

Revision 7
Revision Date: 17 Jan 2012

1. IDENTIFICATION

PRODUCT NAME:

Xenon Difluoride

CHEMICAL FORMULA:

XeF₂

PRODUCT USE:

Etchant in MEMS processing

COMPANY NAME:

Pelchem (Pty) Ltd

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2. HAZARD IDENTIFICATION

◆ OXIDIZER II, CORROSIVE III

◆ GHS CLASSIFICATION



Oxidizer



Harmful



Respiratory sensitizer

Signal Word:

DANGER

Hazard Statements:

May intensify fire; oxidizer.

Harmful if swallowed / skin contact / inhaled.

Causes mild skin irritation. Causes eye irritation.

May cause breathing difficulty if inhaled.

Harmful to aquatic life.

Precautionary statements:

Keep away from heat / sparks/ open flames / hot surfaces.

Keep / store away from clothing / combustible materials.

Avoid contact with any liquid organic / combustible cellulose materials.

Wear protective gloves / protective clothing / eye protection / face protection.

Do not eat, drink or smoke when handling this product.

Avoid breathing dust / mist / vapour.
In case of inadequate ventilation wear respiratory equipment.
Avoid release to the environment.

Supplementary information:

Strong Oxidizer with pungent ozone like smell.
Subliming solid at sub / atmospheric pressure at ambient temperature.
Reacts with moisture in air to form hydrogen fluoride.
Soluble in water and hydrolyzes to form hydrofluoric acid.
Solid product combusts cellulose materials: ie paper.
Solid reacts violently with organic materials: ie alcohol, acetone.
Handle solid product only in glove box or fume cupboard.

Emergency and Disposal

Leaking containers must be sealed in Plastic outer bag.
Dispose of by dissolving in water / acidic solution & neutralize
Dispose of residue according to local chemical disposal site- return to supplier for cylinder and product recycle.
In case of fire use Water only, do **NOT** use CO₂ or Organic agents.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME:

Xenon Difluoride >99.9%

SYNONYMS:

Xenon fluoride (XeF₂);
Xenon difluoride (XeF₂);
Xenon (II) fluoride (F₂Xe)

UN No:

UN3085

CAS-No:

13709-36-9

4. FIRST AID MEASURES

◆ INHALATION:

Remove to fresh air and keep at rest in comfortable position.
If experiencing respiratory symptoms, call a doctor / physician.
Apply artificial respiration (rescue breathing) if needed. Get medical attention.

◆ SKIN CONTACT:

Remove contaminated clothing, jewelry, and shoes immediately.
Wash hands thoroughly after handling.
If skin irritation occurs: wash with plenty of soap and water until no evidence of chemical remains (at least 15-20 minutes).
Get medical attention, if needed. The use of calcium gluconate gel is advised.

◆ EYE CONTACT:

Remove contact lenses, rinse cautiously with water or normal saline solution, keeping eyes wide open for several minutes.
If eye irritation persists, get medical advice / attention.

◆ **INGESTION:**

If swallowed call doctor / physician if you feel unwell.
Rinse mouth, do not induce vomiting.
If vomiting occurs, keep head lower than hips to help prevent aspiration.

◆ **FIRST AID RESPONDERS**

Wear protective gloves / protective clothing / eye protection / face protection.

5. FIRE-FIGHTING MEASURES

◆ **FIRE AND EXPLOSION HAZARD:**

Negligible fire hazard. The product itself does not burn.
Ignites on contact with combustible materials: ie cellulose.
Reacts explosive if solid comes into contact with liquid organic materials: ie alcohol, acetone.
Decomposes into Xenon and Fluorine gas at temperatures >500 °C.

◆ **EXTINGUISHING MEDIA**

Use Water only.
Do not use dry chemical, carbon dioxide or halogenated extinguishing agents.

◆ **FIREFIGHTING**

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out.
Large fires, flood with water. Apply water from a protected location or from a safe distance.
Wear protective gloves / protective clothing / eye protection / face protection / respiratory protection.

