Safety and Environmental Manual for the HCI

Version 2020 - brochure

MY DEAR, SAFETY IS THE FAIREST ON EARTH!

MIRROR, MIRROR ON THE WALL: WHO'S THE FAIREST OF THEM ALL?
Emergency / Alarm 888 / Evacuation

Emergency Alarm (all types, 24 hours): Tel 888
(valid for all ETH internal telephones)

Alarm Center via cell phone or from outside (24 hours): 044 342 11 88

Save the Alarm Center in your cell phone with the QR code:

Look → Think → Act

1. Secure danger area, protect yourself
2. If possible, always leave the patient on site (the first aid team will come on site)

Additional emergency phone numbers:

Generally, always alert via 888 or 044 342 11 88. Use the following numbers only if communication with the Alarm Center is not possible. Enter the phone number exactly as indicated:

<table>
<thead>
<tr>
<th></th>
<th>For all ETH internal telephones</th>
<th>Cell phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police</td>
<td>0117</td>
<td>117</td>
</tr>
<tr>
<td>Fire brigade</td>
<td>0118</td>
<td>118</td>
</tr>
<tr>
<td>First Aid</td>
<td>0144</td>
<td>144</td>
</tr>
<tr>
<td>Tox Info Suisse</td>
<td>0145</td>
<td>145</td>
</tr>
</tbody>
</table>
## Building evacuation and assembly point

In an emergency, users can request an evacuation of the building via the Alarm Center based on their assessment. If a siren sounds over the loudspeaker system, or you receive a corresponding message (email SMS) via IAT (information and alarm tool) in connection with the call for building evacuation, immediately go to the assembly point via escape route (see illustration on the right).

Follow the instructions of the safety personnel.

Evacuation concept for the HCI building: See chapter 4.2. in the full online edition.

---

**Note:**

The safety and environment manual version 2020 applies to all employees and students in the HCI building. This manual replaces the previous versions.

**QR code for the complete online version:**
## 1. Most important rules in workplace

### Obligations!
All employees and students must behave in a way that the regulations on safety and environmental protection are complied with! All new entrants are personally instructed by the safety officers / assistants who are authorized to issue instructions in the area of safety and environment. New staff members are obligated to follow the safety and environmental guidelines.

### Personal protection!
While working with chemicals and equipment, the use of personal protective materials (available in HCI shop) is mandatory; Priority 1: Properly fitted safety glasses on face! Wearing contact lenses is not allowed. Appropriate over-prescription goggles are prescribed for people who wear glasses. ETH employees can apply for optically adapted safety glasses via the SGU. There is also a requirement for a laboratory coat over street clothing that is appropriate for the laboratory, consisting of flame-retardant and non-melting textiles. If necessary, personal protective equipment must be supplemented with protective gloves, respiratory protection, etc.

### Workspace!
Generally, users must keep the workspaces and fume hoods clean. Everyone who works in a laboratory is responsible for good work hygiene. Workspaces and fume hoods may not be overfilled with large amounts of chemicals. The lab service may block unacceptable workspace. To place, store or handle chemicals or objects contaminated with chemicals is not allowed in desk-areas.

### Forbidden!
It’s not allowed to store or consume foodstuff, cosmetics or medicine within laboratories or in close proximity to chemicals, biological materials or dangerous equipment. Smoking is strictly prohibited in the entire building. Writing zones not separated by glass walls or something similar are considered laboratory zone.

### Contamination!
After working with protective gloves, always dispose them at the place of use! Never walk around the building with gloves or other utensils contaminated by chemicals! People wearing gloves are not served in the service areas! Lab coats may not be worn in offices, toilets, seminar rooms, cafeterias, etc.

### Risk Analysis!
While working with chemicals or biological substances with an increased safety risk, the safety officers or assistants must be informed beforehand. During such work, students, apprentices, guests, service technicians etc., require the immediate presence of a competent supervisor. Before starting work at increased risk, a hazard/risk analysis must be carried out. Please consult the safety data sheets (MSDS), pictograms on the labels of chemicals, and the GHS H-/P-phrases (hazard / safety information). Weblinks:

- www.msds.com (registration required)
- www.reaxys.com

If no MSDS data are available, it must be ensured that all possible risk factors in relation to the unknown chemical have been considered. Be aware of the general rule: the smaller the amounts of reactants and products used in the experiment, the smaller the possible risks and impacts of accidents. Special toxlabs are available for dangerous work after consultation of the safety officer or assistant.

### Sources of Ignition!
Open fire or ignition sources (e.g. Bunsen burners with or without gas cartridges, heat guns) may only be used in rooms where there are no fire-hazardous substances in the immediate vicinity. Alkali metals and their hydrides can ignite spontaneously on contact with air or water. Enhanced caution is required with distillation residues that contain alkali metals.

