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Apply for Beamtime

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Submission of proposals

The next submission for proposals for **AP38** is open. The AP covers the period **October 2025 - March 2026**. Proposals **must** be submitted by **Wednesday 19th March 2025 at 17:00hrs UTC+1/GMT+1.**

For submissions of proposals please see here: Apply for beamtime.

Diamond runs call for proposal every 6 months in the spring and the autumn, aiming for peer review meetings in May and October. The call goes out to users via email and the deadline will be listed here for your attention.

The peer review meetings will review proposals submitted for the following allocation periods which are set as:

1st week of April - end of September

1st week of October - end of March

The available beamline access routes are listed in the below. Proposals should be submitted on-line in UAS.

All relevant access routes (standard, BAG and rapid access - see also menu on the left) at Diamond will be peer reviewed and accepted on their scientific merit.

Resubmissions: you must make it clear in your proposal if it is a resubmission. Describe what you have changed to fulfill the panel's comments on the previous proposal.

If the proposal is awarded beamtime, it is expected that experimental results will be published. If you do not wish to publish your results, please approach our Industrial Liaison Office who offer a wide range of services to meet your research needs.

Important information on the pandemic working conditions at the beamlines can be found here.

Technical assessment and peer review of proposals

Please refer to the relevant information that each of the beamlines have published for you to gauge whether your proposal would be possible under current circumstances. You will find relevant information under each instrument's specific information here. During technical assessment it will be considered whether a proposal can be undertaken with or without users.

You must discuss your planned work with our instrument scientists and submit all proposals to UAS. In addition, please ensure that any outstanding reports are submitted and that your publications related to your previous beamtimes are in our database as the peer review panel will take these in to consideration during the review.

Life Science proposals and review

For MX beamlines (including Xchem), BioSAXS, eBIC, B23 and B24

In order to allow new projects to be considered a rapid access proposal can be submitted at any time. For MX the current status on facility access can be found here.

PI ORCID information

The Principal Investigator (PI) for a proposal must provide an ORCID ID in their registration details, and must have the status of Research Fellow or Academic Staff in UAS. Additionally all Diamond scientists including PDRAs and Support Scientists can apply as PIs providing they have the agreement of their PBS.

Standard Access BAG Access Long Term Access Rapid Access

Which Access Routes are available on each Instrument?

Please see the Access Routes table for the current offering at Diamond. Please visit this page to find out more about the science capabilities of each instrument.

Joint ISIS-Diamond proposals

There may be a need for some proposals to include a request for time at ISIS as well as at Diamond.

Proposals which require access to Diamond and ISIS should be sent to the facility and review panel which has the most appropriate expertise to judge the quality of the proposal. The choice of facility should be made considering the following factors:

1. Is most of the access required on one instrument? Is so, then you should send the proposal to the facility where most access is needed.
2. Is the demand or competition for one of the instruments considerably greater than all others? If this is the case then the proposal should be sent to the panel where the competition is highest.

For details on how to apply please also refer to our 'Preparing a Proposal in UAS' pages, under 'Instruments', as that guides users to people to consult in the application process dfor each instrument.

Access Routes

Which Access Routes are available on each Instrument?

Please see the table below for the current offering at Diamond. Please visit this page to find out more about the science capabilities of each instrument.

	Standard Access	BAG Access	Long Term Access	Rapid Access
DIAD	✓	✗	✗	✓
DL-SAXS	✓	✓	✗	✓
eBIC	✗	✓	✗	✓
E01	✗	✗	✗	✓
E02	✗	✗	✗	✓
E03	✗	✗	✗	✓
MX (I03,I04, I04-1)	✓	✓	✗	✓
XChem	✓	✓	✗	✓
VMXi	✓	✓	✗	✓
I05	✓	✗	✗	✓
I06	✓	✗	✓	✓
I06-1	✓	✗	✓	✓
I06-2	✓	✗	✓	✓
B07	✓	✓	✗	✓
I07	✓	✓	✓	✓
I08	✓	✗	✓	✓
I09	✓	✗	✗	✗
I10	✓	✓	✗	✗
I10-1	✓	✓	✗	✗
I11	✓	✓	✓	✓
I12	✓	✓	✓	✗
I13-1	✓	✓	✓	✓

I13-2	✓	✓	✓	✓
I14	✓	✗	✓	✓
I15	✓	✗	✓	✓
I15-1	✓	✓	✓	✓
B16	✓	✗	✗	✓
I16	✓	✓	✓	✗
B18	✓	✓	✓	✓
I18	✓	✓	✓	✓
I19	✓	✓	✓	✓
I20-Scanning	✓	✗	✓	✗
B21	✓	✓	✗	✓
I21	✓	✗	✓	✓
B22	✓	✗	✓	✓
B22 - Offline	✗	✗	✗	✓
I22	✓	✓	✓	✗
B23	✓	✗	✓	✓
I23	✓	✓	✗	✓
B24	✓	✗	✗	✓
I24	✓	✓	✓	✓

Source page = /Users/Apply-for-Beamtime/Access-Routes.html

Standard Access

The vast majority of proposals to Diamond are for standard access. Here the proposed work is a single experiment to be carried out during one or maybe two sessions at Diamond in the same allocation period.

All proposals should be submitted on line in UAS.

Workflow

The workflow for standard access is simple.

- Submit your proposal
- Diamond carries out a peer review of proposals and sends out results

If successful:

- Submit any dates that are impossible for you to attend Diamond (e.g. conference dates)
- Submit your session investigators and Experimental Risk Assessment (ERA)
- Attend Diamond and carry out your experiments
- Complete the session feedback
- Provide an experiment report, highlighting the outcome of your research at Diamond

Source page = /Users/Apply-for-Beamtime/Standard-Access.html

BAG Access

Introduction

Block Allocation Groups or BAGs are a mode of access whereby a group of users are awarded Diamond access which spans a 2 year period of four six-month allocation periods (APs), but can continue for longer.

BAGs have proved to be a remarkably effective access route for groups of users who require regular access to Diamond instruments and wherever consortia of users can work together. A common situation would be where complete and useful datasets can be collected in minutes, but where facilities have to award whole shifts (8 hours) or days. Administration of BAGs takes place in the Diamond User Administration System (UAS).

BAGs can enable measurements to be made in a more timely and efficient manner. Awarding a BAG allows users to organise themselves and set their own priorities. Successful BAGs grow out of strong collaborations, sometimes between a number of different organisations.

Diamond is keen for BAGs to be formed wherever it can be shown to be appropriate. Indeed, where a consortium of users has a consistent track record of successful exploitation of Diamond, a BAG may be viewed as the default access mechanism.

BAG proposals should be considered the normal mode of access for MX and eBIC proposals.

All BAG proposals should be submitted online in UAS.

An overview of the timeline for BAGs and LTPs can be found here. This also contains particular information for BAGs submitted for eBIC, MX and XChem, the first slides are relevant to any BAG or LTP.

For a guide on how to review the BAG stages see here.

BAG Roles and Responsibilities - see below

BAG requirements - submissions for AP37 (April - September 2025)

Please consult this document and align the stages of the BAG with your BAG progress in UAS - this will show you what to submit for AP37.

BAG progress guide

Updated documents needed are downloadable from UAS from within the proposal and this should be your main source of science case and reporting templates.

Additional Information

BAG Reports

BAG reports are submitted for every allocation period proposal stage, every 6 months, and a 18 month report is submitted for work done for the previous 3 APs period (continuing BAGs). The Peer Review Panels go through large numbers of proposals during their review and reports need to be succinct and provide concise information on what was achieved during the experimental period being reported on.

Participation in other Proposals

It is not usual for a member of a BAG to be on another proposal. Where the nature of the measurements is such that the two proposals are readily distinguishable this is permitted. If a member of a BAG submits a proposal for a measurement type that is already covered by the BAG a clear justification is required to explain why this work cannot be carried out under the BAG proposal.

Accepting new BAG Members

It is expected that, if an institution has regular access to a specific measurement type through a BAG, that BAG will welcome new members from their institute or institutions in close geographical regions.

Possible changes to BAG constitution

If a BAG is becoming too large, please propose a sensible division (i.e. one BAG per faculty) to Diamond and we will assist in forming two BAGs where one used to exist.

If a number of BAGs undertake similar research and are of a certain size and/or constitution the Peer Review Panel/Diamond may consider and advise on whether a merger is necessary.

WORKFLOW FOR A BAG PROPOSAL - 4 Allocation Period (2 years)

A BAG is awarded Diamond beamtime for two years consisting of four six-monthly allocation (or scheduling) periods. Each Diamond year is split in to two six-month allocation periods (APs). To determine which proposals will be awarded time in any period, Diamond runs a call for proposals twice a year.

A proposal submitted to the call with a deadline in the first week of April, will be considered for first Diamond use between October of that year and March of the following year. A proposal submitted to the call with a deadline in the first week of October, will be considered for the first experimental session at Diamond between April and September of the following year.

Figure 1: Steps in the life of a BAG

Whilst the Peer Review Panel will not re-grade the quality of science within the approved BAG project, it will be responsible for judging effective use of Diamond instruments, and the progress of the goals. In light of its assessment, the allocation of time can be revised and corrected for the allocation periods during the two years of the BAG proposal.

At each stage any major changes to the BAG such as change of PI should be considered and highlighted.

