NanoLab alarms and emergency situations

Make yourself familiar with the emergency exits and safety facilities in the NanoLab (Figure 1**).**

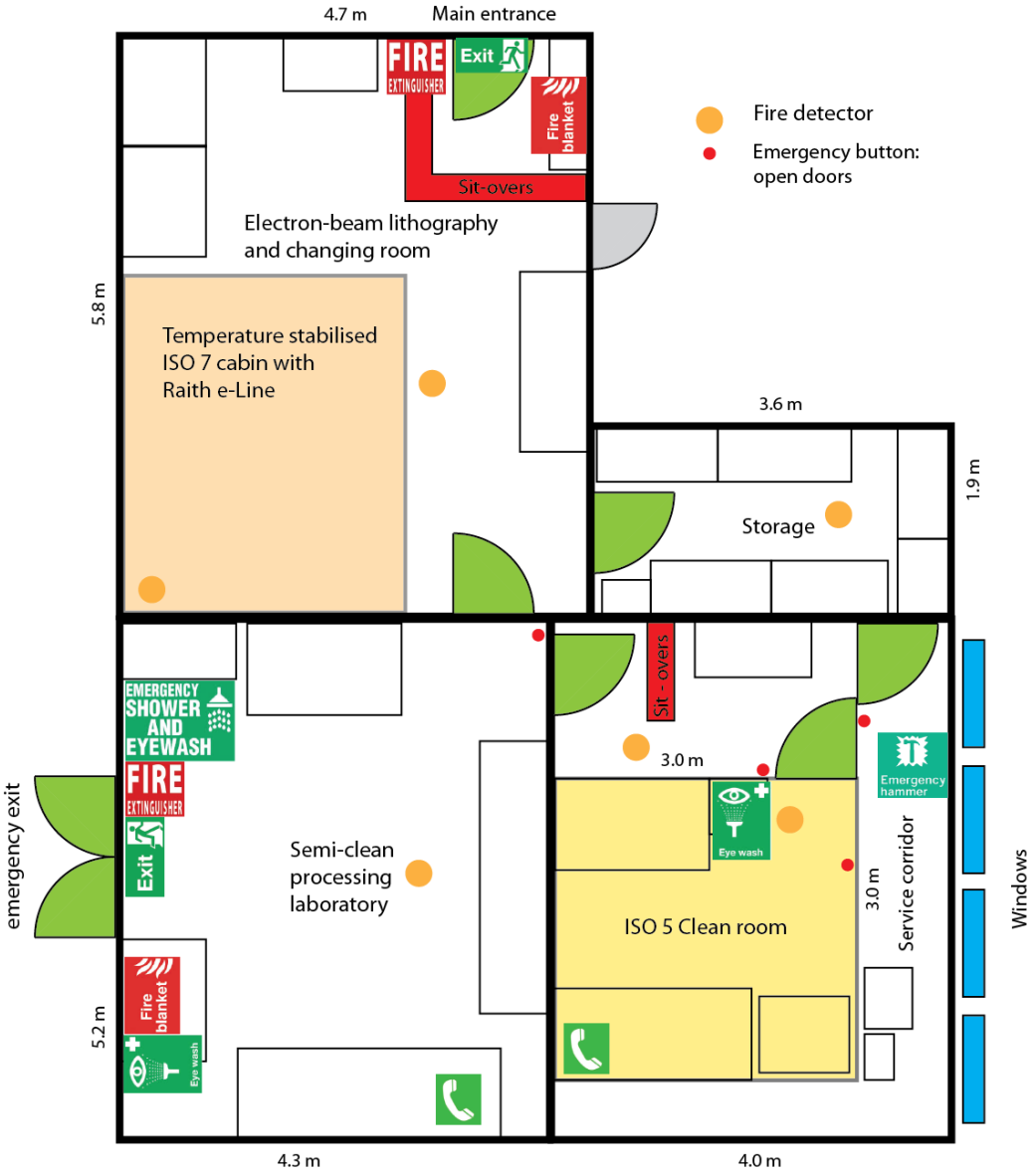

Figure 1: NanoLab: Emergency exits and safety facilities.