### Volatiles!
Any work using or producing toxic, flammable and malodorous chemicals, gases, aerosols, or vapors must be carried out in appropriate fume hoods. Additional absorption devices must be installed to trap any dangerous volatiles.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overpressure!</td>
<td>Vacuum, overpressure, and agitation in unsuitable glass equipment pose a risk of bursting! Quality and wall thicknesses of the glass containers and equipment must be selected according to the intended use. Check them regularly for damage. Experimental autoclaves must be equipped with a pressure gauge and a rupture disc. Exceeding a pressure x volume product of 10 [bar x liter] requires the approval of the Dept. SGU. Alternatively, experiments can be conducted in the high-pressure laboratory, depending on the space requirements.</td>
</tr>
<tr>
<td>Prevention!</td>
<td>Emergency plan: Always have an emergency plan ready to act safely and quickly in the event of an incident or malfunction. Before starting any experiment, all required protection measures must be taken in advance. Necessary emergency material must be organized in order to prevent any possible accidents and the spread of smelly compounds!</td>
</tr>
<tr>
<td>Gas cylinder!</td>
<td>Gas cylinders must always be secured with chains. Gas cylinders and pressurized gas outlets require appropriate pressure reducing valves. Corroded or damaged pressure reducers must not be used.</td>
</tr>
<tr>
<td>Liquefied gases!</td>
<td>In addition to the risk of suffocation and cold burns when using liquefied gases, attention must be paid to the following: Caution with oxygen enrichment in liquid nitrogen, especially in cold traps of high vacuum systems. When air is supplied, cold traps being cooled with liquid nitrogen may be enriched in highly oxidizing liquid oxygen. This can react violently when thawed, together with condensed solvents. Never close Schlenk flasks, ampoules (or similar vessels) with substances that are frozen out under argon with liquid nitrogen. There is a high risk of overpressure explosion when liquid condensed argon thaws in the closed vessel.</td>
</tr>
<tr>
<td>Radioactivity!</td>
<td>Working with ionizing radiation is subject to approval (BAG, SGU). Experiments must be carried out in specially designated radioactivity laboratories. Experiments in the HCI building with radioactive material below the approval limit also require agreement with SGU (<a href="mailto:sgu-umwelt@ethz.ch">sgu-umwelt@ethz.ch</a>).</td>
</tr>
<tr>
<td>Doors and Emergency exit!</td>
<td>Laboratory-, emergency balcony-, escape- and entrance doors to the building may never be obstructed with objects, left open, or prevented from closing with a wedge. The latter ensures the building ventilation balance as well as a negative pressure in the laboratory area, which makes it easier to hold back and combat events. In an emergency, work must be stopped and the laboratory evacuated until the event that caused the emergency is eliminated! Open escape doors on the ground floor and in the basement makes it easier for unauthorized persons and animals (insects, mice) to enter the building. Objects that are not allowed on the escape routes and balconies are removed and disposed of by the laboratory service.</td>
</tr>
<tr>
<td>Respect!</td>
<td>Using headsets or sound systems blocking noise increase the risk of accidents. Sound/radio equipment may only be used with permission of the supervisors and must never be perceivable outside the personal area. In case of unacceptable noise or disco-like situations, the laboratory service will remove the equipment. Persons unable to hear the alarm because of headsets or headphones act on their own responsibility.</td>
</tr>
<tr>
<td>Spam mails!</td>
<td>The use of mass-mail addresses for personal purposes is prohibited! There is a web market available for this purpose: <a href="http://www.marktplatz.ethz.ch">www.marktplatz.ethz.ch</a></td>
</tr>
</tbody>
</table>

**Important note:** More detailed explanations of the most important rules at the workplace as well as other important operating regulations can be found in the chapters of the safety and environmental manual for the HCI version 2020.
2. Responsibilities in the HCI building

2.1. ETH Zurich

The website www.ethz.ch presents an overview of ETH Zurich with its units and research groups as well as all connections to its service and administration groups.

2.2. SGU (Safety, Health and Environment) staff unit of ETH

SGU and the workgroup 'Koordination für Arbeitssicherheit' (KOORAS) are responsible for all safety, health, and environmental issues at ETH.

Website: www.sicherheit.ethz.ch

In case of a personal injury or damage of property, fill in the official form and report as soon as possible (email to: sgu_schaden@ethz.ch). The SGU team and representatives are responsible for handling such cases.

For any questions regarding laboratory or occupational safety, contact the CABS team (First chemical intervention, occupational safety, biosafety, hazardous waste disposal), a section from SGU: cabs@ethz.ch

2.3. Safety and environmental management in the departments

Note: The following organizational structure (militia system) analogously applies in other departments and service platforms in the HCI building.

