HZB Helmholtz Zentrum Berlin

RADIATION PROTECTION DIRECTIVE

for the

Wilhelm Conrad-Röntgen Campus
in

Berlin - Adlershof

1st March 2021

The Radiation protection directive of the Helmholtz-Zentrum Berlin (HZB) for the Wilhelm-Conrad-Röntgen Campus mandates the practical implementation of radiation protection in accordance with the “Ordinance Concerning Prevention of Injury Resulting from Ionising Radiation” (Radiation protection Ordinance, Strahlenschutzverordnung – StrlSchV and Strahlenschutzgesetz – StrlSchG), in the version of 29th of November 2018 and other requirements administered by the competent authorities. It acts as a radiation protection directive in the sense of § 45 StrlSchV.

Berlin, 1st of March 2021

Thomas Frederking
Executive Director Finance and Administration
Responsible for Radiation Protection

Dr. Holger Huck
Authorized Representative for
Radiation Protection

1 Scope of Validity

This Radiation protection directive applies to all persons in radiation protection areas at the Wilhelm-Conrad-Röntgen Campus (WCRC) of HZB or at the Willy-Wien Laboratory (WWL) of PTB or who are, in any way, involved with handling radioactive substances or devices that generate ionising radiation at the WCRC or WWL.
An integral part of this radiation protection directive may also include facility-specific radiation protection directives which contain special requirements and instructions concerning the corresponding facility.

2 Organisation, Responsibility and Duties

2.1 Director responsible for radiation protection

The executive director finance and administration of HZB is the responsible person for radiation protection. Representation of this responsibility is provided by other managing directors of HZB in accordance with the representation policy of the management.

2.2 Radiation protection officers

Radiation protection officers are solely responsible for determining radiation protection measures within the scope of their remit and in agreement with the director responsible for radiation protection. Direct cooperation between radiation protection officers and the director responsible for radiation protection with the respective competences is regulated in §§ 69 - 72 StrlSchG.

The duty of radiation protection officers is to carry out radiation protection within the framework of the authorisation issued to HZB. The radiation protection officers have all the competences to carry out radiation protection in accordance with § 72 StrlSchG. The radiation protection officers have the right to give instructions on radiation protection issues to all persons who are within their remit.
Neither heads of organisational units, institute heads nor authorised representatives nor other employees of the HZB are authorised to make decisions in radiation protection matters. This applies to all duties of the radiation protection officer specified in §§ 69- 72 StrlSchG, in particular the determination of shielding and technical radiation protection measures, decisions on the approval of technical and shielding components and access to radiation protection areas. The following have been appointed as radiation protection officers for WCRC: (rep. stands for representative in case of absence)

Entrire facility

1. Dr. H. Huck
2. Dr. K. Holldack (rep. of 1)
3. Dr. T. Kachel (rep. of 2)
4. Y. Bergmann (rep. of 3)
5. A. Bundels (rep. of 4)
6. L. Pichl (rep. of 5)
7. Dr. M. Scheer (rep. of 6)
8. Dr. M. Ries (rep. of 7)

§ 25 StrlSchG

1. T. Rymon von Lipinski
2. K. Ryll-Clavery (rep. of 1)

Radioactive compounds

1. L. Pichl
2. Y. Bergmann (rep. of 1)
3. Dr. T. Kachel (rep. of 2)

X-ray app. and stray rad. I

1. Y. Bergmann
2. A. Bundels (rep. of 1)
3. L. Pichl (rep. of 2)
4. Dr. K. Holldack (rep. of 3)

X-ray app. and stray rad. II

1. A. Bundels
2. Y. Bergmann (rep. of 1)
3. L. Pichl (rep. of 2)
4. Dr. K. Holldack (rep. of 3)

3 General Principles of Radiation Protection (§ 8 StrlSchG)

Any unnecessary radiation exposure or contamination of humans and the environment must be avoided.

Any radiation exposure or contamination of humans and the environment must be kept as low as possible, taking into account the state of the art of science and technology and taking into account all circumstances of the individual case, even below the limits set forth in the Radiation Protection Ordinance and the X-Ray Ordinance.

4 Exposure Levels

All persons with access to radiologically controlled areas must be registered as radiation workers of category B who are allowed to get up to 6 mSv/a during work.

5 Radiation Protection Areas

Radiation protection areas include all rooms or areas that require specific radiation protection measures. These are:

- Monitored areas
- Radiologically controlled areas
- Exclusion areas

Controlled and exclusion areas must be delimited and clearly marked. Setting up or removal, and marking, of these areas is the duty of the radiation protection officer.

5.1 Monitored areas

Monitored areas are operational areas, which do not fall within the category of controlled areas, where people may receive an effective dose of more than one 1 mSv per calendar year.

