TOMCAT beamline orientation notes

The following beamline orientation notes for TOMCAT are intended as a quick reference. A personal beamline orientation administered by TOMCAT personnel is required for all user groups. Prior to conducting experiments at TOMCAT, each user group must complete and sign the facility's safety declaration form.

Facility Safety Information

Safety first!

The safety of users and staff has the highest priority for the Paul Scherrer Institut (PSI) in designing and conducting research and experiments. Therefore, **no work we do is so important that it needs to be done without assuring the proper safety measures!** PSI strictly requires that users and staff comply with all the institute's safety rules and regulations while working on the premises.

Stop work authority

Users and PSI personnel have "stop work authority": If you observe anyone doing work that is deemed unsafe or potentially unsafe, you have the **authority** and **obligation** to issue a "**stop work**" order. All **activities must be suspended immediately** until work conditions are confirmed to be safe. In case of doubt, consult a local contact, supervisor or safety official.

Emergency phone numbers

Dial **3333** from any PSI phone in case of any emergencies. From mobiles or external phones, dial **+41 56 310 3333** to reach the PSI emergency organization directly.

Alarms

Note the two types of alarm signals used at PSI: **Building evacuation alarms** and **emergency alarms**. Refer to the table below for the appropriate response. Non-compliance with any emergency procedures may result in the immediate suspension of the experiment.

Alarm Signals	Emergency instructions
Evacuation Alarm for Buildings Signal: ∿∿∿ (swelling and decaying sound) The fire and evacuation alarm is an audible signal in the building.	• Close the windows • Bring experiments to a safe state • Take personal belongings • Evacuate the building when alarm is sounding • Follow the „Emergency Exit" signs to the marked assembly point • At the assembly point, wait for and comply with instructions from the NFO staff
Emergency Alarm Signal: – – – – – – – – – (repeated 3 broken tones, lasting 90 seconds) The emergency alarm with outdoor warning siren.	• Go quickly into the next building • Stay inside • Close all doors and windows • If possible, obtain information via the PSI Intranet • Wait for and comply with instructions from the NFO staff
End of Alarm Signal: —————— (continuous tone, lasting 90 seconds) End of Alarm with outdoor warning siren.	• All emergency instructions lifted • Resume normal activity • Further information via the PSI Intranet

Fire emergency procedure

In case of a fire at the beamline or within the SLS, make sure you follow these steps:

1. Alarm the PSI fire department by pressing the **fire alarm button** (next to all emergency doors).
2. **Call 3333** to notify the emergency response team about the exact nature of the incident.
3. Alert other people in the vicinity of the danger and prevent them from entering the dangerous zone.
4. If it is safe for you to do so, rescue other people.
5. If it is safe for you to do so, start fighting the fire with the provided means (fire extinguisher, water hose).
6. Evacuate the SLS building and go to the assembly point in front of the TimeOut building and wait for instructions from the emergency response team (firefighters are on their way).

Note that you have **no obligation** to fight a fire yourself if you feel your safety is at risk or if you are not sure how to properly react to the situation. **Always alert the professional emergency response teams before attempting to fight the fire by yourself!**

Oxygen deficiency alarm procedure

The TOMCAT beamline is equipped with oxygen level monitors. Two types of alarms are issued if oxygen levels drop below a defined threshold: a **pre-alarm** and the **main alarm**. In case of such an alarm, please do the following:

Pre-alarm (< 19% O_2): The red gas alarm lights will start flashing.

- Call **3333** within 10 minutes of the onset of the pre-alarm and follow the emergency central's instructions.
- Open all the doors to the hutch and control room.
- Leave the experimental hutch and control room.

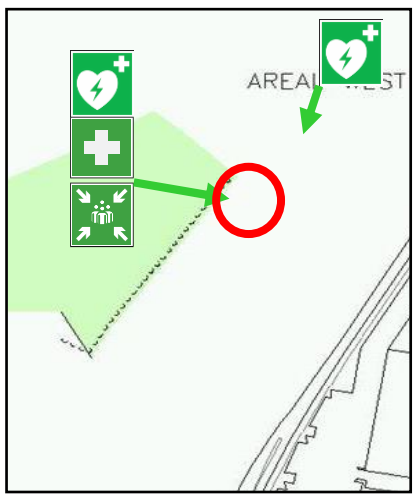
Main alarm (< 18% O_2): A horn will sound with the building evacuation alarm signal and the red gas alarm light flashes.

- Call **3333** immediately from a nearby phone and follow the emergency central's instructions.
- Close all doors
- Leave the beamline
- Go to the assembly point in front of the TimeOut building and wait for instructions from the emergency response team (firefighters are on their way).

Please also notify your local contact as soon as possible when you encounter an oxygen deficiency alarm.

Emergency egress routes and procedures

Upon arrival and during the beamline orientation, identify all the nearby emergency exits. Escape paths are posted on all hutch doors. Make sure to keep emergency egress routes clear at all times. The assembly area in case of a building evacuation is located in front of the TimeOut cafeteria (building WBGB, see map).



Location of safety equipment

Safety equipment near TOMCAT is found at the following locations:

- **Emergency exits:** On the outside wall of the SLS building next to the TOMCAT entrance in Section #27 and #32, and in short intervals along the ring.
- **Fire alarm button:** Next to all emergency and building exits. Call **3333** after activating the alarm.
- **Fire extinguisher / fire hose:** Next to the emergency exit in Section #32.
- **Shower / Eyewash:** Immediately outside of the TOMCAT beamline next to column #31. Additional eye showers are located in the sample preparation lab sinks.
- **First aid kit:** The first aid kit is stored next to the emergency exit door in Section #32. Please notify 3333 if supplies run low.