2.3.1. Organisation D-CHAB

Website: www.chab.ethz.ch/das-departement/services/su-management.html
Email hotline: chab-safety@chem.ethz.ch
2.3.2. Services of the SU management for HCI

**Hotline operation** in HCI: Users in HCI may address all security concerns and technical defects to the E-mail address in the table below. A comprehensible short description of the situation or defect is required. The hotline informs the HCI staff about maintenance and upkeep work (building services, laboratories and offices), or in an event of sudden malfunctions, such as a power or ventilation failure.

<table>
<thead>
<tr>
<th>Hotline contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E-mail hotline:</strong> <a href="mailto:chab-safety@chem.ethz.ch">chab-safety@chem.ethz.ch</a></td>
</tr>
<tr>
<td><strong>During ETH opening hours:</strong></td>
</tr>
<tr>
<td>Phone hotline: 044 63 3 48 12</td>
</tr>
<tr>
<td>Pager PSA: *8034812</td>
</tr>
<tr>
<td><strong>Outside of ETH opening hours (no guarantee):</strong></td>
</tr>
<tr>
<td>Cell phone: 075 410 99 21</td>
</tr>
<tr>
<td><strong>Alarm:</strong> internal 888 / external 044 342 11 88</td>
</tr>
</tbody>
</table>

3. Excerpts from the manual

3.1. Training concepts from SU management

The **Safety Lecture** is currently divided into 6 Safety Lecture practice modules and 3 topic sections (see table below). The topic sections can be further processed and supplemented. The aim of the safety lecture is primarily to teach the methodology for creating risk assessments, to explain our emergency organization, to impart basic knowledge about safety, to provide links to the authorities and to explain the causes of accidents in relation to our incidence statistic.

The Safety Lecture will be held as a lecture shortly before the start of the semester, but it is also available as a PowerPoint presentation, illustrated with video clips, online on our SU management website.

The **Safety Lecture practice modules** were developed as a preventive measure based on the incident statistics and their cause analysis. The practice modules focus on the work topics that have the most work-related accidents.
3.2. Safety-Test (via test platform Moodle)

Safety-Test

The Safety-Test is an obligation for all (except for short practical courses such as 3.5 weeks long block courses). All new employees at the HCI (including administrative staff, service units and all students who have not yet completed a test as part of the internship) must complete a version of the Safety Test (either in German or English, see table). The Safety Test contains 40 multiple choice questions (randomly generated), which must be answered in a maximum of 30 minutes. Only one answer is correct. Preparations are available on the website under the heading “GHS training”. The internship leaders and assistants, which have been trained by SU management organize the Safety Test exams themselves with their students.

What must be done in case someone fails the test?

After passing the Safety Test, each person automatically receives feedback as to whether he has passed or failed. Persons who have not passed the exam may retake it after a week. If the person fails again, the responsible secretariat must be informed. The managing professor then decides on the further procedure. Controlling is usually carried out by the secretariats or the internship leaders of the internship laboratories.

Safety-Lecture-Test

The Safety Lecture Test is mandatory for all persons who will work in laboratories and for all assistants in the internship rooms at the HCI. The Safety Lecture Test (either in German or English) must be taken and passed by all persons, including doctoral students, post-docs, assistants, but also visiting scientists who work in laboratories and intend to deal with chemicals and biological substances. The staff in administration and in the service units as well as all students are not affected. The Safety Lecture Test comprises 10 questions (randomly generated), which must be answered in free text within a maximum of 30 minutes. A correct answer earns 2 points. The safety manual and safety lecture are used for preparation.

After passing the Safety Lecture exam, it will be examined by an expert and the examinee will be informed. Persons who have not passed the exam may retake the exam after a one-week break.

What must be done in case someone fails the Safety Lecture Test?

If the person fails again, the responsible Safety Officer must be informed. The managing professor then decides on the further procedure. Controlling is usually carried out by the Safety Officers.
3.3. Duties

Safety officers and assistants

Each unit and internship require a contact person for safety and environment. The responsible supervisor appoints safety officers or assistants. For their additional service they receive a credit point. The responsibility (except for grossly negligent acts) always lies with the managing professors.

The employer and the professors must ensure that the safety officers they have delegated have not been forced into this duty and they perform their work with good motivation.

Duties for safety officers and assistants are:

- Personal introduction and training of new employees / students in the area of safety and environment. The basis for the personal introductions to safety is the document ‘Guide for Safety Introduction of New Staff at HCI’, which can be downloaded from the SU management's website. The goal of the personal introduction and training of new employees / students must be that nobody can say after an incident: ‘I did not know that, I was not informed about it!’

- Verifying that the new employees / students have taken or passed the mandatory Safety Test or Safety Test Lecture.

