Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THECOMPANY/UNDERTAKING

Product Identifier

Perihalan Produk: **Hafnium standard solution, 1 mg/ml Hf in 5% HF**
Product Description: **Hafnium standard solution, 1 mg/ml Hf in 5% HF**
Cat No. : 196010000; 196011000
Synonyms Hydrofluoric acid solution; Fluohydric acid; Fluoric acid

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

Recommended Use Laboratory chemicals.
Uses advised against No Information available

Company

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SECTION 2: HAZARDS IDENTIFICATION

Classification of the substance or mixture

Substances/mixtures corrosive to metal	Category 1 (H290)
Acute oral toxicity	Category 3 (H301)
Acute dermal toxicity	Category 2 (H310)
Acute Inhalation Toxicity - Vapors	Category 3 (H331)
Skin Corrosion/Irritation	Category 1 B (H314)
Serious Eye Damage/Eye Irritation	Category 1 (H318)

Label Elements

Signal Word **Danger**

Hazard Statements
H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H301 - Toxic if swallowed
H310 - Fatal in contact with skin
H331 - Toxic if inhaled

Precautionary Statements
Prevention
P262 - Do not get in eyes, on skin, or on clothing
P234 - Keep only in original packaging
P264 - Wash face, hands and any exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P284 - Wear respiratory protection
Response
P310 - Immediately call a POISON CENTER or doctor
P331 - Do NOT induce vomiting
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
P304 + P340 - IF INHALED: Remove person to fresh air and keep 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
P330 - Rinse mouth
P390 - Absorb spillage to prevent material damage
P362 + P364 - Take off contaminated clothing and wash it before reuse
Storage
P406 - Store in corrosion resistant polypropylene container with a resistant inliner
P405 - Store locked up
P402 - Store in a dry place
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
Disposal
P501 - Dispose of contents/ container to an approved waste disposal plant

Other Hazards

This product does not contain any known or suspected endocrine disruptors

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No	Weight %
Hafnium	7440-58-6	0.01
Hydrogen fluoride	7664-39-3	5
Water	7732-18-5	94.99

SECTION 4: FIRST AID MEASURES

Description of first aid measures

General Advice
Immediate and specialised first aid and medical treatment is required. Speed is of the essence. Flush with plenty of water immediately. Continue flushing during transport to hospital or medical center.

Eye Contact
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required. Dermal burns may be treated with calcium gluconate gel or slurry in water or glycerine. This compound binds the active fluorides in an insoluble form and limits burn extension and pain. Soaking or immersion with iced 0.13% Benzalkonium chloride solution may be used for skin burns and should be continued until the pain is relieved. Do not use in eyes.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Inhalation If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove to fresh air. Immediate medical attention is required. A nebulized solution of 2.5% Calcium gluconate may be administered with Oxygen by inhalation.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Most important symptoms and effects, both acute and delayed

Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation.

Indication of any immediate medical attention and special treatment needed

Notes to Physician This product contains hydrogen fluoride. Generous application of calcium gluconate gel to the affected skin may be indicated. For dermal exposure, the use of 2.5-33% calcium gluconate or carbonate gel or slurry has been recommended. The gel is either placed into a surgical glove into which the affected extremity is then placed or applied directly on the burn. This compound binds with the active fluorides in an insoluble form and limits burn extension and pain. Calcium chloride should not be used. Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing media

Suitable Extinguishing Media

Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Extinguishing media which must not be used for safety reasons

No information available.

Special hazards arising from the substance or mixture

The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products

Gaseous hydrogen fluoride (HF).

Advice for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Environmental precautions
Should not be released into the environment.

Methods and Material for Containment and Cleaning Up
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

Reference to Other Sections
Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling
Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Conditions for Safe Storage, Including any Incompatibilities
Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Do not store in metal containers.

Specific End Uses
Use in laboratories.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Component	Malaysia	ACGIH TLV	OSHA PEL
Hafnium		TWA: 0.5 mg/m³	(Vacated) TWA: 0.5 mg/m³ TWA: 0.5 mg/m³
Hydrogen fluoride		TWA: 0.5 ppm TWA: 2.5 mg/m³ Ceiling: 2 ppm Skin	(Vacated) TWA: 3 ppm (Vacated) TWA: 2.5 mg/m³ (Vacated) STEL: 6 ppm TWA: 3 ppm

Component	European Union	The United Kingdom	Germany
Hydrogen fluoride	TWA: 1.8 ppm (8h) TWA: 1.5 mg/m³ (8h) STEL: 3 ppm (15min) STEL: 2.5 mg/m³ (15min)	STEL: 3 ppm 15 min STEL: 2.5 mg/m³ 15 min TWA: 1.8 ppm 8 hr TWA: 1.5 mg/m³ 8 hr	TWA: 1 ppm (8 Stunden). AGW - exposure factor 2 TWA: 0.83 mg/m³ (8 Stunden). AGW - exposure factor 2 TWA: 1 mg/m³ (8 Stunden). AGW - exposure factor 4 TWA: 1 ppm (8 Stunden). MAK TWA: 0.83 mg/m³ (8 Stunden). MAK TWA: 1 mg/m³ (8 Stunden). MAK Höhepunkt: 2 ppm Höhepunkt: 1.66 mg/m³ Haut