5.2 Controlled areas

Controlled areas are areas in which people may receive an effective dose of more than 6 mSv per calendar year. In general, exposure of 40 hours per week and 50 weeks per calendar year is used to set the limits for control or monitored areas. Control areas must be marked with the radiation symbol acc. annex 10 StrlSchV as well as the following inscription on a yellow warning sign:

Controlled area

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with the addition that refers to the radiological danger in this area. This addition may read: **Caution – Radiation**
In addition, it must be indicated that access for unauthorised persons is prohibited

X-ray facilities should have the following label.

X-rays – No unauthorised access

5.3 Exclusion areas

Exclusion areas are areas within a controlled area where the local dose rate may be higher than 3 mSv/h. They must also be labelled with the radiation symbol in acc. with annex 10 StrlSchV. The red warning sign must be the inscription:

Exclusion area
- No access -

Access to exclusion areas is only permitted if it is necessary for compelling operational reasons and under the control of the competent radiation protection officer.

6 Access to radiation protection areas

6.1 Employees Subject to Radiation protection Monitoring

HZB employees who work in radiation protection areas or who handle radioactive materials or other sources of ionising radiation are classified as radiation workers of category B. They must register with the Radiation Protection Office Adlershof (dosimetry-support@helmholtz-berlin.de) before starting work. After submission of the signed certificate of completion of the radiation protection instructions, they receive an official albedo dosimeter and, for work on the accelerator components, a direct reading electronic dosimeter.

6.2 External Personnel Exposed to Radiation

Employees of external institutions ("external personnel") who are classified as exposed to radiation outside the HZB or who become exposed to radiation through their work at WCRC may only work within the controlled areas of WCRC if their employer holds a permit acc. to § 25 StrlSchG and has completed a delimitation agreement with the HZB (Adlershof). A delimitation agreement must also be concluded with foreign institutes. The existence of approval in accordance with Germany's § 25 StrlSchG is proven by submission of a foreign radiation passport or confirmation letter (see below).

Before starting work, employees of foreign institutions must provide a registered, fully administered radiation passport. In the case of foreign guests, from countries where radiation passports are not used, a letter (i.e. confirmation letter) from the sending company/institution can be provided, instead of the radiation passport, which confirms that the person is registered as radiation worker and the sending company/institution is authorised under the laws of its country to have the person act as such in a foreign institution. The radiation protection register number has to be included into the radiation passport or confirmation letter by the external institution.

Registration and issue of the official gamma and neutron-sensitive albedo dosimeter is carried out in the Radiation Protection Office. These dosimeters are to be worn for the duration of the stay, even if the guest is in possession of his own official dosimeter. Additional direct readable dosimeters are only provided for activities on accelerator components.
Pre-registration should be made three weeks before commencing the activity. A copy of the radiation passport (pages 2, 3, 6, 7) must be sent in advance to the Radiation Protection Office Adlershof (dosimetry-support@helmholtz-berlin.de).
The existence of the radiation passport and a signed certificate of completion of the radiation protection instructions are prerequisites for receiving a dosimeter.

6.3 Access Restrictions

Adolescents under the age of 18 and pregnant women are not permitted to enter control areas as, in the latter case, it is not possible to ensure compliance with the exposure limit for the uterus. These access restrictions apply accordingly to the monitored areas, as well as for X-ray devices and sources of X-ray stray radiation (e.g. electron microscopes).

6.4 Visitors

Radiologically controlled areas at WCR campus (BESSYII,MLS,HoBiCaT,bERLinPro):

In general, access to control areas is only permitted for radiation workers in compliance with the access rules of Section § 25 StrlSchG. Visitors may remain in controlled areas for a maximum of 7 days per year and will receive a DIS dosimeter at the BESSY entrance after previous registration with the Radiation Protection Office. This visitor policy does not apply to participation in experiments in the experimental hall with the exception of users of the MX Beamline. The visitor regulation may not be applied if access of more than 7 days per calendar year is required and after the 7-day deadline the access rule for external radiation workers must be applied. The details are listed in the following table.

Access procedure for radiologically controlled areas at WCRC

Personnel group	Pre-requisite for hall access	Access
Pregnant women, breastfeeding mothers and persons under 18	-	**No access to control areas**
HZB employees	Unchanged procedure: - HZB registration form - Online instruction - Dosimeter from radiation protection office (RPO)	**7-days regulation not applicable** May enter the hall
Visiting scientists and scholars at HZB	Either as HZB employee (see above) or: delimitation contract & radiation passport must be submitted 1 week in advance Online training SSR number	**7-days regulation not applicable** Access as HZB employee or with radiation passport
Visitor groups (not "active" in the hall)	Registration form with name list, date of birth and gender At least 1 week prior to radiation protection department	**7-days regulation applicable**
Guest scientist from GATE (not MX user)	Delimitation contract & radiation passport must be submitted 1 week in advance Online training SSR number	**7-days regulation not applicable**
All others: **MX users** **external personnel** **technical personnel** **trainees** **individual visitors**	Access requirements for 7-days regulation will be verified, this requires about 1 week to process* 7-days regulation is applied for via registration form **In case 7-days regulation is not possible:** Delimitation contract & radiation passport must be submitted 1 week in advance Online training SSR number * also shorter in urgent cases, e.g. accidents (excl. MX users)	**7-days regulation applicable**

7-days regulation: hall access must not exceed maximum 7 days over the course of one year from the first day of stay

Monitored areas at WCR campus:

These areas are also accessible for persons who are not radiation workers. The 7 days visitor regulation is also applicable for monitored areas.
This rule may not be applied to stays at experiments using synchrotron radiation. This is due to stochastic beam dumps and required neutron monitoring for personal dosimetry.