Period	**Activity**	**Detail**	**What is submitted?**
-2 AP	BAG proposal for **experiment in 1st AP**	At this stage the proposal is created and submitted within the Diamond User Administration System (UAS; uas.diamond.ac.uk). It is at this stage that the overall scientific programme for the BAG is presented for review. The scientific case for a BAG is only reviewed and graded once in its life cycle. Alongside the scientific case for support, there should be a justification of the instrument time that will be required to deliver the science proposed in the overall BAG research programme. In addition, a specific request should be made for the time needed in the first 6-month period.	The **BAG proposal,** including **science case,** and request for beamtime in the 1st AP
-1 AP	Request for BAG beamtime for **the 2nd experimental period**	At this stage it is necessary to: • check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the second allocation period.	Request for time in the 2nd AP

1st AP	Request for BAG beamtime for **the 3rd experimental period**	During the 1st allocation period it will be necessary to: • check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the third allocation period • submit a report for the work carried out in the third allocation period (depending on when in the allocation period the experiment(s) took place). • Request for time in the 3rd AP	**6 monthly** report (depending on when in the period the experiments took place)
2nd AP	Request for BAG beamtime for **the 4th experimental period**	During the 2nd allocation period it will be necessary to: • check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the fourth allocation period • submit a report for the work carried out in the 1st or 2nd allocation period.	Request for time in the 4th AP **6 monthly** report
3rd AP		During the 3rd allocation period it will be necessary to: • check that the proposal is still correct • submit a report for the work carried out in the 2nd or 3rd allocation period. • If decision to continue BAG, please see over – new proposal needed • **6 monthly** report	6 monthly report (or *18 month* report if planning a continuation of the BAG, see over)
4th AP	BAG completion 4th experimental period	Final experimental sessions are completed After completion of the full BAG proposal it is necessary to complete a final report to indicate the outcome of the proposed work. This will be reviewed alongside future proposals to Diamond.	**Final report**

Recurrent (continuing) BAG Lifecycle

During the two years of a BAG, it often becomes apparent that this mode of Diamond access is very useful to the members of the BAG and continuing proposals frequently become the norm. In order to enable continuous Diamond access for the BAG it is necessary to apply for

the new BAG by the end of the third allocation period of the current one. The new proposal will be evaluated during the fourth AP of the current one. If awarded, beamtime for the new proposal will begin immediately after the end of the current one, leading to a continuous workflow (Figure 2).

Figure 2: Steps in a Continuing BAG

Period	**Activity**	**Detail**	**What is submitted?**
-2 AP	BAG proposal for **experiment in 1st AP**	At this stage the proposal is created and submitted within the Diamond User Administration System (UAS; uas.diamond.ac.uk). It is at this stage that the overall scientific programme for the BAG is presented for review. The scientific case for a BAG is only reviewed and graded once in its life cycle. Alongside the scientific case for support, there should be a justification of the instrument time that will be required to deliver the science proposed in the overall BAG research programme. In addition, a specific request should be made for the time needed in the first 6-month period.	The **BAG proposal,** including **science case,** and request for beamtime in the 1st AP
-1 AP	Request for BAG beamtime for **the 2nd experimental period**	At this stage it is necessary to: • check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the second allocation period.	Request for time in the 2nd AP
1st AP	1st experimental period	During the 1st allocation period it will be necessary to: • check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the third allocation period • submit a report for the work carried out in the third allocation period (depending on when in the allocation period the experiment(s) took place). • Request for time in the 3rd AP	**6 monthly** report (depending on when in the period the experiments took place)
2nd AP	2nd experimental period	During the 2nd allocation period it will be necessary to:	**6 monthly** report

		• check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the fourth allocation period • submit a report for the work carried out in the 1st or 2nd allocation period. • Request for time in the 4th AP	
3rd AP	3rd experimental period	During the 3rd period from the BAG was first proposed a new BAG proposal needs to be prepared and submitted (1st submission of the continuation). Often this process will be a case of ensuring the accuracy of and updating the initial proposal. In addition, the report for the third allocation period becomes an 18 month report, enabling the panel to make a clear assessment of the work that has been achieved in the BAG to date.	**18 month report** New Proposal for continuing BAG (for 5th AP – 1st experimental period of continuing BAG)
4th AP	4th experimental period	At this stage it is necessary to: • check that the proposal is still correct • submit a specific request for the instrument time needed in the sixth allocation period of the continuing BAG (2nd experimental period).	Request for time in the 6th AP **6 month report**
5th AP	1st experimental period of cont. BAG	During the 5th allocation period it will be necessary to: • check that the proposal is still correct • submit a specific request for the instrument time needed in the seventh allocation period (3rd experimental period of the continuing BAG) • submit a report for the work carried out in the fourth or fifth allocation period (depending on when in the allocation period the experiment(s) took place).	Request for time in the 7th AP **6 month report**
6th AP	2nd experimental period	Process continues as above	

This cycle can be continued *ad infinitum*, provided the peer review panel remain happy that the science being proposed is of high quality and the BAG are making good use of the access being awarded.

Source page = /Users/Apply-for-Beamtime/BAG-Access.html

Long Term Access

Introduction - LTPs

Long Term Proposals (LTPs) are a mode of access whereby a PI can plan a series of experiments to take place over four six-month allocation periods. LTPs are useful where a series of experiments, potentially on different instruments, will be required in order to either answer a scientific problem or support the development of new instrumentation, a new technique or new community. The proposal must state the long term benefits expected from the successful implementation of the LTP that would be hard to consider in a series of individual standard proposals.

Users are requested to discuss any planned LTP in detail with the respective Diamond scientists before submission.

Within the proposal it must be clear how the experiments on the requested instruments form a single piece of work spanning the two year period, including an outline plan of the experiments or developments proposed over the period. In addition, only instruments accepting Long Term Proposals at the start of the proposal can be included. The award of an LTP is based on the scientific merit of the proposed science.

All Long Term proposals should be submitted on line in UAS.

Download the Guidelines for LTP submission in AP37

Useful guidance on LTP submission (see first couple of slides)

Roles Within LTPs

Principal Investigator

Each LTP has a Principal Investigator (PI). The PI is responsible for:

- all communication between the LTP and Diamond (e.g. User Office, beamline and safety staff)
- ensuring that members of the LTP are aware of the access within the allocation periods (APs) and are ready to perform experiments

- ensuring that all deadlines and reports within the User Administration System (UAS) are met including the experimental risk assessment (ERA) and report submission.

Alternate Contact

An LTP can have any number of Alternate Contacts (ACs) who have permissions in UAS to carry out all the administrative tasks of a PI. They are included on all communication sent by UAS to the LTP along with the PI.

The role of AC is reserved to experienced academic representatives from a collaborating institution or to a scientist/post-doc who has a delegated role to administer the LTP. An LTP can have a number of Alternate Contacts (ACs) who have permissions in UAS to carry out all the administrative tasks on behalf of a PI. They are included in all communication sent by the UAS to the LTP along with the PI.

Co-Investigator

Everyone who is on the proposal but is not the PI or an AC will be registered as a Co-Investigator (Co-I).

Long Term Proposal (LTP) requirements - submissions for AP37 (April--September 2025)

As we are still working off the issues around LTP progression we provide the LTP submission guidance here.

Please consult this document and align the stages of the LTP with your LTP progress in UAS - this will show you what to submit for AP37.

LTP progress guide

Workflow

A LTP is awarded Diamond beamtime for two years consisting of four six-monthly allocation (or scheduling) periods. Each Diamond year is split in to two six-month allocation periods (APs). To determine which proposals will be awarded time in any period, Diamond runs a call for proposals twice a year.

A proposal submitted to the call with a deadline in the first week of April, will be considered for first Diamond use between October of that year and March of the following year. A proposal submitted to the call with a deadline in the first week of October, will be considered for the first experimental session at Diamond between April and September of the following year.

Figure 1: Steps in the life of an LTP

Period	Activity	Detail	What is submitted?
-2 AP	LTP proposal for **experiment in 1st AP**	At this stage the proposal is created and submitted within the Diamond User Administration System (UAS; uas.diamond.ac.uk). It is at this stage that	The **LTP proposal,** including **science case,** and request

		the overall scientific programme for the LTP is presented for review. In addition, a specific request should be made for the time needed in the first 6-month period.	for beamtime in the 1st AP
-1 AP	Request for LTP beamtime for **the 2nd experimental period**	At this stage it is necessary to: • check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the second allocation period.	Request for time in the 2nd AP
1st AP	Request for LTP beamtime for **the 3rd experimental period**	During the 1st allocation period it will be necessary to: • check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the third allocation period • submit a report for the work carried out in the third allocation period (depending on when in the allocation period the experiment(s) took place). • Request for time in the 3rd AP	**6 monthly** report (depending on when in the period the experiments took place)
2nd AP	Request for LTP beamtime for **the 4th experimental period**	During the 2nd allocation period it will be necessary to: • check that the proposal is still correct (and highlight major changes, if any). • submit a specific request for the instrument time needed in the fourth allocation period • submit a report for the work carried out in the 1st or 2nd allocation period.	Request for time in the 4th AP **6 monthly** report
3rd AP		During the 3rd allocation period it will be necessary to: • check that the proposal is still correct	**6 monthly** report

		• submit a report for the work carried out in the 2nd or 3rd allocation period.	
4th AP	LTP completion 4th experimental period	Final experimental sessions are completed. After completion of the full LTP proposal it is necessary to complete a final report to indicate the outcome of the proposed work. This will be reviewed alongside future proposals to Diamond.	**Final report**

Whilst the Peer Review Panel will not re-judge the quality of science within the approved LTP, they will be responsible for judging effective use of Diamond instruments, and the progress of the goals and in the light of its judgement will adjust the allocation of time in subsequent allocation periods.

Source page = /Users/Apply-for-Beamtime/Long-Term-Access.html

Rapid Access

Rapid access is available for many of the instruments at Diamond. Rapid access applications can normally be submitted at any time, although some instruments hold a call for rapid access proposals.

