



MATERIAL SAFETY DATA SHEET  
COMPLIES WITH 29 CFR 1910.1200.  
OSHA HAZARD COMMUNICATION RULE

DATE OF LAST REVISION: 06-16-97

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## CHEMICAL IDENTITY

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LABEL IDENTITY	<b>HAFNIUM OXIDE</b>
CHEMICAL NAME/SYNONYMS	<b>HAFNIUM DIOXIDE, HAFNIA</b>
FORMULA	<b>HfO<sub>2</sub></b>
CALCULATED MOLECULAR WEIGHT	<b>210.49</b>
CHEMICAL FAMILY	<b>METAL OXIDE</b>
CAS REGISTRY NUMBER	<b>12055-23-1</b>
HAZARDOUS INGREDIENTS	<b>HAFNIUM OXIDE</b>
%: <b>100</b>	TLV: <b>0.5mg/m<sup>3</sup> (as Hf)</b> OSHA/PEL: <b>0.5 mg (Hf) / m<sup>3</sup></b>

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## PHYSICAL AND CHEMICAL PROPERTIES

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COLOR, FORM AND ODOR	<b>White powder, pieces and tablets, no odor</b>
BOILING POINT	<b>5400 C</b>
DENSITY (gm/cc)	<b>9.68 at 20°</b>
VAPOR PRESSURE @ 20°	<b>NA</b>
% VOLATILE BY VOLUME (%)	<b>NA</b>
REACTION WITH WATER	<b>None</b>
EVAPORATION RATE (H <sub>2</sub> O=1)	<b>NA</b>
SOLUBILITY IN WATER	<b>Insoluble</b>
MELTING POINT	<b>2758 C</b>

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## FIRE AND EXPLOSION HAZARD DATA

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FLASH POINT	<b>NA</b>
AUTOIGNITION TEMPERATURE (°C)	<b>NA</b>
FLAMMABILITY	<b>Non-flammable</b>
EXTINGUISHING MEDIA	<b>NA (Use suitable extinguishing agent for Surrounding materials and type of fire)</b>
SPECIAL FIRE FIGHTING PROCEDURES	<b>Wear a self-contained breathing apparatus and full protective clothing to prevent contact with skin and eyes. Fumes from fire are hazardous. Isolate runoff to prevent environmental pollution.</b>
UNUSUAL FIRE & EXPLOSION HAZARDS	<b>None recorded</b>



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### HEALTH HAZARD INFORMATION

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TOXICITY DATA      **\*no data on this compound\***      **Hf data:** unk-mus LD50: **76mg/kg**

HMIS RATING:

HEALTH: **1**    FLAMMABILITY: **0**    REACTIVITY: **0**    PERSONAL PROTECTION: **B**

ROUTES OF ENTRY

INHALATION:      **Yes**  
SKIN:              **Yes**  
INGESTION:       **Yes**  
EYES:              **Yes**

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:      **None**

EFFECTS OF OVEREXPOSURE (acute and chronic):

INHALATION: **May cause irritation to the nose, throat and mucous membranes.**  
INGESTION: **Considered to be non-toxic due to poor absorption in the alimentary Tract of mammals. Chronic – May cause damage to the liver.**  
DERMAL: **May cause irritation, redness and itching.**  
EYE: **May cause irritation, redness, itching and watering.**  
TARGET ORGANS: **Liver**

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CARCINOGENICITY: **None**    NTP: **No**    IARC MONOGRAPHS: **No**    OSHA REGULATE: **No**

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EMERGENCY FIRST AID PROCEDURES:

INGESTION: **Administer 1-2 glasses of water or milk to induce vomiting**  
INHALATION: **Remove to fresh air, administer oxygen if breathing is difficult**  
SKIN CONTACT: **Brush material off skin, wash affected area with soap and water**  
EYE CONTACT: **Flush eyes for at least 15 minutes with lukewarm water**

**SEEK MEDICAL ATTENTION IMMEDIATELY FOR ALL CONDITIONS MENTIONED ABOVE**

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### REACTIVITY DATA

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STABILITY

**Stable**

CONDITIONS CONTRIBUTING TO INSTABILITY

**None**

INCOMPATIBILITY (MATERIALS TO AVOID)

**None recorded**

HAZARDOUS DECOMPOSITION PRODUCTS

**None recorded**

HAZARDOUS POLYMERIZATION

**Will Not Occur**

CONDITIONS TO AVOID

**None**



## HAFNIUM OXIDE MATERIAL SAFETY DATA SHEET

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### SAFE HANDLING AND USE

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#### STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Wear appropriate respiratory and protective equipment specified in section VIII-control measures. Isolate spill area and provide ventilation. Vacuum up spill using a 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.**

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### SPECIAL PROTECTIVE INFORMATION

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RESPIRATORY PROTECTION	<b>NIOSH approved dust-mist-fume cartridge respirator</b>
LOCAL EXHAUST	<b>Maintain below TLV for Hf</b>
MECHANICAL (general)	<b>Recommended</b>
SPECIAL	<b>NA</b>
OTHER	<b>NA</b>
PROTECTIVE GLOVES	<b>Rubber gloves</b>
EYE PROTECTION	<b>Safety glasses</b>
OTHER PROTECTIVE EQUIPMENT	<b>Wear protective clothing to prevent contamination of skin and clothes</b>

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### SPECIAL PRECAUTIONS

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#### PRECAUTIONS TO BE TAKEN IN HANDLING/STORAGE:

**None**

TRANSPORTATION REQUIREMENTS	DOT CLASS:	<b>Not Classified</b>
	UN NUMBER:	<b>NC</b>
	IMCO CLASS:	<b>NC</b>
	OTHER:	

#### PRECAUTIONARY LABELING

**Store in cool dry area. Store in tightly sealed container. Wash thoroughly after handling.**

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THE ABOVE INFORMATION IS ACCURATE TO THE BEST OF OUR KNOWLEDGE. HOWEVER, SINCE DATA, SAFETY STANDARDS AND GOVERNMENT REGULATIONS ARE SUBJECT TO CHANGE THE CONDITIONS OF HANDLING AND USE, OR MISUSE ARE BEYOND OUR CONTROL, **ANGSTROM SCIENCES** MAKE NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR THE RELIANCE THEREON. USER SHOULD SATISFY HIMSELF THAT HE HAS ALL CURRENT DATA RELEVANT TO HIS PARTICULAR USE.

**NA= NOT APPLICABLE**

**ND= NO DATA FOUND**