1. Power failure

Different power failure may appear in the laboratory. Check first if the whole laboratory (*e.g.* no lights and no ventilation) or if only a single instrument is affected.
All exits and emergency facilities (phone, eyewash, fire blankets, etc.) are shown Figure 1. Make yourself familiar with the safety precautions.

Different power failures may occur:

a. Instruments: DO NOT try to fix the problem!
b. Ventilation: Be aware of missing sounds - "silent laboratory" and leave the laboratory. The ventilation can stop working also when there are no other signs of a power failure *e.g.* lights are still on. When the power returns and the fume hood has been restarted, check that the airflow has been restarted and keep the sash down for at least 5 minutes to dispose any vapours accumulated in the hood.
c. Lights: Leave the laboratory by following the emergency exit signs mounted over the doors.
d. Main power failure: Leave the laboratory immediately by following the emergency exit signs.

For any power failure issues above, contact:
Martin Greve (+47 55 58 83 26) or Rachid Maad (+47 55 58 27 63).

2. Fire alarm

In case of a fire you HAVE TO leave the laboratory immediately. DO NOT waste time with shutting down machines and leave all your belongings.

There are two different exits as seen in Figure 1. Choose the safest and fasted way to leave the laboratory. In case of power failure, use the main entrance and leave the laboratory.

- If the fire alarm appears and you cannot use the normal lab entrance, use the emergency exit in the semi-clean processing laboratory.
- If the doors in the cleanroom/service corridor are looked, press the red buttons (see Figure 2) and the doors will open.

Figure 2: Emergency button to open the doors.

- If you are locked in the clean room or in the service corridor (behind the clean room) use the escape-hammer and destroy the window. Use the blanket to avoid injury when breaking the glass.
  ONLY use the escape-hammer if really necessary and there is no other safe way to leave the laboratory!

3. Cooling water (you do not hear an alarm!)

The main cooling water system is stored in the basement laboratory. The temperature is supposed to be 18 °C, which is the only temperature that is compatible with all the systems. The following systems make use of the cold water:
Temescal, Temescal cryopump, Plasmatherm main system, Plasmatherm heat exchanger, Plasmatherm mechanical pump, e-Line temperature stabilised cleanroom cabin.

This cooling water system has a pressure sensor and shuts down if a certain limit is reached. Note that the pressures and flows of the systems is different for each so that if anything is changed the whole system needs to be recalibrated. The highest pressure is needed by the Temescal, which needs a large flow of cold water to keep the evaporation source from overheating.
Additionally there is a second cooling system only supplying the e-Line (Raith). This cooling unit is situated in the storage room.

If you realise there is no cooling water (*e.g.* leaking water) contact **immediately** Martin Greve or Rachid Maad and shut down the machine if necessary. For shutting down see SOP's next to each machine.

4. Fume hood alarms

The fume hood located in the semi-clean room (room 268) is shown in Figure 3. HF antidote as well as alarm switches and storage place of the spill kit are emphasised.