There are different flavours of rapid access depending on the instrument required:

- Normal instrument access - you would attend a normal Diamond session for example to carry out a feasibility study or collect additional data for a publication of thesis.
- Fully remote instrument access - you would send your sample to Diamond and carry out you own experiment by logging in remotely to the beamline.
- Sample based access - you would send your sample to Diamond and our beamline science team will analyse it at a time when the instrument is not otherwise being used.

All proposals should be submitted on line in UAS.

Workflow

The workflow for rapid access is simple.

- Submit your proposal
- The Diamond PBS carries out a Peer Review of the proposal and sends out the results.

If successful:

- A session will be scheduled for your access

- Submit your session investigators and Experimental Risk Assessment (ERA)
- Carry out your experiments at Diamond, remotely or Diamond staff will do this
- Complete the session feedback
- Provide an experiment report, highlighting the outcome of your research at Diamond

Source page = /Users/Apply-for-Beamtime/Rapid-Access.html

Proprietary Access

Proprietary access is available for any user who wishes to make use of the instruments available at Diamond in order to carry out research which will not be made available via publication to a wider audience. This includes any research that is too sensitive to be made available to the peer review panels for assessment of the scientific merit or in reporting of the experiments carried out.

Such access to Diamond is managed by the Industrial Liaison Office, headed by Elizabeth Shotton. Please visit their pages to find out about the wide range of services that are available.

Source page = /Users/Apply-for-Beamtime/Proprietary-Access.html

Preparing a Proposal in UAS

All proposals to Diamond need to be submitted through the User Administration System (UAS). The process of preparing a proposal is split in to a number of sections each of which is outlined below.

If any support is required in using the UAS interface, please contact the User Office. If you do not already have an account in UAS you can register at: https://uas.diamond.ac.uk/uas/#register

Source page = /Users/Apply-for-Beamtime/Preparing-a-Proposal-in-UAS.html

Peer Review

Peer Review of Proposals

All proposals submitted to Diamond in the biannual call for proposals will be reviewed in a two-step process.

Technical Feasibility: The proposal is assessed by the relevant Principal Beamline Scientist or Senior Microscope Scientist to determine whether the proposed science can be carried out on the requested instrument.

Scientific Merit: An external peer review panel meet to assess and rank the proposals by scientific merit. The peer review panels make their recommendations to the Directors who approve the final decision.

Where the proposal is for Rapid Access the relevant Principal Beamline Scientist or Senior Microscope Scientist will review the scientific merit. For all commissioning calls or calls for friendly users, the relevant Diamond Director, instrument scientist and an external advisor review the proposals.

The main peer review panel meetings are usually in the fourth week of May and the third week of November.

The current membership of the peer review panels is given below. The panel chair person is indicated with bold text.

For Peer Reviewers

Information relevant to peer reviewers can be downloaded here.

Peer Reviewer Guidelines

Guide to using UAS for Peer Review

Honorarium Forms

Source page = /Users/Apply-for-Beamtime/Peer-Review.html

Frequently Asked Questions

Source page = /Users/Apply-for-Beamtime/Application-FAQs.html

Your Experiment

Source page = /Users/Experiment-at-Diamond.html

These pages will guide you through the things you need to consider as you plan your visit to Diamond

Before you Arrive

Diamond wants every element of your visit to go smoothly. Please take time to read the policies and corresponding rules, as well as this guide in preparation for your visit to Diamond. You can find the detailed information on our reimbursement rules here: Diamond Financial Support & Expenses Procedure for Diamond Users.

If you need a Visa or an ETA to enter the UK please ensure you apply for these in good time before the session and day of travel.

Hearing loop available

A portable hearing loop is available to all users, staff and visitors to borrow from the User Office should this be required, while at Diamond.

Please note: We ask for this to be signed out and it is your responsibility to return to the User Office after use.

What is a portable induction loop?

A portable hearing induction loop system is used to amplify sound in a given area for people who use hearing aids. It will help anyone with suitable hearing aids to pick up sound and will improve their quality of listening. A hearing loop will reduce background noise without compromising conversation confidentiality.

For use with hearing aids in the 'T' position, which is standard on most hearing aids.

More information can be found here.

Source page = /Users/Experiment-at-Diamond/Before-you-Arrive.html

Safety Video and Test

Safety Video

You must view the online safety video and take the safety test before you come to Diamond Light Source. There are no facilities available at Diamond for you to undertake the training here.

As an alternative to watching the video, users can access the following text script.

Please contact us should you experience any problems with viewing the video.

Safety Test

After watching the video, you will need to take the safety test online. Please ensure that at the end of the test you click through all the screens to ensurer your results are recongnised by the User Administration system. Once passed, the test remains valid for a period of 12 months.

Source page = /Users/Experiment-at-Diamond/Before-you-Arrive/Safety-Video-and-Test.html

Your time at Diamond

Diamond wants every element of your visit to go smoothly. This guide provides information to meet your needs while you are with us at Diamond.

On arrival to the Harwell Science and Innovation Campus there are two places most people need to identify.

Main Gate (R75)

Report to the Main Gate of the UKRI site where Diamond is located. If you are not in posession of your user pass please report to reception. If you already have you user pass you can access site via the turnstile on the left hand side of the main gate buiding.

Ridgeway House (R87)

To find Ridgeway House from the Main Gate, walk straight to the the end of the pathway, cross over the road at the zebra crossing, turn left then a sharp right.

RAL site map

Instruments

Please arrive between 09:00 and 14:00 to ensure you receive your training. Otherwise, you should arrive at the synchrotron at a time agreed with your local contact.

The beamlines are numbered in a clockwise direction.

I14, eBIC and ePSIC are housed in an external buildings which are immediately behind the R22 restaurant when coming from Diamond House.

The I13 instruments are in a separate building alongside I14 on Road Five, and can be accessed from the rear of Diamond House.

Source page = /Users/Experiment-at-Diamond/Your-time-at-Diamond.html

After you Leave

After you have finished your experiment at Diamond you may have a few tasks to do to ensure your time with us is completed correctly.

Source page = /Users/Experiment-at-Diamond/After-you-Leave.html

Frequently Asked Questions

Source page = /Users/Experiment-at-Diamond/Experiment-FAQs.html

IT User Guide

Information on accessing, copying, and retreiving data, FedIDs, remote desktops, Linux, visitor WiFi, and more...

More: Bring your own kit // Linux help // Printing help // Software at Diamond

Source page = /Users/Experiment-at-Diamond/IT-User-Guide.html

I am on-site

Get to your data from a Diamond desktop (read-write) or your own laptop using the GOVWIFI Network (read-only). Register with GOVWIFI at Connect to GovWifi - GovWifi

The GOVWIFI Network is accessed by Wi-Fi by registering or over a wired connection on a beamline (Black Cat 6 patch cables).

Copy data during acquisition to the beamline's designated Data Dispenser hardware.

More: Bring your own kit // Linux help // Printing help // Software at Diamond

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/At-DLS.html

Access your data

Get to your data from a Diamond computer or from your own laptop on the visitor network

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/At-DLS/Access-data.html

Back-up your data

Notes

A 'Clone' is a unique process for copying the data into the area you specify.

You can define more than one Clone for a visit if required (each needs its own external hard drive)

Users can only define and manage Clones for their own visits; Beamline Staff can manage all visits.

What type of hard-drive should I use?

You can use either USB-2 or USB-3 connections. (Newer DataDispensers do not have eSATA interfaces).

1. Your Disk should be a USB3 device
2. If you are using USB3, the connecting cable must be a USB3 Cable
3. The disk must be formatted with either NTFS or ext3/ext4.

Mac formatted disks (e.g. HFS+) are explicitly NOT supported.

Questions? Contact Matthew Webber by e-mail or on Ext: 8657

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/At-DLS/DataDispenser.html

Bring your own kit

Experimental equipment

A Beamline Visitor Instrumentation Network will be made available to connect users' equipment that needs access to the beamline network. e.g. Specialist sample environments.

Process Variables (PVs) published by the beamline are visible on this network. Users must give at least 2 weeks advance notice if they require the use of this network. For more information regarding experimental equipment, Please consult your Beamline contact.

Laptops, tablets, smartphones

These devices must not be connected to any Diamond Network other than the Visitor Network either wirelessly (SSID - "DLS-VIS") or wired connection (Black CAT6 cables only).

External hard disk drives

It is recommended that only hard-disk drives with their own power supply are used in conjunction with the Beamline DataDispensers as it has been found that hard-disk drives that draw power from the data bus can be unreliable in heavy use.

You can use either USB-2 or USB-3 connections. (Newer DataDispensers do not have eSATA interfaces). USB-3 is faster so long as these 3 requirements are all satisfied:

1. Your Disk must be a USB-3 device
2. The connecting cable must be a USB-3 Cable
3. You must use a USB-3 port on the DataDispenser
4. If the drive is formatted FAT or Ex-FAT (windows) then they are not normally compatible within the linux file system and aren't recognised
5. Disks with Linux partitions Ext3 etc work, as does NTFS, and it may be necessary to format them like that to get them working

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/At-DLS/BYO.html

Printing help

Naming conventions

All printer names in Diamond follow a naming scheme. Additionally, all printers have a name tag. A printer name will contain the building, the room the printer is in, the printer type, and a printer number. Thus, Diamond House printers will be called dh.floor.room.type.no, in the synchrotron building s.floor.room.zone.type.no and beamline printers beamline.room.type.no, e.g.

dh.g.51.bw.1	Diamond House: black/white printer, room G.51 (ground floor)
s.1.13.z02.co.1	Synchrotron building: colour printer, room 1.13, zone 02 (1st floor)
b.i16.cc4.col.1	Beamline I06: colour printer in CC4

A full list of printers and their location can be found here: http://print.diamond.ac.uk:631/printers

Printing from the Visitor Network

Diamond's print server is available via the open visitor WiFi network (DLS-VIS), i.e. visitors bringing their own computers and connecting them to DLS-VIS should be able to send output to any Diamond printer following the above instructions.

