

## 1 Identification

### Product identifier

**Product name:** Hafnium(IV) isopropoxide isopropanol complex

**Stock number:** H52288

**CAS Number:**

2171-99-5

**Relevant identified uses of the substance or mixture and uses advised against.**

**Identified use:** SU24 Scientific research and development

### Details of the supplier of the safety data sheet

#### Manufacturer/Supplier:

Alfa Aesar

Thermo Fisher Scientific Chemicals, Inc.

30 Bond Street

Ward Hill, MA 01835-8099

Tel: 800-343-0660

Fax: 800-322-4757

Email: tech@alfa.com

www.alfa.com

**Information Department:** Health, Safety and Environmental Department

#### Emergency telephone number:

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

## 2 Hazard(s) identification

### Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

 GHS02 Flame

Flam. Sol. 2 H228 Flammable solid.

 GHS07

Skin Irrit. 2 H315 Causes skin irritation.

Eye Irrit. 2A H319 Causes serious eye irritation.

STOT SE 3 H335 May cause respiratory irritation.

**Hazards not otherwise classified** No information known.

### Label elements

**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

### Hazard pictograms

GHS02 GHS07

### Signal word

Warning

### Hazard statements

H228 Flammable solid.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H335 May cause respiratory irritation.

### Precautionary statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P280 Wear protective gloves.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

### WHMIS classification

B4 - Flammable solid

D2B - Toxic material causing other toxic effects



### Classification system

#### HMIS ratings (scale 0-4)

#### (Hazardous Materials Identification System)

HEALTH 1 Health (acute effects) = 1

FIRE 2 Flammability = 2

REACTIVITY 1 Physical Hazard = 1

### Other hazards

#### Results of PBT and vPvB assessment

PBT: Not applicable.

vPvB: Not applicable.

## 3 Composition/information on ingredients

### Chemical characterization: Substances

#### CAS# Description:

2171-99-5 Hafnium(IV) isopropoxide isopropanol complex

**Additional information:** Hafnium is routinely found with a low level of zirconium since separation of the two elements is difficult.

**Additional information:** This material builds up pressure slowly. Vent pressure, if any, upon receipt. Vent every 3 months.

## 4 First-aid measures

### Description of first aid measures

#### After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

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**After skin contact**  
Immediately wash with water and soap and rinse thoroughly.  
Seek immediate medical advice.  
**After eye contact** Rinse opened eye for several minutes under running water. Then consult a doctor.  
**After swallowing** Seek medical treatment.  
**Information for doctor**  
**Most important symptoms and effects, both acute and delayed** No further relevant information available.  
**Indication of any immediate medical attention and special treatment needed** No further relevant information available.

**5 Fire-fighting measures**

**Extinguishing media**  
**Suitable extinguishing agents** CO2, sand, extinguishing powder. Do not use water.  
**Special hazards arising from the substance or mixture**  
If this product is involved in a fire, the following can be released:  
Carbon monoxide and carbon dioxide  
Metal oxide fume  
**Advice for firefighters**  
**Protective equipment:**  
Wear self-contained respirator.  
Wear fully protective impervious suit.

**6 Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**  
Wear protective equipment. Keep unprotected persons away.  
Ensure adequate ventilation  
Keep away from ignition sources  
**Environmental precautions:** Do not allow material to be released to the environment without proper governmental permits.  
**Methods and material for containment and cleaning up:**  
Keep away from ignition sources.  
Ensure adequate ventilation.  
**Prevention of secondary hazards:** Keep away from ignition sources.  
**Reference to other sections**  
See Section 7 for information on safe handling  
See Section 8 for information on personal protection equipment.  
See Section 13 for disposal information.

**7 Handling and storage**

**Handling**  
**Precautions for safe handling**  
Handle under dry protective gas.  
Keep container tightly sealed.  
Store in cool, dry place in tightly closed containers.  
Ensure good ventilation at the workplace.  
**Information about protection against explosions and fires:** Protect against electrostatic charges.  
**Conditions for safe storage, including any incompatibilities**  
**Storage**  
**Requirements to be met by storerooms and receptacles:** Store in a cool location.  
**Information about storage in one common storage facility:**  
Store away from oxidizing agents.  
Store away from water/moisture.  
**Further information about storage conditions:**  
Store under dry inert gas.  
This product is moisture sensitive.  
Keep container tightly sealed.  
Store in cool, dry conditions in well sealed containers.  
Protect from humidity and water.  
**Specific end use(s)** No further relevant information available.