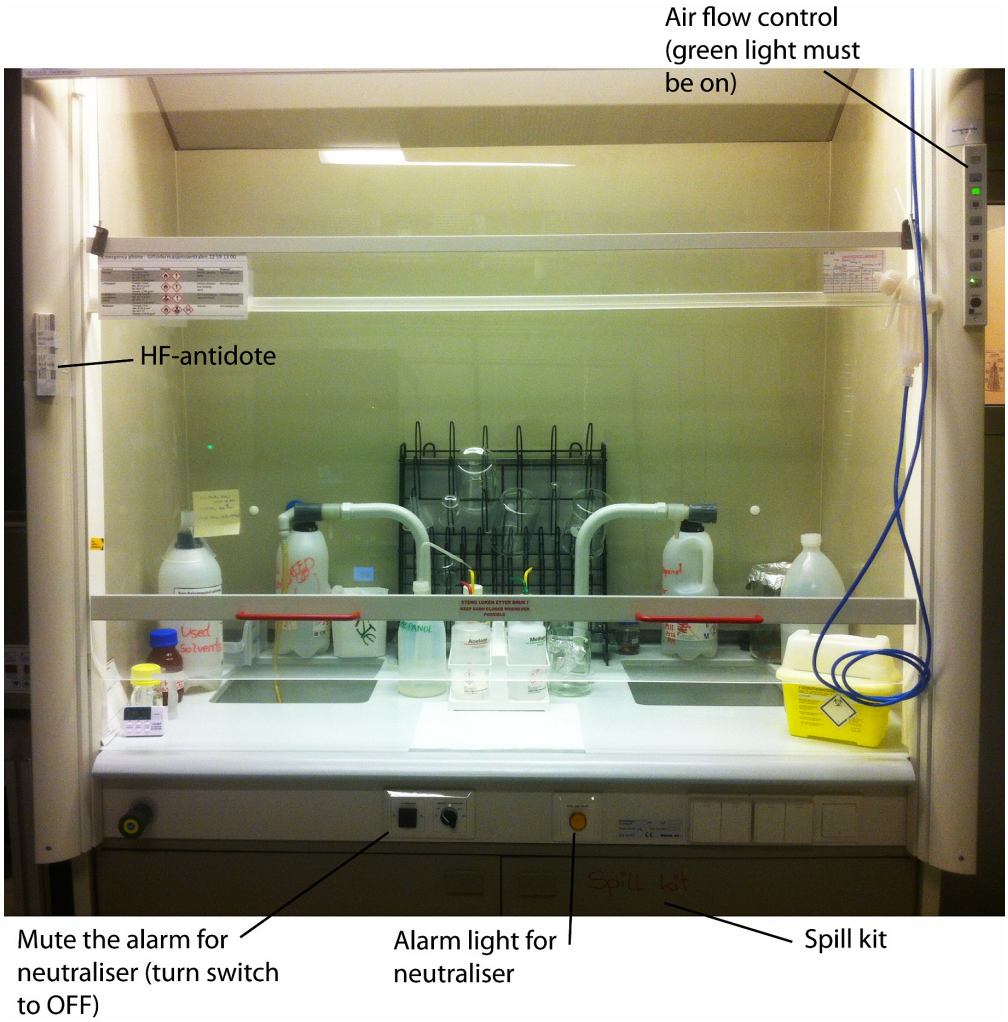

Figure 3: Fume hood in semi-clean room.

Two main alarms can appear:

a) Wastewater neutraliser:

If the following yellow light (Figure 4) is on no more wastewater should be sent through the drains of the sinks! The light will disappear, when the reservoir has been processed by the neutraliser (unit is stored in room 168), and is ready to be used again.

Figure 4: Warning light for neutralizer.

The neutraliser is the machine that neutralises acids and alkaline fluids going down the drains of the fume hood. It works by measuring the pH-value of the wastewater using an electrode and then it dispenses acids (hydrochloric acid) or

alkaline (sodium hydroxide) fluids in the wastewater proportionally to the measured pH-value. In this way it neutralises the wastewater.

Turn the switch to OFF to mute the alarm signal. After the yellow light disappears turn the switch back to ON.

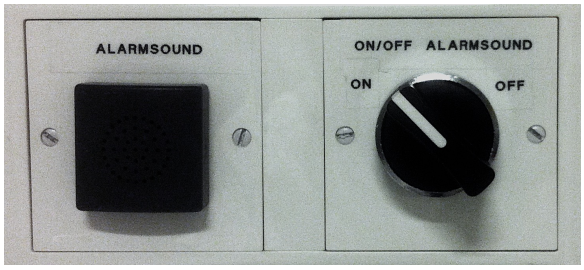

Figure 5: Neutraliser drainage alarm (ON/OFF).

b) Ventilation: Check always the airflow of the ventilation before you start using the fume hood. The vertical bar as seen in Figure 6 contains regulation units for the airflow. If there is a problem with the airflow, a beeping alarm sound will appear and the green light on the upper right changes to orange. If you recognise that the ventilation is not working, close the sash as far as possible and contact Martin Greve or Rachid Maad.

