

ERNST RUSKA CENTER (ER-C)

INTERNAL SAFETY INSTRUCTIONS

for the prevention of accidents

VERSION 23022023, R. Borowski

Welcome to the Ernst Ruska Center!

This leaflet is a summary of elementary safety measures and safety regulations for working within the Ernst Ruska Center. For legal reasons, it must be pointed out that the legal and professional regulations as well as the internal safety regulations of the FZ-JÜLICH alone and in their entirety have superior validity.

1. EMERGENCY AND ACCIDENT REPORTING

The safety center of the FZ-JÜLICH forwards all reports of accidents, cases of damage and calls for help in emergencies to the responsible relief and rescue services. It can be reached at any time from any telephone of the FZ-JÜLICH via the telephone number

EMERGENCY : 77

or with cell phone:

02461 61 77

For the content of the emergency message the 5 - W rule has proven itself:

- **WHERE** is the emergency? (on telephone sticker you will find its location)

- **WHAT** has happened?

- **WHAT** is the number of people involved?

- **WHAT** injuries are recognizable?

...and last but not least:

- **WAIT** for further inquiries!

2. COMPANY DOCTOR

The company medical service is located in building 15.2 opposite the Seecasino and can be reached via emergency number 77 or call 5262.

FIRST AID BOXES are at the staircases entrances/exits and in the secretary's office 05.2W R 3004 with Ms. Göcking.



3. ORGANIZATIONAL

In this table you will find the contact persons in the ER-C regarding occupational safety and radiation protection:

Function	Institute	Name	Building Room number	Tel Nr.	E-mail
Area Representative Bldg. 05.2W, 05.2S, 05.7	ER-C 1,2	R. Borowski	05.2S 3003	6700	r.borowski@fz- juelich.de
Area Representative Bldg. 04.6	PGI -5	C. Thomas	04.6 96	3152	c.thomas@fz- juelich.de
Area Representative Bldg. 05.2W 05.2V	ER-C 3	A. Katranidis	05.2V 4008	85474	a.katranidis@fz- juelich.de
Safety Officer Bldg. 05.2W, 05.2S, 05.7	ER-C 1,2	M. Kruth	05.2W 3079	3605	m.kruth@fz- juelich.de
Hazardous Materials Officer Bldg. 05.2W, 05.2S,	ER-C 1,2	L. Kibkalo	05.2W 3084	3910	l.kibkalo@fz- juelich.de
Hazardous Materials Officer Bldg. 05.2W, 05.2S,	ER-C 1,2	P. Paciok	05.2W 3080	9338	p.paciok@fz- juelich.de
B-SSB (Radiation Safety Officer) Bldg. 05.2S, 05.2W, 04.6	ER-C 1,2	C. Thomas	04.6 96	3152	c.thomas@fz- juelich.de
C-SSB Radiation Safety Officer Bldg. 05.2S, 05.2	ER-C 1,2	M. Kruth	05.2W 3079	3605	m.kruth@fz- juelich.de
C-SSB Radiation Safety Officer Bldg. 05.2S, 05.2W	ER-C 1,2	L. Kibkalo	05.2W 3084	3910	l.kibkalo@fz- juelich.de
C-SSB (t.b.a.) Radiation Safety Officer Bldg.05.2W	ER-C 3	P. Sundermeyer	0.5X 2066	2066	p.sundermeyer@fz- juelich.de
C-SSB, B-SSB Representative Radiation Safety Officer Bldg. 05.2S, 05.2W	ER-C 1,2,(3)	R. Borowski	05.2S 3003	6700	r.borowski@fz- juelich.de

