UPEX

Safety information for proposals

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Contents

Preface

All experiments carried out at European XFEL must comply with the German safety legislation and the safety regulations of European XFEL.

This document gives information about

- Safety information required for proposal submission
- Safety training for users
- Safety information for pregnant and nursing women

In case of problems or questions please visit the web pages of the safety group or send an email to expsaf@xfel.eu.

1 Safety requirement for proposal submission

Queries concerning the feasibility - technical or safety aspects - of an experiment should be clarified with European XFEL staff of the instrument before the proposal is submitted. The User Office will assist you to find the most appropriate person.

The safety aspects of the experiment, resources and instrumentation must be as detailed as possible. The description of the proposed experiment should include information about the experimental set up, the samples and the requirements for carrying out the experiments.Experimental conditions requiring **special safety precautions** must be **clearly stated in all sections of the proposal**.

All material, including samples and equipment brought to the European XFEL remains entirely the responsibility of the proposer. Depending on the proposal evaluation, further tests or modifications to the equipment could be required to adapt it for use at the European XFEL well before the experiment, generally at the costs of the proposer or user group.

The Safety group evaluates the submitted proposal with regard to safety the following way:

GREEN (feasible)

YELLOW (feasible with caution):

RED (feasible with strict procedures required):

Or REJECTED (not feasible).

In case the proposal has been approved the experiment and beamtime has been awarded the safety group may need further information on the experiment to be carried out. In a safety letter the principal investigator will be

asked further information about the experiment. This letter should be answered as soon as possible in order to avoid any delay in the scheduling of the experiment.

1.1 Samples

Each sample or substance brought to the European XFEL must be described in the samples section. When filling out the samples section please give as much detailed information, select and tick the boxes where required.

In case the sample or substance needs to be used in a laboratory the section 5 “laboratory access” needs to be filled out.

1.1.1 General information about samples and substances

Under ***Sample/Substance*** provide the detailed name of the substance or sample.

Under **Sample/substance description** the entire composition of your sample must be given, this includes the chemical formula or CAS number if available.

Under ***reception and storage requirements*** please state how the sample arrives at European XFEL (brought by user/send to XFEL) and whether there are special requirements for reception and storage (fridge, humidity control, in the dark,…). Please order standard samples/substances on user accounts directly to European XFEL. Please get in contact with the relevant lab responsible European XFEL staff early to further discuss reception and storage options !

For storage it is mandatory that containers have to be clearly and permanently labelled with name of the owner, the name of the substance and the appropriate hazard labels according to the Globally Harmonized System of Classification and Labelling of Chemical (GHS).

Under ***Usage requirements*** describe any special requirement that you need for using the sample at the instrument.

All samples and substances must be removed by you after completion of the experiments. In case you wish to dispose samples or substances on-site the waste disposal policy of European XFEL must be followed. The disposal collection vessels and procedures of disposal are provided by the Safety Group. Please contact the Safety Group for details (expsaf@xfel.eu).

Under **associated risks** you should describe any danger associated with the reception of the sample or subtance, the risk associated to any used equipment and or disposal of the substance.

1.1.2 Chemical properties of samples and substances

In this section information about properties of chemical samples and substances must be provided. This also includes chemical substances that occur in animals, microorganisms and plants, e.g. DNA or RNA fragments, antibodies, enzymes, natural and recombinant proteins.

Indicate the type of hazard(s) of the sample, following the Globally Harmonized System of Classification and Labelling of Chemical (GHS). This information can be for example found in the material safety data sheet. If this information is not known this should be mentioned in text box **other:.**

GHS 01 	Exploding bomb	For explosion or reactivity hazards
GHS 04 	Gas cylinder	For gases under pressure
GHS 08 	Health hazard	May cause or suspected of causing serious

		health effects
GHS 02 	Flame	For fire hazards
GHS 05 	Corrosion	For corrosive damage to metals, as well as skin, eyes
GHS 07 	Exclamation mark	May cause less serious helath effects or damage the ozone layer
GHS 03 	Flame over circle	For oxidizing hazards
GHS 06 	Skull and crossbones	Can cause death or toxicity with short exposure to small amounts
GHS 09 	Environment	May cause damage to the aquatic environment

1.1.3 Experiments with biological samples

According to the German and European biosafety legislation biological agents are

- micro-organisms, cell cultures and endoparasites including their genetically modified forms,
- agents associated with transmissible spongiform encephalopathy (TSE), that may constitute a hazard to humans as a result of infections, communicable diseases, toxin formation, sensitization or other effects which are harmful to human health.

The following substances are considered as equivalent to biological agents:

- *ectoparasites* which may cause autonomous diseases in humans or create sensitising or toxic effects,
- *technologically produced biological entities* with new properties that may pose a threat to humans in the same way as biological agents.

Micro-organisms are all cellular or non-cellular microscopically or sub-microscopically small biological entities which are capable of replicating or transferring material, in particular bacteria, viruses, protozoa and fungi.

Cell cultures are cells isolated from multicellular organisms and grown in vitro.

Toxins are metabolic products or cell components of biological substances which may have a toxic effect in humans when they are inhaled, ingested or absorbed through the skin, and may therefore result in acute or chronic damage to health or death.

A ***genetically modified organism*** (GMO) is any organism whose genetic material has been altered using genetic engineering techniques. Please specifiy Donor organism, genetic sequence, type of modification, use of vector and acceptor organism in detail.

Biological agents are classified into risk groups 1 to 4 according to the infection risk originating from them. The EU's legal classifications (Annex III to Directive 2000/54 EC), as well as additional national classifications, can be found in the technical rules of the biological substance ordinance (TRBA 460–468).

