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MATERIAL SAFETY DATA SHEET

Section 1- PRODUCT IDENTIFICATION

COMPOSITION Hf	PRODUCT NAME Hafnium
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Section 2- HAZARDOUS INGREDIENTS

Note: Products under normal conditions do not represent an inhalation, ingestion or contact health hazard.

MATERIAL OR COMPONENT	CAS NUMBER	WT%	EXPOSURE LIMITS
			OSHA PEL (Mg/M3) ACGIH TLV(MG/M3)
Hf	7440-58-6		TWA=0.5mg/m³

Section 3- PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS) <input type="checkbox"/> Liquid <input type="checkbox"/> Solid <input type="checkbox"/> Gas <input type="checkbox"/> Other	APPEARANCE AND ODOR Similar to stainless steel
MELTING POINT (BASE METAL): 2227°C	SPECIFIC GRAVITY: 13.3

Section 4- FIRE AND EXPLOSION

Flash Point (Method Used) N/A	Flammable Limits N/A	LEL	UEL
EXTINGUISHING MEDIA Type D fire extinguisher. Dry table salt.			
SPECIAL FIRED FIGHTING PROCEDURES & UNUSUAL FIRE AND EXPLOSION HAZARDS See Attached List			

Section 5- REACTIVITY DATA

STABILITY Stable	INCOMPATIBILITY (MATERIALS TO AVOID) See Attached List
CONDITIONS TO AVOID Keep away from source of ignition.	
HAZARDOUS DECOMPOSITION PRODUCTS Will not occur.	

Section 6- HEALTH HAZARD GUIDE

MAJOR EXPOSURE HAZARD <input type="checkbox"/> Inhalation <input type="checkbox"/> Skin <input type="checkbox"/> Skin Absorption <input type="checkbox"/> Eye Contact <input type="checkbox"/> Ingestion
EFFECTS OF OVEREXPOSURE TOXICITY DATA: Hafnium metal has no known toxicity. The metal is completely insoluble in water, saline solutions or body chemicals. COMMENT: Soluble hafnium compounds have been reported to cause liver damage in lab tests on animals. The Ld50 of hafnium chiefly as the oxychloride was 76 mg/kg for mice. A 90 day hafnium chloride feeding study in rats at 1.0% and 0.1% resulted in unspecified liver effects. No industrial disease has been evident with up to 20 years exposure to hafnium compounds.

EMERGENCY & FIRST AID PROCEDURES

SKIN CONTACT: Normal procedure for cuts from sharp metals.

EYE CONTACT: Normal procedure for inert foreign objects.

Section 7- SPILL OR LEAK PROCEDURES

SPILL OR LEAK PROCUDRES

No special procedures indicated

WASTE DISPOSAL METHODS

Fine non-recyclable scrap should be burned in small quantities under controlled conditions. Resultant hafnium oxide can be deposited in a landfill.

Section 8- SPECIAL PROTECTION

RESPIRATORY

Wear appropriate NIOSH approved respirator while conducting operations such as surface grinding which will generate dust.

VENTILATION

Normal

EYE PROTECTION & PROTECTIVE CLOTHING

Eye protection is recommended when surface grinding which will generate flying particles. Use gloves to avoid cuts.

Section 9- SPECIAL PRECAUTIONS

Machining of hafnium may result in fine turnings, chips and/or dust. Any material with a dimension of less than 0.0235" or a cross section less than 0.0078" can be ignited and can sustain combustion. Keep away from any source of ignition. Keep fine turnings completely dry, or very wet. If wet, the water content should be more than 25% by weight for maximum safety in handling. Severe explosions can result from ignition of hafnium powder or machining fines containing moisture in the concentration range of 5-10%. Do not accumulate large quantities of fines or machining residues. Dispose of materials immediately.

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ATTACHED LIST (Hf)

FIREFIGHTING PROCEDURES:

Isolate burning material. It is advisable to allow large fires to burn out, keeping the fire from spreading. Wear reflective heat resistant suit. Small fires can be controlled by smothering with dry salt or using Type D dry powder fire extinguishing material.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Do not spray water on burning fines, chips, powder or sponge as a violent explosion may result. This hazard increases with finer particles. If a fire starts in a mass of wet metal fines, such as a barrel of damp machining chips; the initial fire may be followed by an explosion and a very high temperature flash radiation. Therefore, when in doubt, personnel should retire and not attempt to extinguish the fire. The explosive characteristic of such material is caused by the hydrogen and steam generated by the burning mass. Carbon dioxide is not effective in extinguishing burning hafnium.