**8 Exposure controls/personal protection**

**Additional information about design of technical systems:**  
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

**Control parameters**  
**Components with limit values that require monitoring at the workplace:**

Hafnium, metal and compounds as Hf  
mg/m3

ACGIH TLV	0.5
Austria MAK	0.5
Belgium TWA	0.5
Denmark TWA	0.5
Finland TWA	0.5
France VME	0.5
Germany MAK	0.5
Ireland TWA	0.5; 1.5-STEL
Korea TLV	0.5
Netherlands MAC-TGG	0.5
Norway TWA	0.5
Poland TWA	0.5
Switzerland	0.5-MAK-W
United Kingdom TWA	0.5; 1.5-STEL
USA PEL	0.5

**Additional information:** No data

**Exposure controls**  
**Personal protective equipment**  
**General protective and hygienic measures**  
The usual precautionary measures for handling chemicals should be followed.  
Keep away from foodstuffs, beverages and feed.  
Remove all soiled and contaminated clothing immediately.  
Wash hands before breaks and at the end of work.  
Avoid contact with the eyes and skin.

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Maintain an ergonomically appropriate working environment.  
**Breathing equipment:** Use suitable respirator when high concentrations are present.  
**Protection of hands:**  
Impervious gloves  
Check protective gloves prior to each use for their proper condition.  
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.  
**Penetration time of glove material (in minutes)** Not determined  
**Eye protection:** Safety glasses  
**Body protection:** Protective work clothing.

## 9 Physical and chemical properties

### Information on basic physical and chemical properties

#### General Information

##### Appearance:

**Form:** Solid  
**Odor:** Not determined  
**Odor threshold:** Not determined.

**pH-value:** Not applicable.

##### Change in condition

**Melting point/Melting range:** Not determined  
**Boiling point/Boiling range:** Not determined  
**Sublimation temperature / start:** Not determined

**Flash point:** Not applicable  
**Flammability (solid, gaseous)** Highly flammable.  
**Ignition temperature:** Not determined  
**Decomposition temperature:** Not determined  
**Auto igniting:** Not determined.

**Danger of explosion:** Not determined.

##### Explosion limits:

**Lower:** Not determined  
**Upper:** Not determined  
**Vapor pressure:** Not applicable.  
**Density:** Not determined  
**Relative density** Not determined.  
**Vapor density** Not applicable.  
**Evaporation rate** Not applicable.

##### Solubility in / Miscibility with

**Water:** Reacts  
**Partition coefficient (n-octanol/water):** Not determined.  
**Viscosity:**  
**dynamic:** Not applicable.  
**kinematic:** Not applicable.  
**Other information** No further relevant information available.

## 10 Stability and reactivity

**Reactivity** No information known.  
**Chemical stability** Stable under recommended storage conditions.  
**Thermal decomposition / conditions to be avoided:** Decomposition will not occur if used and stored according to specifications.  
**Possibility of hazardous reactions** Reacts with water  
**Conditions to avoid** No further relevant information available.  
**Incompatible materials:**  
Oxidizing agents  
Water/moisture  
**Hazardous decomposition products:**  
Carbon monoxide and carbon dioxide  
Metal oxide fume

## 11 Toxicological information

### Information on toxicological effects

**Acute toxicity:** No effects known.  
**LD/LC50 values that are relevant for classification:** No data  
**Skin irritation or corrosion:** Causes skin irritation.  
**Eye irritation or corrosion:** Causes serious eye irritation.  
**Sensitization:** No sensitizing effects known.  
**Germ cell mutagenicity:** No effects known.  
**Carcinogenicity:** No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.  
**Reproductive toxicity:** No effects known.  
**Specific target organ system toxicity - repeated exposure:** No effects known.  
**Specific target organ system toxicity - single exposure:** May cause respiratory irritation.  
**Aspiration hazard:** No effects known.  
**Subacute to chronic toxicity:** Hafnium compounds may be irritating to the skin and eyes. There are reports of liver damage from hafnium exposure.  
**Subacute to chronic toxicity:** No effects known.  
**Subacute to chronic toxicity:**  
Isopropyl alcohol, if formed, may act as a local irritant and in high concentrations as a narcotic with symptoms such as headache, nausea, dizziness, vomiting, mental depression, anesthesia, and coma. Similar symptoms may be caused by ingestion. It can cause corneal burns on contact with the eyes and has caused teratogenic, mutagenic and reproductive effects in laboratory animals.  
**Additional toxicological information:** To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