Access procedure for monitored areas at WCRC

Personnel group	Pre-requisite for hall access	Access
Pregnant women, breastfeeding mothers and persons under 18	-	**No access to monitored areas**
HZB employees	HZB registration form Online instruction Dosimeter from radiation protection office (RPO)	**7-days regulation not applicable** May enter monitored area
Visiting scientists and scholars at HZB	Either as HZB employee (see above) or: Online training SSR number Dosimeter from RPO	**7-days regulation not applicable** Access as HZB employee May enter monitored area
Visitor groups (not "active" in the hall)	Registration form with name list, date of birth and gender At least 1 week prior to RPO	**7-days regulation applicable**
Guest scientist from GATE (not MX user)	Online training SSR - Number	**7-days regulation not applicable**
All others: **MX users** **external personnel** **technical personnel** **trainees** **individual visitors**	Access requirements for 7-days regulation will be verified, this requires about 1 week to process* 7-days regulation is applied for via registration form **In case 7-days regulation is not possible:** Online training SSR Number Dosimeter from RPO	**7-days regulation applicable**

7-days regulation: hall access must not exceed maximum 7 days over the course of one year from the first day of stay

7 Safety Measures and Procedures in Control areas

7.1 Safety Measures

Controlled areas must be physically delimited and secured against unauthorized access.
Exclusion areas must be secured against all access using an interlock system and, in exceptional cases, with mechanical locks.
The safety measures are determined by the responsible radiation protection officer or by operating licenses.

7.2 Personnel Dose Measurement

Personal dosimeters must be worn in controlled areas and in the appropriately marked monitored areas (see 5.1). They should be worn, and remain visible from the outside, at a position representative of the radiation exposure. Usually this is the front of the torso at beam height.

7.3 Ambient Dose Rate

During all work in which the radiation protection officer identifies a risk of increased radiation exposure, the local dosage rate must be measured. For this purpose, it is necessary to use devices that are suitable for the type of radiation, the radiation energy and the time- structure of the radiation (pulsed radiation).

8 Handling Radioactive Materials

The handling of open radioactive substances is not permitted at BESSY II, MLS, HoBiCaT and bERLinPro. The usage of enclosed radioactive materials (such as check sources) requires the prior approval of the responsible radiation protection officer.

9 Transport of Accelerator and Beamline Components

The transport of accelerator and beamline components is only possible after receiving approval from the responsible radiation protection officer.

10 Procedure in Case of Accidents

10.1 General

All special incidents that are relevant to radiation protection must be reported to the responsible radiation protection officer immediately. In particular, all personal injuries or injuries in controlled areas must be reported immediately to the radiation protection officer.
Outside normal office hours, a radiation protection officer can be reached via the mobile phone number

0175 - 9306879

If there is a risk of contamination, incorporation or exposure of the person concerned, the radiation protection officer must also be notified immediately and according to the information sheet

"First Aid in Event of Increased Exposure to Ionising Radiation"

This information sheet is available in every controlled area. The Regional Radiation Centre (RSZ), the Charité Clinic for Nuclear Medicine, Virchow-Klinikum Campus, has a 24-hour on-call service.

Regionales Strahlenschutz-Zentrum,
Augustenburger Platz 1
13353 Berlin, Tel: 450 657 024
and
Charité – Universitätsmedizin Berlin, Campus Benjamin Franklin,
Klinik und Hochschulambulanz für Radiologie,
Hindenburgdamm 30, 12203 Berlin, Tel 8445-3041

10.2 Fire Alarm

All persons active within controlled areas must, with specific regard to their work conditions, familiarise themselves with the information sheet

"Procedure in Case of Fire Alarm"

In particular they must become familiar with the appropriate muster points in case of fire alarm.

11 Activities in External Control areas

If an HZB employee (see 6.2) wishes to work as radiation worker in an external controlled area (e.g. at another research institution, university), he must inform the Radiation Protection Office early enough. The employee in question then receives his radiation passport, which contains all records of previous radiation protection monitoring. Without the radiation passport it is not possible to work in external facilities! Please note that the issuing of a new radiation passport by the competent authority can take up to 3 weeks!

The employee receives a second, official personal dosimeter. This must be taken to the external facility and returned to the Radiation Protection Office after returning for monthly evaluation.

12 End of Employment in Radiation protection Areas

If an employee (also under fixed-term contract) or guest ceases their activity in radiation protection areas at HZB, he or she must unregister at the Radiation protection Office and return the dosimeter. If a radiation passport has been issued, it will be filled out and returned to the employee.