FLASH POINT: 28°C-Closed Cup

AUTO IGNITION TEMPERATURE: Not available

EXPLOSION LIMITS: Product is not explosive, however, formation of explosive air/vapor mixtures is possible.

EXTINGUISHING MEDIUM: Carbon dioxide, extinguishing powder, or water spray. Fight large fires with water spray or alcohol resistant foam.

SPECIAL FIRE FIGHTING PROCEDURES: Wear self-contained, approved breathing apparatus and full protective clothing, including eye protection and boots.

HAZARDOUS COMBUSTION AND DECOMPOSITION PRODUCTS: Carbon oxides and hafnium oxides

SECTION 6 ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Wear all appropriate equipment when using this material. Ensure adequate ventilation. Avoid the formation of dust. Avoid breathing vapors, mist, gas, or dust. Remove all sources of ignition. Beware of vapors accumulating to form explosive concentration. Vapors can accumulate in low areas.

ENVIRONMENTAL PRECAUTIONS: Prevent spillage from entering drains or allowing to be released into the environment.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP: Absorb with liquid binding material. Sweep up and place in suitable container for proper disposal.

SECTION 7 HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING: Wear appropriate personal protective equipment. Avoid contact with skin and eyes. Use with adequate ventilation. Wash thoroughly after using. Keep container closed when not in use. Avoid formation of dusts and aerosols. Keep away from sources of ignition – no smoking. Take measures to prevent the build up of electrostatic charge. Fumes can combine with air to form an explosive mixture.

CONDITIONS FOR SAFE STORAGE: Store in cool, dry, and well-ventilated area. Store away from air, water, moisture, and oxidizing agents. Moisture sensitive – protect from humidity and water. Store under dry inert gas.

SECTION 8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

EXPOSURE CONTROLS: Contains no substances with occupational exposure limit values.

Component	Exposure Limits	Basis	Entity
Hafnium (IV) tert-butoxide	0.5 mg/m ³	TLV	ACGIH
	0.5 mg/m ³	PEL	OSHA
	0.5 mg/m ³	REL	NIOSH

TLV: Threshold Limit Value over 8 hours of work.

REL: Recommended Exposure Limit

PEL: Permissible Exposure Limit

EYE PROTECTION: Wear chemical safety glasses or goggles and face shield.

SKIN PROTECTION: Wear nitrile or rubber gloves, and a complete suit protecting against chemicals.

VENTILATION: Provide local exhaust, preferably mechanical.

RESPIRATOR: Use an approved respirator.

ADDITIONAL PROTECTION: Provide eyewash stations, quick-drench showers and washing facilities accessible to areas of use and handling.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

COLOR AND FORM: Clear to pale-yellow liquid

ODOR: No data available

MOLECULAR WEIGHT: 470.94

BOILING POINT: 90° C

MELTING POINT: 2° C

SPECIFIC GRAVITY: 1.15gm/ml

VAPOR DENSITY: No data available

SOLUBILITY: Reacts with water

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Contact with moisture, heat, flames, and sparks.

INCOMPATIBILITY: Strong oxidizing agents and halogens

DECOMPOSITION PRODUCTS: Carbon oxides and hafnium oxides.

SECTION 11 TOXICOLOGICAL DATA

ACUTE TOXICITY: No data available

CARCINOGENIC EFFECTS: No components of this product present at levels greater than or equal to 0.1% is identified a carcinogen.

MUTAGENIC EFFECTS: Not available

TETRATOGENIC EFFECTS: Not available

CHRONIC TOXICITY: Not available

RTECS: No data

To the best of our knowledge the toxicological effects of this compound have not been fully investigated.

SECTION 12 ECOLOGICAL DATA

No data available.

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose of in according to local, state, and federal regulations.

SECTION 14 TRANSPORTATION DATA

DOT: UN1993	IATA: UN1993
Flammable liquids, n.o.s. (Hafnium (IV) tert-butoxide)	Flammable liquid, n.o.s. (Hafnium (IV) tert-butoxide)
CLASS 3	CLASS 3
PG III	PG III

Marine Pollutant: No

SECTION 15 REGULATORY INFORMATION

TSCA: Not listed in the TSCA inventory

SARA 302/304: Not Listed

SARA 311/312: Fire Hazard, Acute Health Hazard.

SARA (TITLE 313): Not Listed

CALIFORNIA PROP. 65: Not Listed

MASSACHUSETTS RIGHT TO KNOW COMPONENTS: No components are subject to the Massachusetts Right to Know Act.

NEW JERSEY RIGHT TO KNOW COMPONENTS: Hafnium (IV) tert-butoxide

PENNSYLVANIA RIGHT TO KNOW COMPONENTS: Hafnium (IV) tert-butoxide

SECTION 16 OTHER INFORMATION

DISCLAIMER: The information herein is believed to be accurate and reliable as of the date compiled. However, Prochem, Inc. makes no representation, warranty, or guarantee of any kind with respect to the information in this document or any use of the product based on the information.

DATE PREPARED: 01/15

SDS DEPT.