## 12 Ecological information

**Toxicity**  
**Aquatic toxicity:** No further relevant information available.  
**Persistence and degradability** No further relevant information available.  
**Bioaccumulative potential** No further relevant information available.  
**Mobility in soil** No further relevant information available.  
**Additional ecological information:**  
**General notes:**  
Do not allow material to be released to the environment without proper governmental permits.  
Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.

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Avoid transfer into the environment.  
**Results of PBT and vPvB assessment**  
**PBT:** Not applicable.  
**vPvB:** Not applicable.  
**Other adverse effects** No further relevant information available.

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**13 Disposal considerations**

**Waste treatment methods**  
**Recommendation** Consult state, local or national regulations to ensure proper disposal.  
**Uncleaned packagings:**  
**Recommendation:** Disposal must be made according to official regulations.

**14 Transport information**

<b>UN-Number</b> <b>DOT, IMDG, IATA</b>	UN3181
<b>UN proper shipping name</b> <b>DOT</b>	Metal salts of organic compounds, flammable, n.o.s. (Hafnium(IV) isopropoxide isopropanol complex)
<b>IMDG, IATA</b>	METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S. (Hafnium(IV) isopropoxide isopropanol complex)
<b>Transport hazard class(es)</b> <b>DOT</b>	
	
<b>Class</b> <b>Label</b> <b>Class</b>	4.1 Flammable solids, self-reactive substances and solid desensitised explosives. 4.1 4.1 (F3) Flammable solids, self-reactive substances and solid desensitised explosives
<b>Label</b> <b>IMDG, IATA</b>	4.1
	
<b>Class</b> <b>Label</b>	4.1 Flammable solids, self-reactive substances and solid desensitised explosives. 4.1
<b>Packing group</b> <b>DOT, IMDG, IATA</b>	III
<b>Environmental hazards:</b>	Not applicable.
<b>Special precautions for user</b>	Warning: Flammable solids, self-reactive substances and solid desensitised explosives F-A,S-I Heavy metals and their salts (including their organometallic compounds)
<b>EMS Number:</b> <b>Segregation groups</b>	
<b>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</b>	Not applicable.
<b>Transport/Additional information:</b>	
<b>DOT</b> <b>Marine Pollutant (DOT):</b>	No
<b>UN "Model Regulation":</b>	UN3181, Metal salts of organic compounds, flammable, n.o.s. (Hafnium(IV) isopropoxide isopropanol complex), 4.1, III

**15 Regulatory information**

**Safety, health and environmental regulations/legislation specific for the substance or mixture**  
**GHS label elements** The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)  
**Hazard pictograms**



GHS02 GHS07

**Signal word** Warning  
**Hazard statements**  
H228 Flammable solid.  
H315 Causes skin irritation.  
H319 Causes serious eye irritation.  
H335 May cause respiratory irritation.  
**Precautionary statements**  
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
P280 Wear protective gloves.  
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**National regulations**  
This product is not listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. Use of this product is restricted to research and development only. This product must be used by or directly under the supervision of a technically qualified individual as defined by TSCA. This product must not be used for commercial purposes or in formulations for commercial purposes.  
**SARA Section 313 (specific toxic chemical listings)** Substance is not listed.  
**California Proposition 65**  
**Prop 65 - Chemicals known to cause cancer** Substance is not listed.  
**Prop 65 - Developmental toxicity** Substance is not listed.  
**Prop 65 - Developmental toxicity, female** Substance is not listed.  
**Prop 65 - Developmental toxicity, male** Substance is not listed.  
**Information about limitation of use:** For use only by technically qualified individuals.  
**Other regulations, limitations and prohibitive regulations**  
**Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.** Substance is not listed.

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**The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.**  
Substance is not listed.  
**Annex XIV of the REACH Regulations (requiring Authorisation for use)** Substance is not listed.  
**Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/23/2015 / -

Abbreviations and acronyms:

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)

ICAO: International Civil Aviation Organization

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

CAS: Chemical Abstracts Service (division of the American Chemical Society)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

USA