First aider Bldg. 05.2W, 05.2S	ER-C 1,2,3	M. Göcking	05.2W 3004	4274	m.goecking@fz-juelich.de
First aider Bldg. 05.2W, 05.2S	ER-C 1,2,3	L. Kibkalo	05.2W 3084	3910	l.kibkalo@fz-juelich.de
First aider Bldg. 05.2W, 05.2S, 05.7	ER-C 1,2,3	R. Borowski	05.2S 3003	6700	r.borowski@fz-juelich.de
Laser Safety Officer	ER-C 1	M. Schnedler	04.6 98	3155	m.schnedler@fz-juelich.de
Laser Safety Officer	ER-C 2	M. Mikulics	05.7 2010	5399	m.mikulics@fz-juelich.de
Laser Safety Officer	ER-C 3	J. Fitter	05.2V 4012a	2024	j.fitter@fz-juelich.de
Biological Safety Officer	ER-C 3	I. Weyand (IBI-1)	15.1 224	4040	i.veyand@fz-juelich.de
Ladder Safety Representative Bldg. 05.2W, 05.2S, 05.7	ER-C 1,2, (3)	R. Borowski	05.2S 3003	6700	r.borowski@fz-juelich.de

Up-to-date overviews of the contact data of the safety officers and persons responsible are available for the ER-C in the documents at

<https://er-c.org/index.php/access/safety-instructions/>.

For all rooms of the ER-C in which experimental facilities are kept, room officers have been appointed who support the area officers in the performance of their duties (see below) and are the contact persons in case of absence of the respective area officer. The names of the room officers can be found in the room-specific operating instructions that are available in the respective rooms.

You will find the current rules and information from the employers' liability insurance association in the DGUV database (<https://publikationen.dguv.de/regelwerk/>).

All state "technical rules" can be found at the "baua":

https://www.baua.de/DE/Angebote/Rechtstexte-und-Technische-Regeln/Technischer-Arbeitsschutz/Technischer-Arbeitsschutz_node.html

You will also find a large selection of safety documents on the intranet pages of Occupational Safety:

<https://intranet.fz-juelich.de/de/organisation/gs/ueberuns/organisation/s-a/>

4. RESPONSIBILITIES AND COMPETENCIES

- a) At least once a year, a general safety briefing for all members of the ER-C shall be held by the director of the institute. Participation in this instruction must be confirmed by signature. The current version of this safety data sheet will be handed out at this time. (optionally in German or English)
- b) At least once a year, a workplace-related or room-specific instruction session is to be held, if possible, following the general instruction session, by the respective room or area representative. Again here, participation must be confirmed by signature.
- c) Radiation protection instruction by one of the Radiation Protection Officers shall take place at least once a year. Signed participation is mandatory.
- d) Each new employee (including doctoral students, students, guests and trainees) shall be instructed regarding work safety by the Area Representative and instructed by the department's Radiation Protection Officer for radiation protection. Participation in the instruction must be confirmed by signature.
- e) External users of equipment of the ER-C - in particular those using experimental facilities - shall be instructed by the respective instrument officer in relation to their workplace. This also applies to short-term stays if safety-relevant work is to be carried out during this time. The latest versions of this safety data sheet and the associated operating instructions must also be issued to them. Participation in the instruction must be confirmed by signature.
- f) For employees and guests who do not have sufficient knowledge of the German language, an English-language safety briefing will be carried out.
- g) When setting up or commissioning new equipment or when starting work with new working materials, the responsible area representative and the hazardous materials officer must be consulted. This applies in particular to the handling of chemicals or sample materials, safety in the handling of interference sources such as electron microscopes and X-ray equipment, electrical safety and explosion protection.
- h) For the commissioning of test setups, even only for trial operation, approval must be obtained from the respective responsible specialist. For the area of radiation protection, Mr. Carsten Thomas (ER-C1, Tel.: -3152), for the area of electrical safety, Mr. Michael Moers (PGI-JCNS-TA, Tel. -4444) is this expert.
- i) The respective scientific area officers and the room officers are authorized to give instructions to employees of the ER-C and external guests. The area officers are authorized to give instructions to the room officers.

5. GENERAL INSTRUCTIONS FOR SAFE WORKING

This leaflet is intended to point out special hazards, rules of conduct and safety measures resulting from the special field of activity of the Ernst Ruska-Centrum (ER-C). Please observe the following basic rules:

- a) Inform yourself about possible hazards related to your activities and experiments.
- b) Obtain the necessary **personal protective equipment (PPE)** such as goggles, gloves, safety shoes, etc.