Exposure Controls
Engineering Measures
Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations

and safety showers are close to the workstation location.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection	Goggles
Hand Protection	Protective gloves
Skin and body protection	Long sleeved clothing

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators
Recommended Filter type:	Acid gases filter Type E Yellow conforming to EN14387 Particulates filter conforming to EN 143 To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly When RPE is used a face piece Fit Test should be conducted

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice

Environmental exposure controls No information available

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Colorless	
Physical State	Liquid	
Odor	pungent	
Odor Threshold	No data available	
pH	< 1.0	
Melting Point/Range	-35 °C / -31 °F	
Softening Point	No data available	
Boiling Point/Range	105 °C / 221 °F	
Flash Point	No information available	**Method -** No information available
Evaporation Rate	No data available	
Flammability (solid,gas)	Not applicable	Liquid
Explosion Limits	No data available	
Vapor Pressure	No data available	
Vapor Density	2.21	(Air = 1.0)
Specific Gravity / Density	1.15-1.20	
Bulk Density	Not applicable	Liquid

Water Solubility	Miscible
Solubility in other solvents	No information available

Partition Coefficient (n-octanol/water)

Component	**log Pow**
Hydrogen fluoride	-1.4

Autoignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No information available
Oxidizing Properties	No information available

SECTION 10: STABILITY AND REACTIVITY

Reactivity

None known, based on information available.

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	Corrosive to metals. Contact with metals may evolve flammable hydrogen gas.

Conditions to Avoid

Incompatible products. Excess heat.

Incompatible Materials

Metals. Cyanides. Sulfides. Bases. Fluorine.

Hazardous Decomposition Products

Gaseous hydrogen fluoride (HF).

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects

Product Information

(a) acute toxicity;

Oral	Category 3
Dermal	Category 2
Inhalation	Category 3

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hydrogen fluoride	-	-	LC50 = 0.79 mg/L (Rat) 1 h
Water	-	-	-

(b) skin corrosion/irritation; Category 1 B

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; Based on available data, the classification criteria are not met

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation.

Endocrine Disrupting Properties Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity effects Do not empty into drains. .

Component	Freshwater Fish	Water Flea	Freshwater Algae	Microtox
Hydrogen fluoride	LC50 = 660 mg/L, 48h (Leuciscus idus)	EC50 = 270 mg/L, 48h (Daphnia species)		

Persistence and degradability
Persistence Soluble in water, Persistence is unlikely, based on information available, Miscible with water.
Degradability Not relevant for inorganic substances.

Bioaccumulative potential Bioaccumulation is unlikely

Component	log Pow	Bioconcentration factor (BCF)
Hydrogen fluoride	-1.4	No data available

Mobility in soil The product is water soluble, and may spread in water systems. Will likely be mobile in the environment due to its water solubility. Highly mobile in soils.

Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors

Other adverse effects No information available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from Residues/Unused Products Waste is classified as hazardous Dispose of in accordance with the European Directives on waste and hazardous waste Dispose of in accordance with local regulations

Contaminated Packaging Dispose of this container to hazardous or special waste collection point.

Other Information Waste codes should be assigned by the user based on the application for which the product was used Do not empty into drains Do not flush to sewer Large amounts will affect pH and harm aquatic organisms Solutions with low pH-value must be neutralized before discharge

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

UN-No	UN1790
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	II
Proper Shipping Name	HYDROFLUORIC ACID

Road and Rail Transport

UN-No	UN1790
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	II
Proper Shipping Name	HYDROFLUORIC ACID

IATA

UN-No	UN1790
Hazard Class	8
Subsidiary Hazard Class	6.1
Packing Group	II
Proper Shipping Name	HYDROFLUORIC ACID

Special Precautions for User No special precautions required

SECTION 15: REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories X = listed

Component	EINECS	TSCA	DSL	PICCS	ENCS	ISHL	IECSC	AICS	KECL
Hafnium	231-166-4	X	X	X	X		-	-	KE-18170
Hydrogen fluoride	231-634-8	X	X	X	X	X	X	X	KE-20198
Water	231-791-2	X	X	X	X		X	X	KE-35400

Component	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Hydrogen fluoride				Annex I - Y34

National Regulations

Persistent Organic Pollutant This product does not contain any known or suspected substance
Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 16: OTHER INFORMATION

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
POW - Partition coefficient Octanol:Water

TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code
OECD - Organisation for Economic Co-operation and Development
BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
ATE - Acute Toxicity Estimate
VOC - (Volatile Organic Compound)

Key literature references and sources for data
https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Revision Date 21-Mar-2025
Revision Summary Not applicable.

In accordance with local and national regulations: Occupational Safety and Health

(Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013

Disclaimer

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End of Safety Data Sheet