Safety documentation
The PSI safety rules and guidelines for facility users can be found through the user office webpage:
https://www.psi.ch/useroffice/safety-at-psi

Resources
Don't hesitate to contact any of the TOMCAT or SLS staff in case of questions or concerns. Contact details for all TOMCAT beamline staff members are posted in the controls hutch. In case of emergencies, always first contact the emergency organization by calling **3333** immediately.

Beamline Safety and Operation

Personal safety system
The Personal Safety System (PSYS) is there to ensure that nobody is exposed to harmful radiation. The procedure and the search pattern for the experimental hutch will be demonstrated during the beamline orientation. The operation of the beamline shutters will be explained by your beamline contact.

Emergency stop buttons
Familiarize yourself with the locations of the emergency stop buttons inside the hutch and next to the hutch door. They should be pushed immediately if anyone is locked inside the hutch.

Remote motion control
When moving motors and equipment remotely, ensure that the motion range is clear, and especially that nobody/nothing is within a possible collision range of the equipment. Some components may move very swiftly and quietly. Alert anyone in the vicinity of the moving equipment before starting a motion. Monitor the moving equipment closely during operation.

Chemical storage and waste disposal
TOMCAT is not a chemical stockroom and cannot store materials for the user's chemical needs beyond the duration of the experiments. Users should plan to have chemicals shipped in and out of PSI for their experiments. Transport of chemical materials must conform to the appropriate shipping and import/export regulations. Chemical waste that is generated must be disposed of properly in coordination with the TOMCAT beamline contact. All chemical containers must be correctly labeled at all times.

Biological samples and Biohazard materials
Biological samples in formalin should be handled in the laminar flow hood located in the sample preparation lab. Additional restrictions and regulations exist for work with biohazard materials. Coordinate such activities with your local beamline contact.

Laser safety
When using lasers at the beamline, be sure to post the necessary warning signs and wear laser safety goggles at all times when working with the laser. You must be trained and authorized to use the laser prior to conducting experiments. Your beamline contact will provide further instructions.

Electrical safety
Users are not permitted to conduct any work on low, medium or high-voltage electrical installations (> 25V AC / > 60V DC or > 2.0 A). Only trained and authorized PSI personnel must perform such work (AW-93-05-03.3 Rev.1). Also note that daisy chaining of extension cords is not allowed.
Custom electrical equipment brought to the beamline must either be certified according to European or equivalent standards (e.g.: CE certification) or be inspected and approved by an electrical safety inspector from PSI before being used at the beamline.

Gas cylinder handling and usage
Gas cylinders must be safely secured at all times. Disconnect any regulators and secure the cylinder safety cap before transporting gas cylinders. Always use the proper gas regulators (they are different for different gases!).

Liquid Nitrogen (LN2) usage and fill procedures

For experiments that require LN2, the location of the LN2 fill-station and the appropriate filling procedures will be explained during beamline orientation. Proper PPE must be worn at all times when working with liquid nitrogen, including the appropriate gloves, a face shield, hearing protection, long pants and closed shoes.

Cranes / hoists

Users and untrained personnel are strictly forbidden to operate any cranes or hoists at PSI. Cranes with a maximum rated capacity < 1000 kg may be operated by trained personnel, while higher loads require a professional crane operator license.

Equipment protection system (EPS)

The equipment protection system is designed to protect beamline components from damage. Usually, the white beam shutter will be closed in case of any EPS faults. The fault will be displayed on the EPICS EPS status panel. If an EPS fault occurs, contact beamline personnel immediately. Users are not authorized to handle EPS faults in the absence of beamline personnel.

Computer usage

All PSI computers are to be used only for official use and in accordance with the cyber-security guidelines. No software is to be loaded without prior approval. Note that PSI IT (AIT) monitors all computing activities.

Good housekeeping

Please keep work areas neat and orderly, and safety egress routes and aisles free of obstructions. Users are requested to leave the beamline in a clean state upon their departure.

Working alone

We strongly recommend to work in teams of at least **two people** at all times. This ensures that help is nearby if needed and increases the overall alertness during beamline operation.

Working at height

Working at heights of 1 meter above floor level requires special safety precautions. Use only the provided and approved step stools. Chairs, boxes, or similar items are never to be used as steps!

Samples and chemicals

Samples and chemicals should be stored and prepared in the designated sample preparation lab. Always keep food and chemicals separated from each other. Observe the posted restrictions for food and chemical usage at the beamline:

- No food or drinks in the sample preparation lab and experimental hutch
- No chemicals and samples in the beamline control room

Food and drinks at the beamline

Snacks and drinks can be consumed in the beamline's control and compute rooms. However, it is strongly recommended to use the SLS break room or the TimeOut facilities for the consumption of larger meals.
TOMCAT provides a small food fridge in the control rooms, where users can store snacks and drinks for the duration of their experiments. Please remove all of your food items from the food fridge and clean the fridge upon departure. Never store any food in the sample fridge!
Note that the experimental hutch is a radiation-controlled zone, and it is therefore absolutely forbidden to bring any food or drinks into the hutch!

Alcohol

The consumption of alcoholic beverages at the TOMCAT beamline is strictly forbidden at all times.