Classification of biological agents into risk groups

Risk	Biological agents that are unlikely to cause human disease

group 1	
Risk group 2	Biological agents that can cause human disease and might be a hazard to employees; they are unlikely to spread to the community; there is usually effective prophylaxis or treatment available,
Risk group 3	Biological agents that can cause severe human disease and present a serious hazard to employees; they may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available,
Risk group 4	Biological agents that cause severe human disease and are a serious hazard to employees; they may present a high risk of spreading to the community; there is usually no effective prophylaxis or treatment available.

For experiments at the beamlines, **only biological samples of risk group 1** can be used.

Biological agents of risk group 2 can only be handled in the support laboratory but not at the experimental stations. GMO samples of risk group 2 will require a notification towards the authorities prior to start of work. Therefore it is important to give as much details about the sample and sample handling in the sample section and in the laboratory support section from the beginning. The work description should include the following:

- a brief summary of your research project that explains the purpose and the aim of the project
- a work description with a flow diagram that explains the working steps (e.g. production of GMO) including the maximum volume of cell culture used.
- A list of vectors used

In case the proposal has been approved, the biological safety officer (Sigrid Kozielski, sigrid.kozielski@xfel.eu) may need further information on the GMO

work that you plan carry out. The complete documentation will be sent to the genetic engineering authority of Schleswig-Holstein accompanied by a letter from the Managing Directors of the European XFEL company for approval.

1.1.4 Radioactive samples or substances

The use of radioactive samples/substances is **not** feasible in early user operation. If you intend to prepare for using radioactive substances, pieces of equipment involving radiation or sources later in steady operation, please contact radiation protection officer of the Safety group (Eric Boyd, eric.boyd@xfel.eu) well in advance in order to check about feasibility conditions.

1.1.5 Nanomaterials

According to the COMMISSION RECOMMENDATION of 18 October 2011 (Directive 2011/696/EU) nanomaterials are defined as

“natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm - 100 nm.

In specific cases and where warranted by concerns for the environment, health, safety or competitiveness the number size distribution threshold of 50 % may be replaced by a threshold between 1 and 50 %.

By derogation from the above, fullerenes, graphene flakes and single wall carbon nanotubes with one or more external dimensions below 1 nm should be considered as nanomaterials.”

The most important measure to protect workers’ health is to minimize (reduce or eliminate) exposures to hazardous substances in the workplace. In order to minimize exposure to nanomaterials it is important that you indicate under protective measures all engineering controls and personal protective equipment that is required to carry out the experiment under safe conditions.

In case of question please contact the Safety group under expsaf@xfel.eu.

1.2 Equipment

Equipment brought in by you will need to be checked by the Safety group. Moreover, any equipment brought and supplied by you must conform to the appropriate European and German safety regulations.

In case the experiment has been rated yellow or red the Safety group will contact you for further information. A template for the risk assessment will be sent to you once the proposal has been approved and the beamtime is allocated. It must be returned by email to the Safety Group at least two weeks before the start of the experiment.

If you intend to bring a laser, the class and wavelength are mandatory as well as the supplier's certificate. This certificate indicates the type, class, wavelength and power, which are mandatory details for the laser safety officer of the Safety Group (Pouneh Saffari, pouneh.saffari@xfel.eu) . The Safety Group will ask for more information in the Safety Letter which you will receive once your beam time scheduled invitation is sent.

In case of questions contact the laser safety contact the laser safety officer of the Safety group (Pouneh Saffari, pouneh.saffari@xfel.eu).

If you need to carry out any electrical work for the installation of your equipment, you will also need to contact the Safety Group for authorisation. You will need to bring a document from your employer stating that you have the necessary technical and safety knowledge in this field. The same also applies to the use of lasers. There you will need to bring a document from the employer stating that you have the necessary technical and safety knowledge in operating the laser.

1.3 Start of experiment: Safety approval form

Based on the proposal the necessary safety rules are described in the Safety Approval Form (SAF), which is posted at the beamline with the following information:

- the period of validity
- the list of people carrying out the experiment
- a safety colour code
    - a green SAF for experiments which present no risk; consequently, the unattended operation mode is allowed;
    - a yellow SAF is delivered for experiments which need a particular check by the Safety Group at the beginning of the experiment, but where after this, the unattended operation mode is allowed;
    - a red SAF is delivered for experiments which present a risk; consequently, the unattended operation mode is forbidden: at least one person must be present at all times (24h a day) on the beamline. Do not commence a red experiment on a week-end or on bank holidays.
- information on measures to be taken during the experiment
- the risk analysis including comments from the SRP Group
- the signatures of the Safety officer of the SRP Group and the Beamline Responsible.

If there is a modification in the SAF e.g. a change in the name, validity or sample, **you must immediately contact the Safety group in order to re-validate your form**.

If your experiment has been rated yellow or red, once you are ready to start the experiment, you MUST contact the Safety Group to obtain your SAF.

At the end of the experiment, you must again contact the Safety group so that they may t check the inside of the experimental hutch.

2 Safety training

All users are required to follow the required online-safety trainings before submission of the A Form (user group registration).

Information how to carry out the safety training will be given with Safety letter which you will receive once your beam time scheduled invitation is sent.

Once you have successfully accomplished the online safety training a certificate must be printed out and sent by email to the user office for validation in the access control management system. Each user will receive a personal badge card once arriving on-site at the gate building located at the main entrance.

Beside the safety training for user experiments additional training requirements may be identified for users who plan to perform particular types of work while they are at the European XFEL. Before getting access to laboratories or laser rooms an additional on-site training is required and carried in person by the room responsible or local contact.

The group leader of the instrument or the local contact of the instrument will give an on-site training to the user prior to start of the experiment. This also includes the permission to carry out the area search in the experimental radiation protection hutch prior to XFEL beam operation and the knowledge of the control system.