6. ACCIDENTAL RELEASE MEASURES

◆ **PERSONAL PRECAUTIONS**

Wear protective gloves / protective clothing / eye protection / face protection / respiratory protection.
Use self-contained breathing apparatus.
Avoid contact with combustible materials. Do not touch spilled material. Avoid breathing dust.
Keep unnecessary people away, isolate hazard area and deny entry.

◆ **OCCUPATIONAL SPILLS / LEAKS**

Seal leaking cylinder in plastic bag and store in outer drum. Use alkaline chemical absorbent as prevention in outer drum. Call Pelchem emergency response and return container to Pelchem.
Spills: Move containers away from spill to a safe area. Hydrolyze with water and neutralize with alkaline solution.

◆ **ENVIRONMENTAL PRECAUTIONS**

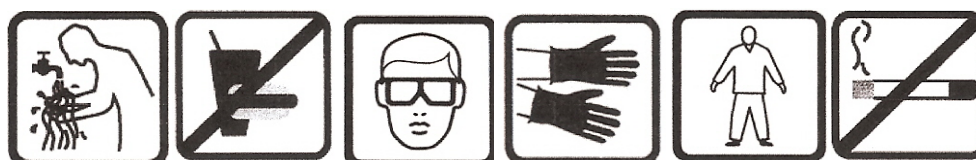
Avoid release of neutralized residue to natural water courses or environment.

◆ **CLEANING UP**

Neutralize / hydrolyze spilled product with water / acid solution, neutralize residue and dispose to an approved landfill site.

7. HANDLING AND STORAGE

Store sealed containers in a well ventilated warehouse.
NFPA 430 Code for the Storage of Liquid and Solid Oxidizing Materials.
Handle product in dry inert atmosphere (fume cupboard / glove box) only.
Avoid contact with incompatible materials (cellulose and organic liquids).
Do not store product in glass containers.
Handle cylinders according to safe gas cylinder practices (CGA, EIGA, AIGA).
Eating, drinking and smoking in work areas is prohibited.
Wash hands after use.
Remove contaminated clothing and protective equipment before entering eating areas.



8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

◆ EXPOSURE LIMITS:

Xenon Difluoride as Fluoride: 2.5 mg/m³ OSHA TWA 2.5 mg/m³ ACGIH TWA 2.5 mg/m³ NIOSH recommended TWA 10 hour(s) 2.5 mg (F)/m³ UK OES.

TWA MEASUREMENT METHOD: Treated pad with pre-filter (with special coating); Reagent; Ion-specific electrode; NIOSH III # 7902, Fluorides.

◆ VENTILATION:

Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

◆ EYE PROTECTION:

Wear splash resistant safety goggles or full face protection.

Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

◆ CLOTHING:

Wear impervious chemical resistant clothing.

◆ HAND PROTECTION:

Wear impervious chemical resistant gloves.

◆ RESPIRATOR:

For concentrations above exposure limits, use appropriate certified respirators.

For unknown concentrations or Immediately Dangerous to Life or Health – Any supplied-air respirator with full face piece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full-face piece.

9. PHYSICAL AND CHEMICAL PROPERTIES

- ◆ Physical state: Solid
- ◆ Color: White
- ◆ Physical form: Crystals
- ◆ Odor: Pungent
- ◆ Molecular weight: 169.29
- ◆ Molecular formula: XeF_2
- ◆ Boiling point: 114°C
- ◆ Melting point: 129°C
- ◆ pH: Not applicable
- ◆ Vapor pressure: 0.5 kPa (4 Torr) at 25°C
- ◆ Density: 4.32 kg/l
- ◆ Packaging density: 2.0 kg/l
- ◆ Water solubility: 25g/l at 0°C

10. STABILITY AND REACTIVITY

- ◆ **REACTIVITY:**
Stable under normal conditions.
Dissolves in water like sugar, resulting in solution of dilute hydrofluoric acid.
- ◆ **CONDITIONS TO AVOID:**
Avoid contact with combustible materials (cellulose / organic liquids).
Divert out of water supplies and sewers.
- ◆ **INCOMPATIBILITIES:**
Combustible materials, reducing agents, moist atmospheres, oils and grease.
Hydrolyses products: hydrogen fluoride.
- ◆ **POLYMERIZATION:**
Will not polymerize.