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/At-DLS/Printing.html

I am off-site

Diamond computers can be accessed from your own computer with the NoMachine software.

During your beamtime you can perform experiments or access data.

Outside beamtime you can view and analyse data, and access other Diamond computer resources.

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Get your data from a previous session. There are two separate routes depending on whether your visit was under or over 40 days ago.

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/Not-at-DLS.html

Access Diamond desktop

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/Not-at-DLS/Nomachine.html

Retrieve data post-session

If your session was **fewer than 40 days ago**, your data will still be on the Diamond file system. Use Globus Online to transfer datasets over 20GB, or FTP, SFTP or rsync for under 20GB.

If your visit was **more than 40 days ago** it has probably been removed from the beamline storage systems. Use TopCAT to access your data from the archive. For Diamond Light Source data restore help, learn more here.

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/Not-at-DLS/Retrieve-data.html

FAQs

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/FAQs.html

Diamond IT Policies

Experimental Data Management Policy
Diamond is committed to ensuring that there is transparency in the manner in which
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Experimental Data produced using Diamond Facilities is owned, stored, accessed and managed.

The purpose of this policy is to provide Users conducting Peer Reviewed Research with information and guidance on Experimental Data ownership, storage, access and management and to ensure that Experimental Data is managed and used in ways that maximises public benefit.

Read the Diamond Experimental Data Management Policy

Acceptable Use Policy
Diamond adhere to the Acceptable Use Policy as provided by JISC:

https://community.jisc.ac.uk/library/acceptable-use-policy

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/Policies.html

Software

Listed below are some of the key software packages used at Diamond

ISPyB - Used on the MX (Macromolecular Crystallography) beamlines to manage your experiment progress before, during and after your visit.

Generic Data Acquisition (GDA) - Used to collect the data during experiments.

Data Analysis WorkbeNch (DAWN) - Use DAWN to analyse the data produced on the beamline.

NoMachine - Used for connecting remotely to beamline desktops.

DataGateway - Used to browse and download archived data from beamline experiments.

Source page = /Users/Experiment-at-Diamond/IT-User-Guide/Software.html

Policies

Source page = /Users/Policy-Documents.html

Diamond has a number of policies surrounding User access to Diamond. Please find these policies in full in this section.

In addition to the main policy document, in a number of cases there is a corresponding set of procedures or rules that apply within these policies.

Please read both the policy and the procedures/rules to ensure you are aware of the current process in place at the time of your visit.

Please do not hesitate to contact the User Office should you have any questions.

Policies

Rules

Safety, Health and Environment Social Media Financial Support and Expenses Procedure for Diamond Users

Policies

Diamond has a number of policies surrounding User access to Diamond. Please find these policies in full in this section.

In addition to the main policy document, in a number of cases there is a corresponding set of rules that apply within these policies.

Please read both the policy and the rules to ensure you are aware of the current process in place at the time of your visit.

Legacy policies

Experimental Data Management Safety, Health and Environment Publications and Open Access Social Media Eligibility for Financial Support Travel Accommodation Subsistence IT Acceptable Use Ethics Policy Code of Best Practice in the Conduct of Scientific Research Equality, Diversity and Inclusion Policy

Source page = /Users/Policy-Documents/Policies.html

Terms and Conditions for Peer Reviewed Facility User Access

By submitting your proposal or using the facilities at Diamond Light Source Limited ("Diamond"), Harwell Science and Innovation Campus, Oxfordshire ("Diamond Facilities"),

you are agreeing to the following terms and conditions on behalf of yourself and the organisation which you represent (the “Establishment”) and you warrant that you are duly authorised to do so on behalf of that Establishment. In these terms and conditions the words “you” and “your” shall refer both to you and to that Establishment.

Source page = /Users/Policy-Documents/Policies/Academic-User-Terms-and-Conditions.html

Terms and Conditions for Proprietary Beamtime

Your access to Diamond facilities is governed by terms and conditions which have been agreed with your employer and it is your responsibility to ensure that you are familiar with these terms and conditions. Please contact your employer should you have any queries regarding the terms and conditions and/or to obtain a copy of the terms and conditions. In the event that you are unsure as to who to contact within your organisation, please feel free to contact our Industrial Liaison Office.

For further information please see here for details from the Industrial Liaison Office.

Source page = /Users/Policy-Documents/Policies/Proprietary-User-Terms-and-Conditions.html

Financial Support & Expenses Procedure for Diamond Users

This page is printable. Please use your browser's print function to print or save as a PDF.

Procedural updates 2024 and 2025

Diamond has updated its expense procedure for users and you can find a summary of this here.

There are changes to the way Users at UK affiliations will be funded from September 2024, non-UK users will be funded from April 2025, and changes to rules on taxi transfers from September 2024 that applies to all eligible users.

Non-UK countries affected by changes to the expense procedure from 1st April 2025 are listed here.

It is crucial that you familiarise yourself with the procedure as this is what your claims will be assessed against.

Source page = /Users/Policy-Documents/Policies/Financial-Support---Expenses-Procedure-for-Diamond-Users.html

Safety, Health and Environment

Definitions

For the purposes of this policy, the following definitions shall apply:

Diamond: Diamond Light Source Ltd, a company incorporated and registered in England and Wales, with company number 4375679 and with registered office at Diamond House, Harwell Science & Innovation Campus, Didcot, Oxfordshire, OX11 ODE, United Kingdom.

Diamond Employee: Any person working for Diamond under a contract of employment.

Diamond Instruments: All research facilities made available by Diamond.

Diamond Users: Diamond Users shall include the following persons making use of Diamond instruments: scientists and engineers from academia, research councils and charitable institutions, researchers from commercial and non-commercial organisations and Diamond employees.

SHE: Safety, health and environment.

You: Diamond Users and all persons working with us, for us, or on our behalf in any capacity, including Diamond Employees, directors, officers, joint appointees, seconded workers, collaborators, students, volunteers, interns, agents, contractors (specifically including suppliers and casual and agency staff), external consultants and third-party representatives.

Source page = /Users/Policy-Documents/Policies/Safety--Health-and-Environment-Pol.html

Eligibility for Financial Support

Definitions

For the purposes of this policy, the following definitions shall apply:

Alternate Contact: Any number of people on a proposal can be identified as Alternate Contacts. Within the UAS they have the ability to carry out all the functions of a Principal Investigator and are considered to do so at the discretion of the Principal Investigator.

BAG Access: A proposal submitted to the BAG access route in UAS. A BAG (Block Allocation Group) is a group of scientists, potentially from more than one institute, who compose a joint proposal to Diamond, in order to receive regular access to Diamond over a two year period.

Commissioning Call: When an instrument is new or developing a new technique, it is customary to appeal to the user community for relevant proposals. This call for users is known as a commissioning call. Proposals submitted in response to a commissioning call will be in the commissioning access route in UAS.

Diamond: Diamond Light Source Ltd, a company incorporated and registered in England and Wales, with company number 4375679 and with registered office at Diamond House, Harwell Science & Innovation Campus, Didcot, Oxfordshire, OX11 ODE, United Kingdom.

Diamond Employee: Any person working for Diamond under a contract of employment.

Diamond Users: Diamond Users shall include the following persons making use of Diamond instruments: scientists and engineers from academia, research councils and charitable institutions, researchers from commercial and non-commercial organisations and Diamond employees.

Diamond Instruments: All research facilities made available by Diamond.

In House Research: Diamond has an allocation of instrument time for Diamond employees and their collaborators. This instrument time is known as In House Research.

Long Term Proposal: A proposal submitted to the long term access route in UAS. A small number of proposed experiments require regular access to Diamond over a two year period in order to carry out a more significant experiment.

Offline Laboratory: Any access to instruments at Diamond that do not require submission of a proposal. Usually this is access to equipment not attached to the synchrotron machine, eBIC or ePSIC.

Principal Investigator: One person is identified as Principal Investigator on every proposal. They are considered as the person ultimately responsible for the proposal and all experimental sessions carried out on that proposal.

Proprietary Users: A subset of Users, who pay for their access to Diamond in order to ensure that their research remains confidential.

Rapid Access: A proposal submitted to the rapid access route in UAS. These are usually for an experiment that needs to be carried out urgently to complete a paper or thesis or to provide initial data or proof-of-principle for a standard proposal.

Standard Access: A proposal submitted to the standard access route in UAS. The majority of proposals to Diamond are in this category and are usually for one or two sessions at Diamond in a specific six month time period.

UAS: The User Administration Software (UAS) is used to record User information and to facilitate the logistics of proposal and session management.

Source page = /Users/Policy-Documents/Policies/Eligibility-for-Financial-Support-Pol.html

IT Acceptable Use

Diamond adhere to the Acceptable Use Policy as provided by JANET

https://community.jisc.ac.uk/library/acceptable-use-policy

Source page = /Users/Policy-Documents/Policies/Acceptable-Use-Pol.html

Rules

Safety, Health and Environment Social Media Financial Support and Expenses Procedure for Diamond Users

Source page = /Users/Policy-Documents/Rules.html

Safety, Health and Environment

Source page = /Users/Policy-Documents/Rules/Safety--Health-and-Environment-Rules.html

Social Media

Source page = /Users/Policy-Documents/Rules/Social-Media-Rules.html

User Committee (DUC)

Source page = /Users/DUC.html

Diamond recognises that close interaction with the user community is essential to provide the most effective service and get the maximum benefit from the investment that has been made in Diamond. To achieve this, the Diamond User Committee (DUC) has been set as a platform for discussion between Diamond and the user community of matters relating to the operation and strategy of Diamond. The committee is chaired by Prof Andrea Russell.

