Université du Québec à Trois-Rivières **Reference Program**	**Standard Operating Procedure** **Safe use of hydrofluoric acid**	**N° PON**: PON-SST-GMD-005 **Version number**: 01 **Departments and services:** Laboratories

Potential Risks:	Acute Toxicity, Oral (Class 2), Acute Toxicity, Inhalation (Class 2), Acute Toxicity, Dermal (Class 1), Skin Corrosion (Class 1A), Serious Eye Damage (Class 1)  Contact with the skin results in very painful deep burns that may take a long time to heal. In the case of dilute solutions (<50%), pain may appear after several hours only. It is therefore important to react very quickly to any contact, even to a dilute solution of HF. Unlike other strong acids such as HCl or H2SO4, hydrofluoric acid in its undissociated form easily penetrates the skin, damaging underlying tissues; the fluoride ion can then cause soft tissue destruction, decalcify bones, and cause arrhythmia or cardiac arrest. HF solutions and vapors can cause severe eye burns. Ten (10) to 15 ppm of HF vapors can irritate the eyes, skin, and respiratory tract. Exposure as short as five minutes to concentrations between 50 and 250 ppm can be fatal to humans.
Personal Protective Equipment (PPE)	**Mandatory**  **Gloves: nitrile under butyl rubber or neoprene gloves** Use of concentrated acid: wear vapor tight goggles, PVC/neoprene apron and/or sleeves.
Minimal equipment and materials required:	- Antidote: Calcium gluconate gel, 2.5%. - Chemical fume hood
Required training:	- WHMIS - Laboratory Safety - Specific training for the use of hydrofluoric acid: first aid and management of a hydrofluoric acid spill
Additional resources:	- Safety data sheet hydrofluoric acid

1. Description of the Preventive Measures

The safety instructions and procedures in effect at the UQTR must be respected by all people at the time of the intervention

Before you start

1. Make sure you have read the hydrofluoric acid SDS.
2. Complete a risk identification of your experiment to eliminate all risks and implement measures to control them.
3. Get your setup or experiment approved by your supervisor.
4. Order only the amount needed for your experiments.

⚠ **Caution:**

Use

1. Wear mandatory PPE.
2. Work under the chemical fume hood at all times. If unable to do so, consult hazardous materials management.
3. Keep the antidote, calcium gluconate, near the use of hydrofluoric acid at all times.

At the end of the experiments:

Use proper glove removal technique to avoid skin contact with the product (i.e., without touching the outer surface of the glove).

Wash and dry hands.

⚠ **Caution: never work alone when using hydrofluoric acid.**

Emergency measures

Accidental skin exposure:

Immediately remove contaminated clothing and shoes. Wash with soap and plenty of water. Immediately transport the victim to the hospital. **Seek immediate medical attention**. Following decontamination with water, more serious damage may occur due to penetration or absorption of the fluoride ion. Treatment should be aimed at binding the fluoride ion and counteracting the effects of exposure. Exposed skin can be treated with 2.5% calcium gluconate gel, applied repeatedly, until the burning sensation stops.

Accidental eye exposure:

Rinse immediately with water for at least 15 minutes. Remove contact lenses if worn.

Following any exposure to hydrofluoric acid (by skin, eye, ingestion or inhalation), the affected person should **immediately seek medical attention**. It is important to give the SDS to medical personnel.

Accidental spill:

Do not use sand to pick up the spill.

Refer to the UQTR spill management procedure.

In short:

Have the facility assessed and contact the Security Operations Centre

If you have a **respirator** with the appropriate cartridges and **all personal protective equipment**:
1-) Apply Trivorex (universal neutralizer) in a circular motion from the outside to the inside.
2-) Mix with the scraper.
3-) Add Trivorex until the mixture is neutralized (beige).
4-) Recover in a bag, identify well and ask for a collection to the hazardous materials management.

⚠ **Caution**: **If you are assisting someone who has been exposed to hydrofluoric acid, consider protecting yourself first.**

⚠ Because of the toxicity of the fluoride ion and its ability to migrate through the body, **it is important to react quickly** to hydrofluoric acid exposure.

Storage

⚠ **Caution:** Hydrofluoric acid is **not compatible with glass,** ceramics, cement and some metals. The reaction with some metals can even release highly flammable hydrogen gas**.**

Store hydrofluoric acid in polyethylene or Teflon containers. When storing, you can use a secondary polyethylene container to prevent leakage that could damage nearby cylinders.

2. Disposal of Waste and Hazardous Materials

Collect hydrofluoric acid waste in a container provided by Hazardous Materials Management, made of plastic. Be sure not to contaminate the sides of the container.

DO NOT use a glass container.

Identify the hazardous waste label.

Request a collection at: gmd@uqtr.ca

3. History of changes and approvals

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Date of change	Description of the change	Individuals involved	
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