11. TOXICOLOGICAL INFORMATION:

Ingestion: LD 90 mg/kg: Species: Mouse

Inhalation: LC (2h) 445 mg/m³: Species: Mouse

Dermal: Skin irritant. No further data available.

Eyes: Mild eye irritant – does not cause irreversible effect.

Respiratory: Irritant to mucous membranes and respiratory tract.

Mutagenicity: Not considered a mutagen by comparison with other fluorides.

Carcinogenicity: Not considered a carcinogen by comparison with other fluorides.

Reproductive toxicity: Not considered a reproductive toxin by comparison with other fluorides.

Specific target organ toxicity: Respiratory irritant.

12. ECOLOGICAL INFORMATION:

Solubility in water 25% results in dilute hydrofluoric acid.

Harmful to aquatic life.

LC₅₀ fish: 50 ppm HF.

Biodegradability: No data available.

Bioaccumulation: Rapidly excretes through kidneys and urinal tract by comparison with other fluorides.

13. DISPOSAL CONSIDERATIONS

Leaking containers must be sealed in plastic outer bag.

Dispose of by dissolving in water / acidic solution & neutralize.

Dispose of residue according to local chemical disposal site- return to supplier for cylinder and product recycle.

14. TRANSPORT INFORMATION

UN ID: 3085
PROPER SHIPPING NAME: Oxidizing solid, corrosive, NOS
HAZARD CLASS OR DIVISION: 5.1 Sub Risk: 8
PACKING GROUP: II



- ◆ **LAND TRANSPORT ADR/RID:**
Oxidizing solid, corrosive, NOS
ADR/RID CLASS: 5.1 Sub Risk: 8
ITEM NUMBER: 27(b)
WARNING SIGN/LABEL: 5.1, 8
HAZARD ID NUMBER: 50

- ◆ **AIR TRANSPORT IATA/ICAO:**
CORRECT TECHNICAL NAME:
Oxidizing solid, corrosive, NOS
IATA/ICAO CLASS: 5.1, Sub Risk: 8

PACKAGING GROUP: II
LABEL: Oxidizer, Corrosive

PASSENGER AIRCRAFT:

1 kg per inner package / 5 kg maximum per outer package.

CARGO AIRCRAFT ONLY:

Combination packages: 5 kg per inner package / 25 kg maximum per outer package.
Single packages: 25 kg maximum per single package.

◆ **MARITIME TRANSPORT IMDG:**

Oxidizing solid, Corrosive NOS.
UN/ID NUMBER: UN 3085.
IMDG CLASS: 5.1 Sub Risk: 8.
PACKAGING GROUP: II.
EmS No.: 5.1-11 MFAG Table No.: 760.

15. REGULATORY INFORMATION

- | | |
|----------------------------------|--|
| ◆ USA TSCA Status | : Included on inventory. |
| ◆ Canada DSL | : Not included on inventory. |
| ◆ Australia AICS | : Included on inventory. |
| ◆ Japan ENCS | : Not included on inventory. |
| ◆ South Korea ECL | : Included on inventor. |
| ◆ China SEPA | : Not included on inventory. |
| ◆ OSHA (29 CFR 1910.1) | : Oxidizer, corrosive, toxic. |
| ◆ TSCA 12(b) export notification | : Not listed. |
| ◆ SARA Section 312 (40 CFR 370) | : Fire hazard / acute health hazard. |
| ◆ WHMIS Classification | : Not rated. |
| ◆ EU risk and safety phrases | : R 8-64 Contact with combustible material may cause fire. |

16. OTHER INFORMATION

NFPH & HMIS RATING

Health : 3

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

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Fire : 0
Instability : 2
Special : OX