- The twenty-first meeting was held at Diamond on the 17 September 2019.
- The twentieth meeting was held at Diamond on the 12 February 2019 and details are available here.
- The nineteenth meeting was cancelled.
- The eighteenth meeting was held at Diamond on the 13 March 2018 and details are available here.

- The seventeenth meeting was held at Diamond on the 26 September 2017 and details are available here.
- The sixteenth meeting was held at Diamond on the 21 March 2017 and details are available here.

The next meeting of the Diamond User Committee will take place in Autumn 2020 at Diamond Light Source. If you have any topics or issues which you would like to raise at this meeting then please contact the relevant committee member.

Terms of reference for committee members.

Membership

Science Group		
Macromolecular Crystallography (MX) I03, I04, I04-1, I23, I24, VMXi, VMXm, HeXI, XFEL-Hub, MPL	Dr Colin Levy c.levy@manchester.ac.uk	Dr David Briggs david.briggs@crick.ac.uk
Soft Condensed Matter I22, B23, B22, B21	Dr Matthew Derry m.derry@aston.ac.uk	Dr Arwen Tyler a.i.i.tyler@leeds.ac.uk
Magnetic Materials I06, I10, B16, I16, I21	Dr Hariom Jani hariom.jani@physics.ox.ac.uk	Dr Robin Perry robin.perry@ucl.ac.uk
Crystallography I11, I15, I15-1, I19	**Nominations open for this post**	Dr Enrique Jimenez-Melero e.jimenez-melero@bham.ac.uk
Structures and Surfaces I05, B07, I07, I09	Dr Rosa Arrigo r.arrigo@salford.ac.uk	Dr Anna Regoutz a.regoutz@ucl.ac.uk
Spectroscopy I18, I20-1, I20-2, B18,	Prof Andrea Russell A.E.Russell@soton.ac.uk	Dr Silvia Ramos-Perez S.Ramos-Perez@kent.ac.uk

Biological Cryo-Imaging eBIC, B24, Cryo-Fluorescence microscopy	Dr Natasha Lukoyanova n.lukoyanova@mail.cryst.bbk.ac.uk	Dr Jamie Blaza jamie.blaza@york.ac.uk
Imaging and Microscopy I08, DIAD, I12, I13-1, I13-2, I14, ePSIC	Dr James Everett j.everett@keele.ac.uk	Dr Alexander Lunt ajgl20@bath.ac.uk

Students/Postdocs and Early Career representatives	
Student Biological and Life Sciences	Benjamin Nash B.Nash@uea.ac.uk
Student Chemical and Physical Sciences	Hayley Gilbert hg479@cam.ac.uk
Early Career/Postdocs Biological and Life Sciences	Dr Charlie Collingham c.j.collingham@reading.ac.uk
Early Career/Postdocs Physical and Chemical Sciences	Dr Reshma Rao reshma.rao@imperial.ac.uk

Source page = /Users/DUC/Membership.html

Meetings

Twenty-first Meeting - 17 September 2019

The Twenty-first meeting was held at Diamond on 17th September 2019. The agenda is below.

- Agenda
- Minutes

Twentieth Meeting - 12 February 2019

The Twentieth meeting was held at Diamond on 12th February 2019. The approved minutes and agenda are below.

- Agenda
- Minutes

Eighteenth Meeting - 13 March 2018

The Eighteenth meeting was held at Diamond on 13th March 2018. The approved minutes and agenda are below.

- Agenda
- Minutes

Seventeenth Meeting - 26 September 2017

The Seventeenth meeting was held at Diamond on 26th September 2017. The approved minutes and agenda are below.

- Minutes
- Agenda

Sixteenth Meeting - 21 March 2017

The Sixteenth meeting was held at Diamond on 21st March 2017. The approved minutes and agenda are below.

- Minutes
- Agenda

Fifteenth Meeting - 27 September 2016

The fifteenth meeting was held at Diamond on 27th September 2016. The approved minutes and agenda are below.

- Minutes
- Agenda

Fourteenth Meeting - 22 March 2016

The fourteenth meeting was held at Diamond on 22nd March 2016. The approved minutes and agenda are below.

- Minutes
- Agenda

Thirteenth Meeting - 22 September 2015

The thirteenth meeting was held at Diamond on 22nd September 2015. The approved minutes and agenda are below.

- Minutes
- Agenda

Twelfth Meeting - 17 March 2015

The twelfth meeting was held at Diamond on 17th March 2015. The approved minutes and agenda are below.

- Minutes
- Agenda

Eleventh Meeting - 23 September 2014

The eleventh meeting was held at Diamond on 23rd September. The approved minutes and agenda are below.

- Minutes
- Agenda

Tenth Meeting - 18 March 2014

The tenth meeting was held at Diamond on 18th March 2014. The approved minutes and agenda are below.

- Minutes
- Agenda

Ninth Meeting - 24 September 2013

The ninth meeting was held at Diamond on 24th September 2013. The approved minutes and agenda are below.

- Minutes
- Agenda

Eighth Meeting - 5 March 2013

The eighth meeting was held at Diamond House on 5 March 2013 The approved minutes and agenda are below.

- Minutes
- Agenda

Seventh Meeting - 18 September 2012

The seventh meeting was held at Diamond House on 18 September 2012. The approved minutes and agenda are below.

- Minutes
- Agenda

Sixth Meeting - 20 March 2012

The Sixth meeting was held at Diamond House on 20 March 2012. The approved minutes and agenda are below.

- Minutes
- Agenda

Fifth Meeting - 6 September 2011

The fifth meeting was held at Cosener's House on 6 September 2011. The approved minutes and agenda are below.

- Minutes
- Agenda

Fourth Meeting – 1 February 2011

The fourth meeting was held at Diamond on 1 February 2011. The approved minutes and agenda are below.

- Minutes
- Agenda

Third Meeting - 8 September 2010

The third meeting was held at Diamond on 8 September 2010. The approved minutes and agenda are below.

- Minutes
- Agenda

Second Meeting - 12 February 2010

The second meeting was held at Diamond on 12 February 2010. The approved minutes and agenda are below.

- Minutes
- Agenda

First Meeting - 23 June 2009

The Diamond User Committee had their first meeting at Diamond on 23rd June 2009. The minutes of the meeting along with all documentation presented by Diamond staff can be found below along with the meeting's agenda.

- Minutes from the first DUC Meeting
- Agenda for Meeting.

After the meeting members nominated Dr Joanna Collingwood as Chair of the Committee via an e-mail election.

Source page = /Users/DUC/Meetings.html

Safety, Health & Environment

Source page = /Users/SHE.html

Instructions for Users

Induction: Users coming to site - complete the induction training & test prior coming to Diamond (valid for 12 months).

Policy & procedures: Read and understand Diamond's SHE Policy statement. Read and adhere to the procedures relevant to the type of work you are conducting at Diamond.

User Safety Rules: Read and adhere to all Diamond rules.

Experimental Work Instructions: Read and adhere to the work instructions relevant to the work you are conducting at Diamond.

Laboratory Handbooks: Read and adhere to the handbooks relevant to the laboratory type that you shall be using at Diamond.

Laboratory Standard Risk Assessments: These assessments can be referenced when completing the laboratory section of your experimental risk assessment.

Contact your Diamond Local Contact if you have any questions or issues.

Induction

Safety Video and Test

TEST BELOW IS CURRENTLY UNDER TESTING AND SHALL NOT BE USED UNTIL FURTHER NOTICE.

Please complete the test on following link instead: Safety Video and Test.

Source page = /Users/SHE/Induction.html

Policy & Procedures

Instructions for Users

Read and understand Diamond's SHE Policy statement. Read and adhere to the procedures relevant to the type of work you are conducting at Diamond.

Source page = /Users/SHE/Policy---Procedures.html

Policy Statement

As part of its endeavour to be a leading-edge scientific research facility, the Board of Diamond Light Source Ltd (Diamond) considers the effective management of safety, health and environmental (SHE) matters to be of prime importance. As such, it undertakes to provide a safe, healthy and environmentally sound workplace.

The Chief Executive Officer (CEO) has overall responsibility for SHE and ensures that the Executive and the Board proactively considers and reviews SHE issues. Executive members and associated management and supervisory teams will determine and commit sufficient resources and effort within their functional area to achieve SHE obligations. This includes the appointment of competent persons and advisers.

Executive members are committed to ensuring cooperation and coordination across Diamond groups and expect management to actively lead this process within Diamond and with contractors, users, and other interested parties.

Diamond’s SHE management system is modelled on recognised standards and will be achieved by integration with its management processes. This includes a commitment to continuous improvement and the setting of objectives. Clear performance indicators will be monitored, together with suitable audit and review processes.

Compliance with relevant SHE legislation, codes of practice and guidance are regarded as the minimum standard to be achieved. Diamond is committed to injury and ill-health prevention, minimisation of pollution and resource usage and promotion of positive mental and physical wellbeing. This includes designing, managing and maintaining its premises, structures and equipment so as to minimise the SHE risks associated with their construction, maintenance, use and decommission.

Diamond actively consults employees on SHE matters and fully accepts its responsibilities to users, visitors, contractors and others affected by its activities. Diamond requires such persons to cooperate with implementing this policy, associated rules and procedures. Employees are expected to work safely and adhere to the letter and spirit of this policy and report any practices or conditions that pose risk to safety, health or the environment.

