

## MICRONOVA RULES

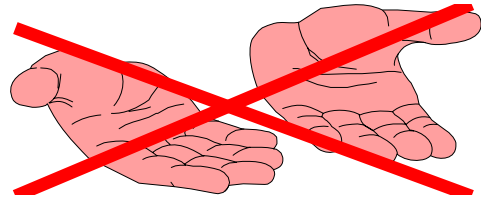
The University part of Micronova is open for students from 8.00 a.m. to 4.15 p.m. During mentioned time the main entry of the building is open. All other entries are always closed.

**NOTICE!!! When main door is closed, you can go out with code key only.**

## CLEAN ROOM RULES

- Only an authorised person can work in the clean room
- Work permit is given by Micro and Nanofabrication Centre
- Participants of laboratory courses are allowed to go into the clean room and out of the clean room with assistant only.
- Garments specified for a given facility must be worn by all personnel and students entering the clean room
- Never go outside of the clean room the clean room garments on
- No eating, smoking, or gum chewing

- Avoid rapid walking and quick motions that create turbulence
- Always use rubber or nitrile gloves
- Do not touch your faces with gloves
- Cosmetics are not allowed
- Only approved clean room compatible paper is allowed. There is suitable paper inside the clean room, do not take any notebooks with you.

**Forbidden items:**

Pencils, cardboard, expanded polystyrene, tissues

- Chemicals and equipment should bring into the clean room trough backside entry of the clean room. All bottles and items should clean by wiping with 20% IPA.
- You are allowed to bring smaller items like wafer boxes etc. when entering the clean room. Don't forget to clean them in the entry room.
- Handle chemicals only in wet benches or fume hoods.



- Always use goggles or face shield when handling chemicals
- There are all chemicals needed in the clean room. For usage of any other chemical you need permission of the Micro and Nanofabrication Centre.
- All operators as well as students should take care that the working areas, equipment and vessels are cleaned after their work.
- When using beakers or other chemical vessels, mark them carefully. Mark the name of used chemical, datum and your own initials.
- Clean the items which have been on the floor
- Do not use floor or table tops as storage
- When noticing **equipment failure** contact Micro and Nanofabrication Centre personnel
- When noticing water, exhaust, gas etc. failure contact immediately VTT emergency phone

• EMERGENCY PHONE 0 040 5274 840

### **HF and Ammonium Fluoride**

(Source: the Stanford University Clean Room manual)

**There are a lot of horror stories about HF. Take them seriously.**

**50 % HF solution** is considered very toxic (T+).

40 % Ammonium fluoride solution is considered toxic (T)

**Sioetch** contains HF and Ammonium fluoride is considered toxic (T)

(Sioetch = BOE = BHF)

However, any solution containing a source of free fluorine ions is also hazardous.

On contact, HF easily passes through skin and tissue. Because its action can be delayed for many hours (diluted solutions), it can distribute throughout the body. Negatively charged fluorine ions bind very easily to positively charged calcium and magnesium ions to form insoluble salts (CaF<sub>2</sub> and MgF<sub>2</sub> salts form some natural gemstones.) In the body, Ca and Mg ions are used to mediate a variety of physiological processes, such as muscle movement. Calcium is also a chief component in bone.

Local tissue damage (and the point of contact) results from free hydrogen ions which causes corrosive chemical burns and free fluorine ions which cause deep tissue damage including erosion of bone.

Systemic damage can occur when fluorine becomes distributed throughout the body. These conditions include hypocalcemia (loss of calcium) and hyperkalemia (too much potassium). Since calcium and potassium regulate the heart, irregular beating and cardiac arrest are manifestations. "Deaths have been reported from concentrated acid burns to as little as 2.5% BSA [body surface area exposed to skin contact]."

Calcium gluconate is used as an antidote. This provides extra calcium ions, which can scavenge free fluorine ions before they penetrate and damage tissue. In cases of skin contact, calcium gluconate gel must be applied immediately to the area of contact. In cases where systemic damage is a risk, calcium gluconate is administered by a healthcare professional in an injection.

**Pure hydrogen fluoride is an extremely toxic gas**, which very easily dissolves in water. "Hydrofluoric acid" describes this solution form. HF easily passes between gas and liquid phases; so HF- (and NH<sub>4</sub>F-) containing solutions will emit toxic fumes. Although lab safety precautions tend to emphasize protection against skin contact with fluoride-containing solutions, remember to avoid inhalation of the fumes by always working under fully exhausted areas of the wet benches.

## **HYDROFLUORIC ACID FIRST AID FOR SKIN CONTACT**

1. IMMEDIATELY rinse the contacted skin area with water, steadily being careful to wash the acid away from other parts of your body, especially finger/toe nails.
2. Remove all clothing exposed to the HF.
3. Continue rinsing at least for 1-2 minutes. Do NOT dry the skin.
4. Puncture the Calcium Gluconate Gel tube using the inverted tube cap.
5. Squeeze the Calcium Gluconate Gel on the contacted area; cover the entire area with gel.
6. Spread the gel, and gently massage it into the skin. Take the gel with you and continue to apply fresh gel now and then.
7. Go to Medivire or Jorvi or Meilahti to get medical help. Take the safety data sheet of HF with you.
8. Continue to apply fresh gel while en route to the health centre and while waiting to be treated.

**Calcium Gluconate Gel is NOT FOR USE IN THE EYES**

## **HYDROFLUORIC ACID FIRST AID FOR EYES**

Flush with water at least 15 min

Go immediately to Meilahti Silmäklinikka. Take the safety data sheet of HF with you.

Flush your eyes while en route to the health centre using eye wash bottle.

**EYE DAMAGES YOU CAN PREVENT BY USING GOGGLES OR FACE SHIELD**