- c) Report any lack of PPE (e.g. face shield and cryogenic gloves for liquid nitrogen filling equipment) to the safety or area officer.
- d) Report any safety deficiencies you notice to the safety or area representative.
- e) Only carry out work with special safety risks or with hazardous substances if another person who could help you is nearby.
- f) Report any accident! This includes, for example, incidents involving hazardous substances (e.g. spillage or contact/injury).
- g) Get injuries treated, even if you initially think the incident is harmless. This is especially true when handling chemicals where harmful effects may take time to appear. Have the injury entered in the first aid book of the FZ (in the outpatient clinic: building 15.2 entrance E8, tel. 5262).

Complete the accident report together with the safety- or the area officer and forward the accident report to the Occupational Safety and Health Department (AS-A). Template: <https://intranet.fz-juelich.de/de/organisation/gs/s-a/schnellzugriff>

FIRST AID BOXES are located at the staircase's entrances/exits and in the secretary's office 05.2W R 3004 with Ms. Göcking.

6. SPECIAL INSTRUCTIONS FOR PREGNANT PERSONS

- a) Congratulations! Please contact your supervisor and the area officer in confidence before commencing any activities.
- b) Pregnant persons or nursing mothers must not be employed with work where the health of the mother or child (foetus) is endangered by harmful physical factors. This includes in particular ionising radiation.
- c) Pregnant persons and nursing mothers must also not be employed in work where the health of the mother or child (foetus) is endangered by hazardous chemical or biological substances. Such a risk is particularly present in the case of: Exposure to toxic, very toxic and harmful hazardous substances, exposure to carcinogenic, teratogenic or mutagenic hazardous substances; work involving the risk of release of infectious agents.

7. SPECIAL INSTRUCTIONS REGARDING ELECTRICAL SAFETY

- a) The opening of equipment operated with high voltage or high voltage installations in test set-ups, e.g. for fault diagnosis and repair, is prohibited. This work may only be carried out by appropriately trained personnel. Modifications to the heavy-current electrical installation of equipment of any kind, even if only for repair, are not permitted.
- b) All movable electrical equipment shall be inspected at regular intervals and shall be given a seal of approval provided it is free from defects. The corresponding measures are arranged centrally by Mr. Michael Moers (Tel.: 4444). Devices whose test seal has expired **may not been used** and their renewed testing must be arranged by the respective room or area representative.

c) Experimental set-ups with high-voltage installations (max. 50V AC, max. 120V DC) must be approved by a qualified electrician before commissioning or when recommissioning after modifications. Please observe points (a) and (b).

d) Every experimental setup or every device that no longer fulfils the device approval conditions, e.g. by removing the housing, must be clearly labelled so that other persons do not come to harm.

f) Due to the falling of equipment, coolant leaks in the vicinity of electrical equipment, tripping over electrical cables or other incidents of a comparable nature, a high hazard potential may have arisen due to damage that is not directly visible. Inform the person responsible for the laboratory.

8. SPECIAL INSTRUCTIONS CONCERNING THE HANDLING OF VACUUM VESSELS, GLASS CRYOSTATS AND GLASS DEWARS

a) There is a risk of implosion when handling nitrogen and helium glass cryostats. Glass cryostats must have a protective shield made of Plexiglas or metal.

b) Leather apron, face shield and cryogenic gloves must be worn during filling, transport and assembly work on glass cryostats.

c) Protective goggles and cryogenic gloves must be worn when handling transportable small nitrogen glass dewars. Care shall be taken not to drop objects into the glass dewar that could damage it and cause implosion.