Source page = /Users/SHE/Policy---Procedures/Policy.html

Radioactive Samples

Users bringing **radioactive samples** to Diamond shall read and adhere to Procedure for Radioactive User Samples at Diamond

Users accessing the **Active Materials Laboratory (AML)** shall read and adhere to Local Rules for the Active Materials Laboratory.

Source page = /Users/SHE/Policy---Procedures/Radioactive-Samples.html

Human Tissue

Human tissue samples ("'relevant material" i.e. material that consists of, or includes, human cells) are not permitted at Diamond unless they are covered by a UK Research Ethics Committee (REC) approval.

Ethical approvals obtained locally within the UK or outside the UK do not apply.

UK REC approval can take 6-8 weeks to obtain. Evidence of approval shall be provided three weeks to Diamond before a User visit.

Further information is available at Human Tissue Authority

Source page = /Users/SHE/Policy---Procedures/Human-Tissue.html

User Rules

Diamond is committed to injury and ill-health prevention, minimisation of pollution and resource usage and promotion of positive mental and physical wellbeing. These rules have been developed with a view to providing a safe, healthy and environmentally sound workplace.

The rules should be read together with Diamond's Safety, Health and Environmental Policy.

The rules apply to all Diamond Users and persons working with us, for us, or on our behalf in any capacity, including Diamond Employees, joint appointees, seconded workers, collaborators, members of our advisory groups/committees, members of our peer review panels, students, volunteers, interns, agents, contractors (specifically including suppliers and casual and agency staff), external consultants and third-party representatives ("you").

Definitions of certain terms used in these rules are included in Diamond's Safety, Health and Environmental Policy.

Source page = /Users/SHE/User-Rules.html

Experimental Work Instructions

Instructions for Users

Read and adhere to the work instructions relevant to the work you are conducting at Diamond.

Source page = /Users/SHE/Experimental-Instructions.html

High Temperatures

Scope

This experimental work instruction applies to experimental equipment operating at temperatures above 100°C.

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

Assurances that User-provided equipment achieves the relevant;

- Essential Safety Requirements (see below);
- Essential Information Requirements (see below);
- Assurances that Users coming to Diamond achieve the relevant;
- Essential Competency Requirements (see below);
- Assurances that the equipment is compliant with the safety requirements of the home institution.

Diamond Local Contact shall ensure compliance with the following for Diamond provided equipment:

- Essential Information Requirements (see below);

- Essential Safety Requirements (see below);
- Essential Competency Requirements (see below).

Pre-experiment

Diamond Local Contact shall ensure that the above pre-visit requirements for User provided equipment is reviewed by a competent mechanical technician or engineer. This shall include inspection of the equipment.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist (see below).

Essential Safety Requirements

Equipment and components shall be:

- Rated and compatible for the intended temperatures, sample environment, and set-up conditions at Diamond;
- Suitably tested ensure safe operation at Diamond. Non-standard set-ups shall be commissioned and tested prior to coming to Diamond;
- Suitably maintained and inspected to ensure safe operation at Diamond;
- Safely packaged & transported to Diamond to prevent damage that could affect safe operation;
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls. (Ref Essential Hazard & Failure Mode Checklist);
- Fitted with suitable safety devices (e.g., over-temperature cut-off);
- Labelling: Equipment CE / UKCA marked or has an appropriate declaration of conformity;
- Provided with safe operating procedures / instructions.

Essential Information Requirements

Information required:

- A full description of the proposed experimental setup & technical specifications;
- Material details including flash points, auto-ignition temperatures, reaction / decomposition products, etc.;
- Sample environment details including temperature range;
- Safe operating procedure / operating manual / instructions for any equipment not provided by Diamond;
- Evidence that equipment has a valid portable appliance test.

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, test, and operation of the equipment, materials, risks and required safety controls to ensure safe setup;
- Have sufficient skills and be practiced in the safe setup and operation of the specific equipment, materials, risks and required safety controls used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements to ensure safe setup.

Persons operating equipment shall:

- Have sufficient experience and be practiced in safe sample changing, use of emergency stops and safety critical steps (e.g., thermocouple placement) to ensure safe operation;
- Have sufficient skills and be practiced in safe sample changing, use of emergency stops and safety critical steps (e.g., thermocouple placement) of the specific equipment used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements, risks, and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency;
- Be suitably supervised if they do not have sufficient skills, knowledge, and experience.

Essential Experimental Setup Checklist

- Persons setting up the equipment meet the Essential Competency Requirements;
- Guarding: Hot parts and components shall be sufficiently guarded;
- Temperature verification equipment has been issued and persons operating the equipment are trained how to use it;
- Component ratings are suitable for the working temperatures. Components are correctly rated for the conditions, materials and temperatures that will be experienced;
- Fire detection isolations have been completed (if required);

- Furnace, flow cell or other equipment is correctly assembled and functioning (check interlocks, e-stop, cooling water lines, etc.);
- Visual inspection of the set-up is carried out;
- Cleaning: The furnace, flow cell or other equipment is clear of previous samples;
- Temperature controller is set below the auto-ignition temperature (if applicable);
- Manufacturer's instructions (where applicable) have been followed during setting up;
- Formation of a flammable atmosphere is prevented during normal operations and is unlikely in foreseeable accident conditions;
- Modifications from planned setup have been checked by a competent person.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements;
- Visual check of the set-up is carried out before every operation;
- Modifications to the planned set-up are done by a competent person and checked against the Essential Experimental Setup Checklist;
- Safety controls stated in the User Experimental Risk Assessment (ERA) (or lab form) are applied, and the ERA has been graded and validated;
- Safety controls stated in both the beamline risk assessment and any Diamond equipment risk assessment are applied;
- Suitable supervision of the experiment is in place to ensure safety;
- Failure modes of the set-up are understood by all persons supervising the experiment;
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage;
- Emergency conditions and required action is understood by all persons supervising the experiment;
- Emergency action to take on the fire alarm sounding is understood by all persons supervising the experiment;
- Emergency action on power outage is understood by all persons supervising the experiment;
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment.

Essential Hazard & Failure Mode Checklist

The main hazards are:

- Hot surface personal contact, either with heater or hot test samples;
- Fire from flammable materials in contact with heating element or heat source;
- Fire from overheating element or other heat source;
- Fire resulting from failure of components, either heating element, supply leads, power supply or other component;
- Fire resulting from the escape of flammable liquids or gases;
- Electrocution from personal contact with high voltage / high current supply.

Principal failure modes are:

- Poor equipment and / or system design;
- Poor installation / setup;
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- An unsafe system of work;
- Operator error, poor training / supervision.

Source page = /Users/SHE/Experimental-Instructions/High-Temperatures.html

Hazardous Substances

Scope

This experimental work instruction applies to the use of High Health Hazard Substances which include those that are classified as, or expected to be, sensitizing, carcinogenic, teratogenic, mutagenic or toxic for reproduction (or similar hazard). It also includes nanomaterials / nanoparticles.

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

- Essential Information Requirements (see below);
- Assurances that Users coming to Diamond achieve the relevant Essential Competency Requirements (see below)

Pre-experiment

Diamond Local Contact shall ensure that the above pre-visit requirements for the User are achieved.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist (see below).

Essential Safety Requirements

High health hazard substances shall be:

- Eliminated or replaced with non-hazardous or less hazardous substances where reasonably practicable;
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls.(ref Essential Hazard & Failure Mode Checklist);
- Used in the lowest quantities / concentrations possible;
- Safely packaged & transported to Diamond, and meet dangerous goods requirements (where applicable);
- Contained or enclosed to minimize handling and contamination risks;
- Suitably ventilated, where enclosure is not possible;
- Clearly labelled including name, hazards and owner;
- Handling: good laboratory practice to be followed when handling materials especially in peripheral lab spaces;
- Notified to high-risk groups (e.g., New and Expectant Mothers (NAEMs), immunocompromised persons, etc.).

Essential Information Requirements

Information required:

- A full description of the proposed experimental setup & technical specifications;
- Substance and products details including names, formulas, quantities, concentrations, physical forms, etc. (This information must be in the Experimental Risk Assessment);
- Control measures required, including whether a glove box or local exhaust ventilation, e.g. fume cupboard, is required.

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, substances, risks and required safety controls to ensure safe setup;
- Have sufficient skills and be practiced in the setup and handling of the substances, risks and required safety controls used in the experiment;
- Have sufficient knowledge of the essential safety requirements of the substances to ensure safe setup.

Persons operating equipment shall:

- Have sufficient experience and be practiced in safe use of the specific equipment, substances, risks and required safety controls to ensure safe operation;
- Have sufficient skills and be practiced in safe use of the specific equipment, substances, risks and required safety controls used in the experiment;
- Have sufficient knowledge of the essential equipment and substances safety requirements, risks, and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency;
- Be suitably supervised if they do not have sufficient skills, knowledge, and experience.