A piece of tissue is attached on the inside of the sash. It can be used an indicator, if there is airflow in the cabinet. If the fume hood has been restarted (after *e.g.* power failure), check that the airflow has been restored and keep the sash down for at least 5 minutes to dispose any vapours accumulated in the hood before any work is carried out inside.

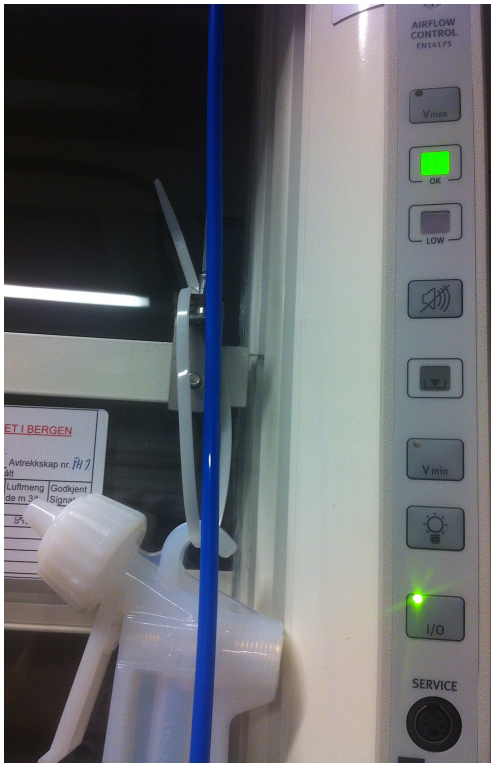

Figure 6: Airflow control panel.

FIRE in the fume hood

If a fire starts in the hood, pull the sash down (if it can be done safely). If the fire is small and you have been trained to use a fire extinguisher, do so. If the fire is large or there are flammable solvents in the hood, do not attempt to fight the fire. Evacuate the laboratory/building.

5. Air conditions/Ventilation

New air is let into the lab by two means, one from the central air condition in the institute supplying the part of the lab where the e-Line is situated. The second part of the lab is supplied from a standalone unit placed in the basement. This filters and controls the air for the second part of the lab including the cleanrooms. Additionally there are four air conditioners cooling the lab air. These are located in the storage room, one in each lab section and one in over the cleanroom cabin. These are operating when the green light is shining, as seen in Figure 7.

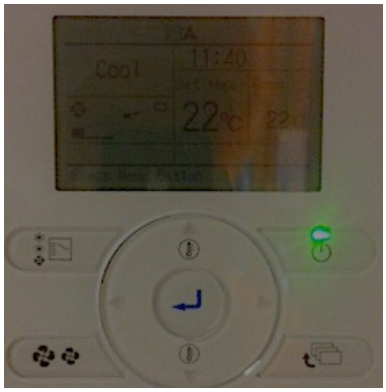

Figure 7: Air condition control panel.

The manual for the air condition can be found in the folder next to the main entrance door. A "quick manual" is mounted next to the control panels. If it is still not working contact Rachid or Martin.

The rooftop ventilator is regulated using a pressure sensor located just above the scrubber. The flow through the fume hood is regulated with the two ventilation flaps (ceiling room 268). The outer fume hoods flow is based on the sash position sensor, and the cleanroom fume hood is based on a flow sensor.

6. Pressurized Air

Pressurised air is supplied to the e-Line, the Plasmatherm and the Temescal tool. For the Plasmatherm the pressure is reduced to 6.0 bar (pressure reducer and gauge are placed in service corridor of cleanroom). The pressurised air is also supplied to the nitrogen generator. More details can be found in "SOP facilities". A folder with all SOP's can be found on the shelf next to the NanoLab entrance.