9. SPECIAL INSTRUCTIONS CONCERNING THE HANDLING OF LIQUEFIED GASES

a) A face shield and suitable cryoprotective gloves and closed-toe footwear shall be worn when transferring liquid nitrogen.

b) Escaping liquid nitrogen evaporates immediately. The cold gas is denser than air and flows downwards. This displaces the vital oxygen in the air. Consequently, there is a danger of suffocation in closed rooms. (One litre of liquid nitrogen produces about 700 litres of gaseous nitrogen at room temperature). Therefore, larger quantities of liquid nitrogen (> 5 litres) should not be decanted in small rooms (< 15 sqm) or the doors of the rooms should be kept open during decanting.

c) Do not ride together in the elevator with a filled liquified N₂ or He tank!

d) Oxygen deficiency monitoring is installed in some laboratories. Leave these labs immediately if an alarm is given. If it is safe to do so, close the liquid nitrogen supply before leaving the laboratory and ensure that the room is ventilated. Inform the person in charge of the laboratory and the area representative.

10. SPECIAL INSTRUCTIONS CONCERNING THE HANDLING OF CHEMICALS AND HAZARDOUS MATERIALS

a) The performance of all experiments with chemicals as well as the set-up of the reaction apparatus must be approved by the project leader or the person responsible for the laboratory.

- b) Ordering chemicals or other hazardous substances is only possible with the approval of the Hazardous Substances Officers.
- c) Before handling chemicals and hazardous substances that have not yet been used, inform yourself about the possible dangers and the protective measures to be taken with the hazardous substance safety advisors and the person responsible for the laboratory. Inform yourself as a precaution even if you think you are dealing with harmless substances.
- d) Open storage of chemicals in the laboratories or fume cupboards is not permitted; they may only be stored in small quantities in suitable safety cabinets.
- e) Containers and bottles for chemicals must be carefully labelled with the correct substance name and GHS pictograms.
- f) As a matter of principle, a lab coat and suitable PPE must be worn when handling hazardous substances.
- g) For the disposal of chemicals never use the sink of the waste water! Ms Sybertz (9278) and Ms Kibkalo (3910) keep disposal canisters ready in the lab rooms.
- h) If you have come into contact with hydrofluoric acid (HF), rinse the affected area IMMEDIATELY with plenty of water and call for help via the company medical service.

EMERGENCY CALL: 77

or, if you are using a cell phone, call

02461 61 77

- i) Mechanical processing of beryllium (Be) and Be alloys is generally prohibited. Beryllium is used, for example, as window material for X-ray detectors and as X-ray neutral material for specimen holders. Even the smallest amounts of beryllium dust have a highly carcinogenic effect. Avoid using mouth vacuum operated tweezers ("butterflies") on the electron microscopes to position specimen holders (hex and snap rings, washers) in the specimen holders.
- j) Dusts and aerosols, such as those produced during the evaporation of metals, pose a health risk. Cleaning of equipment used for this purpose, e.g. in crystal growing, must be carried out in a wet environment with the use of respiratory masks and gloves and under a fume hood.
- k) In combination with paper, oxidizing agents (e.g. H_2O_2) can be a fire hazard. When picking up spilled quantities of such substances, ensure that no additional fire hazard is created. (do not simply throw them into the waste paper basket!)

11. SPECIAL INSTRUCTIONS CONCERNING THE HANDLING OF COMPRESSED GAS CYLINDERS

- a) Compressed gas cylinders shall always be secured to walls or to sufficiently solid laboratory benches by the use of chains.

b) During transport of compressed gas cylinders, screw on the valve cap. Wear safety shoes when transporting compressed gas cylinders and use the special gas cylinder transport trolleys for this purpose.

c) Compressed gas cylinders may only be stored in special safety cabinets within a building. If no suitable cabinet is available, the gas cylinders must be taken outside into the gas cylinder store at the end of the experiment.

12. SPECIAL INSTRUCTIONS CONCERNING THE HANDLING OF ELECTRON MICROSCOPES AND RADIATION SOURCES

a) Electron microscopes are X-ray sources. They are provided with shielding and are type-approved. Against this background, X-ray shielding must not be removed. The same applies to trial operation in case of repair or maintenance. Please inform the SSB immediately if you suspect that the shielding has been modified.