Essential Experimental Setup Checklist

- Persons setting up the equipment shall meet the Essential Competency Requirements;
- The Experimental Risk Assessment (lab form, or COSHH assessment) has been read and understood by the persons using the substances;
- Hygiene measures are appropriate, available, and working. Wet wiping or HEPA vacuuming is needed for nanomaterials;
- Visual inspection of the setup and containment;
- Gas monitoring is in place and functional (where hazardous gases used);
- Modifications from planned setup have been checked by a competent person;
- Local Exhaust Ventilation (LEV): Where prescribed, local exhaust ventilation is functioning, is within date (green label), and correctly positioned. The capture hood is positioned as close to vent / leak sources as practicable and appropriate to the characteristics of the substance being captured (e.g., pressure, density, etc.). Exhaust tubes are open and secured at least 30cm* into LEV (*check LEV logbook);
- Gases and vapours are listed on the LEV COSHH risk assessment and validated.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements;
- Visual check of the setup and containment is carried out before every operation;
- Modifications to the planned setup are done by a competent person and checked against the Essential Experimental Setup Checklist;
- Safety controls stated in the User Experimental Risk Assessment (ERA) (or lab form) are applied, and the ERA has been graded and validated;
- Safety controls stated in both the beamline risk assessment and any Diamond equipment risk assessment are applied;
- Suitable supervision of the experiment is in place to ensure safety;
- No food or drink to be consumed or stored in areas processing or storing high hazard materials;
- Failure modes of the set-up are understood by all persons supervising the experiment;
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage;

- Emergency conditions and required action is understood by all persons supervising the experiment;
- Emergency actions specific for a leak, spill or other contamination event of high hazard materials during the experiment, the setup / preparation (including peripheral lab use), or post-experiment clearance have been written (identifying the foreseeable emergencies) and are understood by all persons supervising the experiment;
- Emergency action on the fire alarm sounding is understood by all persons supervising the experiment;
- Emergency action on gas detection is understood by all persons supervising the experiment;
- Emergency action on power outage is understood by all persons supervising the experiment;
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment;
- Safe and appropriate waste removal has been arranged. Samples to be removed by User unless agreed otherwise;
- Clean down: All potentially contaminated areas will be cleaned, and any contamination removed (post-experiment);
- PPE and lab wear used in the experiment will be correctly cleaned or disposed of.

Essential Hazard & Failure Mode Checklist

The main hazards of high hazard substances are:

- Uncontrolled release;
- Area contamination;
- Exposure of persons at higher risk; and
- Loss of sample.

Principal failure modes are:

- Poor equipment and / or system design;
- Poor installation / setup (e.g., exhaust line falling out of LEV);
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- An unsafe system of work; and
- Operator error, poor training / supervision.

Source page = /Users/SHE/Experimental-Instructions/Hazardous-Substances.html

Magnets, RF, EMF

Scope

This experimental work instruction applies to the use of Magnets, Radio Frequency equipment and Electromagnetic Fields where these are above the Action Levels (ALs) or Exposure Limit Values (ELVs).

See Appendix 1 for further information.

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

- Essential Information Requirements (see below).

Assurances that User-provided equipment achieves the relevant:

- Essential Safety Requirements (see below).

Assurances that Users coming to Diamond achieve the relevant:

- Essential Competency Requirements (see below).

Assurances that the equipment is compliant with the safety requirements of the home institution.

Diamond Local Contact shall ensure compliance with the following for Diamond provided equipment:

- Essential Information Requirements (see below);
- Essential Safety Requirements (see below);
- Essential Competency Requirements (see below).

Pre-experiment

Diamond Local Contact shall ensure that the above pre-visit requirements for User provided equipment is reviewed by a competent mechanical technician or engineer. This shall include inspection of the equipment.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist (see below).

Essential Safety Requirements

Equipment shall be:

- Rated and compatible for the intended fields, frequencies, and voltages / currents;
- Suitably tested by a competent person or body to ensure safe operation at Diamond. Non-standard set-ups shall be commissioned and tested prior to coming to Diamond;
- Safely packaged & transported to Diamond to prevent damage that could affect safe operation;
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls (ref Essential Hazard & Failure Mode Checklist);
- Fitted with suitable safety devices (e.g., remote emergency shutdown);
- Electrical conductors within, and supplying the equipment are covered / double insulated and there is no potential for accidental contact;
- Labelling: Equipment CE / UKCA marked or has an appropriate declaration of conformity; and
- Remote operation enabled as far as possible.

Essential Information Requirements

Information required:

- A full description of the proposed experimental setup & technical specifications.
- Equipment details including hazards, energies, extent to which fields will extend, safety devices.
- Sample environment details including field strengths, shielding requirements, frequencies, and voltages / currents in use.
- Safe distance for persons wearing pacemakers and other medical devices (i.e., 5 gauss line).
- Safe operating procedure / instructions for any equipment not provided by Diamond.
- Unique Identification mark of any equipment not provided by Diamond, i.e., its serial number.
- Manufacturing QA documents.

- Assurances and evidence that all equipment has full up-to-date test and calibration certificates (where applicable).

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, test and operation of the equipment, risks and required safety controls to ensure safe setup;
- Have sufficient skills and be practiced in the setup and operation of the equipment, risks and required safety controls used in the experiment; and
- Have sufficient knowledge of the essential safety requirements of the equipment to ensure safe setup.

Persons operating equipment shall:

- Have sufficient experience and be practiced in safe use of the specific equipment, risks and required safety controls to ensure safe operation;
- Have sufficient skills and be practiced in safe use of the specific equipment, risks and required safety controls used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements, risks, and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency; and
- Be suitably supervised if they do not have sufficient skills, knowledge, and experience.

Essential Experimental Setup Checklist

- Persons setting up the equipment meet the Essential Competency Requirements.
- Metal tools and potential metallic projectiles are eliminated from area with high EMF.
- Guarding: Components which could fragment due to unintended impact when under strong fields are sufficiently guarded.
- Appropriate shielding and / or distance has been selected and placed between the hazard and all those who may be affected by the field.
- Electrical conductors where external to equipment are protected from accidental contact.
- Electromagnetic Field (static and moving): The extent of the field is known and marked, and briefed to people at particular risk, e.g., those fitted with medical implants or body-worn medical devices.
- Protective devices are in place and appropriate for the duties of the equipment – consider voltages and current when examining RCD, MCBs, fuses etc.
- Electrical safety devices are in place (e.g., emergency stop) and confirmed as functional.
- Remote shutdown is enabled for all experimental equipment.
- Signage is sufficient to warn persons with medical devices not to enter areas with high EMF.

- Visual inspection of the setup.
- Manufacturer's instructions (where applicable) have been followed during setting up.
- Modifications from planned setup have been checked by a competent person.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements.
- Visual check of the setup is carried out before every operation.
- Modifications to the planned setup are done by a competent person and checked against the Essential Experimental Setup Checklist.
- Safety controls stated in the User Experimental Risk Assessment (ERA) are applied, and the ERA has been graded and validated.
- Safety controls stated in both the beamline risk assessment and any Diamond equipment risk assessment are applied.
- Lone-working prohibition is in place and understood by all persons supervising the experiment.
- Suitable manning to ensure a suitable level of manning on the beamline.
- Suitable supervision of the experiment is in place to ensure safety.
- Failure modes of the set-up are understood by all persons supervising the experiment.
- Interlocking of the systems in use has been applied and has been tested.
- High field strength: All persons are aware of field strengths and limits, as well as operating times. Persons at particular risk have been identified and notified.
- Appropriate warning signs have been placed at entrances to the hazardous areas.
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage.
- Emergency conditions and required action is understood by all persons supervising the experiment.
- Emergency actions on equipment failure, uncontrolled physical movement due to (stray) fields or localised heating is understood by all persons supervising the experiment.
- Emergency action on the fire alarm sounding is understood by all persons supervising the experiment.
- Emergency action on gas detection (e.g., LN2 for cooling) sounding is understood by all persons supervising the experiment.
- Emergency action on power outage is understood by all persons supervising the experiment.
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment.

Essential Hazard & Failure Mode Checklist

The main hazards are:

- Crush or impact from uncontrolled release of components or equipment causing physical crush (attraction) or impact (repulsion) injuries;
- Stray fields extending beyond expected distances;

- Unexpected field interaction with electrical / electronic / mechanical equipment;
- Localized heating of body parts / whole body exposure;
- Fire resulting from ignition of flammable materials due to overheating of e.g., electromagnetic coils or power supplies;
- Fire resulting from ignition of flammable materials due to overheating from radiated energy;
- Hot surface contact;
- High voltage / current electrocution from contact with energized circuit; and
- High voltage / current burns from contact with energized circuit.

Principal failure modes are:

- Poor equipment and / or system design;
- Poor installation / setup;
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- An unsafe system of work; and
- Operator error, poor training / supervision.

Appendix 1: Action Levels & Exposure Limit Values summary tables

Table 1: Summary of Action Levels (ALs)

Frequency range	Electric field strength V / m	Magnetic field strength (μT)
1 – 8 Hz	10000	$40000 / f^2$
8 – 25 Hz	10000	$5000 / f$
25 – 400 Hz	$2.5 \times 10^5 / f$	200
400 – 3000 Hz	$2.5 \times 10^5 / f$	$80000 / f$
3 – 100 kHz	83	27
100 – 1000 kHz	85	$4.0 \times 10^7 f^{1.234}$
1 – 10 MHz	$87000 / f^{1/2}$	$4.0 \times 10^7 f^{1.234}$
10 – 400 MHz	28	0.092
400 – 2000 MHz	$1.375 \times 10^{-3} f^{1/2}$	$4.6 \times 10^{-6} f^{1/2}$
2 – 300 GHz	61	0.20

Table 2: Summary of Exposure Limit Values (ELVs)

Frequency range	Electric field strength V / m	Magnetic field strength (μT)
1 – 50 Hz	20000	$3 \times 10^5 f$
50 – 1640 Hz	$1 \times 10^6 / f$	$3 \times 10^5 f$
1640 – 3000 Hz	610	$3 \times 10^5 f$
3 – 100 kHz	610	100
100 kHz – 10MHz	$1.93 \times 10^5 / f^{1/2}$	$5.56 \times 10^8 f^{1.349}$
10 – 400 MHz	61	0.20

400 – 2000 MHz	$3x10^{-3}\ f^{1/2}$	$1x10^{-5}\ /f^{1/2}$
2 – 300 GHz	137	0.45

Table 3: Summary of limits for Static Electromagnetic fields

Static field strength	Actions required
	General risk assessment to be completed
>0.5mT (5 Gauss)	Give information on the risks to those affected
	Display warning signs Complete an EMF risk assessment
	Develop and implement local rules f
>0.1T (1000 Gauss)	Ensure those affected by the EMF are trained and given suitable information
	Display warning signs where the field extent is a hazard

Source page = /Users/SHE/Experimental-Instructions/Magnets-RF-EMF.html

High Pressure

Scope

This experimental work instruction applies to experimental equipment with a maximum allowable pressure above 0.5 bar gauge.