- Ensuring that new employees / students have correct personal protective material. They check the fit of their safety glasses especially with the new employees / students and sensitize them to the dangers of open gaps in the face area.

- Informing and transmitting the security guidelines and instructions in their area.

- Advising employees and students, as well as processing and forwarding risk assessments, suggestions, and complaints to chab-safety@ethz.ch.

- Recording and reporting of events to the SGU department and to SU management. Accidents must be reported immediately to the Dept. SGU and the SU management in brief. In the case of medical treatment or hospitalization, the accident form must also be submitted immediately for insurance reasons.

- Safety officers also act as evacuation assistants in their area (see 4.2.4). Safety officers on site act automatically as evacuation assistants (= voluntary service). They act as crew member and support an evacuation while keeping in mind their own safety.

- Personnel interview: The professors must carry out an interview with their safety officers at least once a year. The aim of this conversation is to emphasize the importance of the Safety Officer function and to provide better support.

Supervision:

The assistants ensure that the supervisory obligation is fulfilled in their internship, as listed below. Assistants must know the current laboratory regulations and act accordingly. Before starting an internship, the assistants must give the students a personal safety introduction (see 2.4.5) and discuss the training program with them about the dangers arising from it. Students are not allowed to work alone in the internship laboratory. After the end of work, the assistants carry out a final check in the internship laboratory and ensure that all media and devices are safely in operation or switched off. After the final check, the internship laboratory must be locked.

- Obligation to supervise the beginner’s internship: At least one assistant must always be present in the internship laboratory during the entire internship period. A representative must be able to be called immediately if necessary.

- Obligation to supervise the basic internship: The internship managers can decide whether the supervision obligation can be minimized if there is little risk of danger. Otherwise, the same rules apply as for the beginner’s internship.

- Obligation to supervise an advanced internship: The internship managers can decide whether an assistant must always be present for each internship space during the entire internship period or whether this can be dispensed if there is a little risk of danger. However, it is required that an assistant located in the HCI building can be called in immediately at any time (phone / pager).
3.4. **Accidents involving chemicals / spills**

**Emergency cabinets:** Every section of the HCI (HC1-HC5) has an emergency cabinet which is placed in a specific side corridor on a certain floor (see list of locations below). Next to it is a small box with the key to the cabinet behind a glass window which can be broken if needed. Thus, every user of the HCI always has access to first aid equipment in case of an emergency.

Emergency response officers can also extend the basic range of emergency equipment upon request.

<table>
<thead>
<tr>
<th>Locations of the emergency equipment cupboards:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC1: In the middle side corridor, next to D118</td>
</tr>
<tr>
<td>HC2: In the side corridor next to D212</td>
</tr>
<tr>
<td>HC3: In the side corridor next to D312</td>
</tr>
<tr>
<td>HC4: In the side corridor next to H412</td>
</tr>
<tr>
<td>HC4: In the side corridor next to E412</td>
</tr>
<tr>
<td>HC5: In the side corridor next to F512</td>
</tr>
</tbody>
</table>

**Major events:** If the event cannot be safely managed by the laboratory personnel, the Alarm Center must be alerted immediately. The Alarm Center personnel can summon the Chemistry Intervention Team during daytime or the fire brigade at night and on weekends.

Emergency niches in the HCI corridors

The emergency niches are distributed over all corridors throughout the entire HCI building. They contain two carbon dioxide handheld fire extinguishers, a hose-on-reel extinguisher (water), a fire blanket, fire sand, a body shower, an eye shower, a telephone, fire brigade alarm button, and a small first aid set. An expended or missing bandage set can be requisitioned via Real Estate Service Portal.

3.5. **Escape balconies, balcony and laboratory doors**

**Note:** Laboratory doors and balcony doors must never be left open. Opening the doors of the escape balconies of internship laboratories is only permitted in case of an emergency.

In an emergency, the laboratory must be evacuated and work has to be interrupted until the incident that caused the emergency situation has been cleared! Additionally, balcony doors on the ground floors must be kept closed to prevent pests such as mice, insects, etc. from entering the building.

3.6. **Emergency plan**

In general: **you should always be prepared** that the media supply for your systems or devices could suddenly fail due to incidents or emergency situations in the HCI building!

Create a risk assessment/emergency plan for your systems and devices (usually derived from an existing accident risk assessment). Evaluate possible threats and risks if media supplies suddenly fail. Assess measures and technical investment to mitigate the risk of failure. Create emergency plans based on the risk assessments to define how people should react in case of an incident. The risk assessment can be used to request an emergency supply and alarming system through a building application in the ETH real estate services portal. As additional risk mitigating measure to minimize damages, secondary systems for automatically shutting down your systems and devices in case of an incident can be considered. We gladly support you in the risk assessment. Please contact our hotline email chab-safety@chem.ethz.ch.