DO NOT REMOVE/CHANGE DETECTORS or CAMERAS BEFORE (!) CONTACTING THE RADIATION SAFETY OFFICER!

b) High electrical voltages are used in electron microscopes. The charges present in the capacitors of the voltage generation system and the charges present in the high voltage section can have a lethal effect. The electronics cabinets must therefore always be kept closed. Only authorized and qualified personnel are allowed to open the electronics cabinets.

c) Components containing beryllium are built into electron microscopes. Gloves must be worn when handling parts containing beryllium. Mechanical surface treatment of the corresponding components is prohibited. The beryllium dust produced is toxic and carcinogenic.

d) The viewports of the electron microscopes are made of heavy glass because of the X-ray radiation. If they can be hit by splashes of liquid nitrogen, they must be protected from splashes with a cover before using liquid nitrogen in the environment! Danger of implosion!

13. PROHIBITIONS

In the following, areas with a lower safety risk are distinguished from those with high safety risk (based on the activities carried out there).

Low safety risk: Offices, data processing and operator rooms as well as laboratories used for electron microscopy, provided that the equipment is in a condition that complies with the type-approval or CE certification.

High safety risk: workshops, chemical and furnace rooms, laboratory rooms (i) with experimental equipment without CE certification or without a safety standard equivalent to CE certification, (ii) in which work is performed at high temperatures and pressures, (iii) in which there is a risk of explosion or suffocation, and (iv) in which work is performed on equipment involving open high-voltage installations.

On **Sundays** and **public vacations**, during general company shutdowns and on working days outside the working hours defined by the time recording system (from 6:00 a.m. to 8:00 p.m. on weekdays),

work is only permitted under **exceptional circumstances** and is generally **prohibited** in areas with a **high** safety risk.

Exceptions are possible if work in areas with a low safety risk has been approved in consultation with the head of the institute and the person responsible for the laboratory. The following must then be observed:

OPTION 1) The work must be carried out with a second person present. This second person must be in the immediate vicinity and be able to provide immediate assistance in case of an emergency. Note that it is not sufficient for the assistant to be present somewhere in the building. He or she must be in your immediate vicinity and be informed of and actively perform his or her supervisory function.

OR

OPTION 2) The work must be performed using the PNA (personal emergency call system). Prior to this, it must be clarified whether this is possible in the affected area.

The above mentioned notes of safety risks and the regulations with regard to normal working hours apply equally to employees of the ER-C as well as to external users of ER-C equipment.

14. CONDUCT IN THE EVENT OF IMMINENT DANGER

In the event of immediate danger, e.g. due to escaping hazardous gases, fire or explosion hazard:

CALL EMERGENCY: 77

(or with cellular phone: **02461 61 77**)

15. CONDUCT DURING BUILDING EVACUATION

Special situations are reported via the loudspeakers. However, if you hear a three-step acoustic signal, this means an unusually high danger.

SECURE your experiment in case of a building evacuation (e.g. by switching off heating plates, closing gas lines) so that no additional sources of danger can be created by your absence.

Bear in mind that colleagues or guests may not have understood the loudspeaker announcement. Inform them immediately about the evacuation instruction.

In the event of an evacuation order, go to the assembly point for the ER-C. This is located in the

**Foyer of the Central Library
Building 4.7u**

Wait there for further instructions!



16. WHAT TO DO IN THE CASE OF RADIATION ACCIDENTS

The escape gates to be used in the course of evacuating the premises are the

"main gate" for building 04.6 (old IFF building)

and the

"Biology escape gate" for building 04.8 (new IFF building)

as well as for buildings 05.2S and 05.2W (ER-C)

although the "Hambacher Tor" is closer in the latter cases.

In the case of site-wide evacuation alerts, two categories of warning announcements are to be distinguished:

"Evacuation readiness" : In this case, you are to remain in the building for the time being and await further announcements.

"Immediate evacuation": In this case, you must leave the premises immediately via the above-mentioned escape gate.