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

- Essential Information Requirements (see below).

Assurances that User-provided equipment achieves the relevant:

- Essential Safety Requirements (see below).

Assurances that Users coming to Diamond achieve the relevant:

- Essential Competency Requirements (see below).

Assurances that the system is compliant with the home institution safety requirements.

Diamond Local Contact shall ensure compliance with the following for Diamond provided equipment:

- Essential Information Requirements (see below);
- Essential Safety Requirements (see below);
- Essential Competency Requirements (see below).

Pre-experiment

Diamond Local Contact shall ensure that the above pre-visit requirements for User provided equipment is reviewed by a competent mechanical technician or engineer.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist (see below)

Essential Safety Requirements

Pressure systems, equipment, and components shall be:

- Compliant with the relevant parts of the Pressure Systems Safety Regulations;
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls. (ref. Essential Hazard & Failure Mode Checklist);
- Rated and compatible for the intended pressures, substances, flow rate, temperature, sample environment, and set-up conditions at Diamond;
- Suitably tested by a competent person or body to ensure safe operation at Diamond. Non-standard set-ups shall be commissioned, and pressure tested prior to coming to Diamond. Test pressure shall be > 1.5 times maximum allowable pressure of Diamond experiment;

- Safely packaged & transported to Diamond to prevent damage that could affect safe operation;
- Accompanied with manufacturer's instructions and safe operating & emergency instructions. These shall be communicated to all persons who setup or operate the system;
- Suitably regulated to control pressure (e.g., regulator, flow restrictor specific to the sample environment, etc.);
- Labelled with CE / UKCA mark (or has an appropriate declaration of conformity);
- Labelled with maximum allowable pressure;
- Remote operation enabled as far as possible;
- Suitable for the operating environment and protected from physical damage;
- Suitably regulated to ensure working pressures / flows, and maximum allowable pressure;
- Within its intended design life / supplier's recommended life;
- Fitted with suitable gauges and engineering precautions to prevent over-pressurisation. Pressure relief devices shall activate at safe pressures and discharge to a safe place;
- Leak tested at low pressure (<2 bar);
- Fitted with whip-check safety cables on pressurized flexible lines, where there is a risk of hazardous whipping in the event of disconnection failure;
- Fitted with controls to enable shutdown / isolation from a safe location; and
- Suitably maintained to ensure safety and maintenance recorded.

Essential Information Requirements

Data required:

- A full description of the proposed experimental setup & technical specifications.
- Suitable risk assessment for system.
- Identification of the fluid(s) in pressure system.
- Maximum safe allowable operating pressure (bar).
- Standard operating pressure (bar).
- Test pressure (bar) (include test certificate / records).
- Maximum pressure permitted by gas regulator (bar).
- Pressure relief valve (PRV) setting(s) (bar).
- Total volume of pressure vessel (excluding supply gas bottles).
- Total stored energy of pressure vessel: pressure x volume (bar litres).
- Unique Identification mark of the equipment, i.e., its serial number.
- Manufacturer's operating instructions, and safe operating & emergency instructions.

Assurances that the system:

- Has not been modified from original design specification;
- Is suitable for the operating environment;
- Pressure gauges, pressure transducers, relief valves, etc., have full up-to-date calibration certificates; and
- Is compliant with the relevant parts of the Pressure Systems Safety Regulations.

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, test, and operation of high-pressure equipment to ensure safe setup;
- Have sufficient skills and be practiced in the setup and operation of the specific high-pressure equipment used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements to ensure safe setup; and
- Be aware of their responsibilities under the Pressure Systems Safety Regulations.

Persons operating equipment shall:

- Have sufficient experience operation of high-pressure equipment to ensure safe setup;
- Have sufficient skills and be practiced in the operation of the specific high-pressure equipment used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements, risks, and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency; and
- Be suitably supervised if they do not have sufficient skills, knowledge, and experience.

Essential Experimental Setup Checklist

- Persons setting up the equipment meet the Essential Competency Requirements.
- Guarding: Components which could fragment under pressure are sufficiently guarded.
- Component ratings are suitable for the working pressures. Components are correctly rated for the conditions, materials and temperatures that will be experienced.
- Pressure relief systems are in place, functional, and set to relieve at reasonable pressures.
- Pressure relief systems release to a safe place away from people.
- Visual inspection of all parts.
- Joints are mechanical only - no evidence of glues or adhesives.
- Purging: The system has been purged of previous substances.
- Pressure setting: The pressure is set to the lowest level practical for the experiment.
- Flow restrictor(s) (where applicable) are installed and set to lowest practical flow rate for the experiment.
- Regulators (where applicable) are the correct type and installed correctly. (Consider low / high pressure and gas types).
- Manufacturer's instructions (where applicable) and safe operating instructions have been followed during setting up.
- Labelling: Gas / air lines and connectors (where applicable) are clearly & correctly labelled.
- Leak testing: Assembled system has been leak-tested (at <2 bar).
- Gas monitoring is in place and functional (where hazardous gases used).

- Exhausts are open and cannot lead to pressurisation of the system.
- Modifications from planned setup have been checked by a competent person.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements.
- Visual check of the set-up is carried out before every operation.
- Modifications to the planned set-up are done by a competent person and checked against the Essential Experimental Setup Checklist.
- Safety controls stated in the User Experimental Risk Assessment (ERA) (or lab form) are applied, and the ERA has been graded and validated.
- Safety controls stated in both the User risk assessment / beamline risk assessment and any Diamond equipment risk assessment are applied.
- Lone-working prohibition is in place and understood by all persons supervising the experiment.
- Suitable supervision of the experiment is in place to ensure safety.
- Failure modes of the set-up are understood by all persons supervising the experiment.
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage.
- Emergency conditions and action is understood by all persons supervising the experiment.
- Emergency action for fire alarm is understood by all persons supervising the experiment.
- Power outage action is understood by all persons supervising the experiment.
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment.

Essential Hazard & Failure Mode Checklist

- Impact from the blast of an explosion or release of compressed liquid or gas
- Impact from parts of equipment that fail or any flying debris.
- Contact with the released liquid or gas, such as steam.
- Fire resulting from the escape of flammable liquids or gases.

Principal failure modes are:

- Poor equipment and / or system design;
- Poor installation / setup;
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- an unsafe system of work; and
- Operator error: poor training / supervision.

Source page = /Users/SHE/Experimental-Instructions/High-Pressure.html

Hazardous Voltages

Scope

This experimental work instruction applies to experiments with hazardous voltages (>50 volts AC, or >120 volts DC) and involving:

- Non-propriety or modified electrical equipment; and / or,
- Experimental setups with open conductors or contacts (not meeting IP2X rating).

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

- Essential Information Requirements (see below).

Assurances that User-provided equipment achieves the relevant:

- Essential Safety Requirements (see below).

Assurances that Users coming to Diamond achieve the relevant:

- Essential Competency Requirements (see below).

Assurances that the equipment is compliant with the safety requirements of the home institution.

Diamond Local Contact shall ensure compliance with the following for Diamond provided equipment:

- Essential Information Requirements (see below);
- Essential Safety Requirements (see below);
- Essential Competency Requirements (see below).

Pre-experiment

Diamond Local Contact shall ensure that the above pre-visit requirements for User provided equipment is reviewed by a competent electrical technician or engineer. This shall include inspection of the equipment.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist.

Essential Safety Requirements

Experimental setup and equipment shall be:

- Rated and compatible for the intended voltage, current, sample environment and setup conditions at Diamond
- Suitably tested by a competent person or body to ensure safe operation at Diamond. Non-standard set-ups shall be commissioned and tested prior to coming to Diamond;
- Safely packaged & transported to Diamond to prevent damage that could affect safe operation;
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls (ref. Essential Hazard & Failure Mode Checklist);
- Electrical conductors are not exposed and cannot be contacted by persons when the equipment is energized (must be shielded to achieve IP2X rating). Where IP2X cannot be achieved, access to hazardous voltages must be controlled (e.g., via interlocks);
- Fitted with suitable safety devices (e.g., grounding, emergency stops, RCD / RCCB / RCBOs, MCB / MCCBs, fuses, etc.);
- Labelling: Equipment CE / UKCA marked or has an appropriate declaration of conformity; and
- In compliance with the Electricity at Work Regulations, including the requirements relating to work on or near live conductors and competency.

Essential Information Requirements

Information required:

- A full description of the proposed experimental setup & technical specifications.
- Energy details including voltages, current, possible unsafe or fault conditions, etc.
- Sample environment details including what the equipment will be used for, energies used, etc.

- Risk assessment and safe operating procedure / instructions for any equipment not provided by Diamond.
- Unique Identification mark of any equipment not provided by Diamond, i.e., its serial number.
- Assurances and evidence that equipment has full up-to-date test and calibration certificates (where applicable).

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, test and operation of the equipment, hazardous voltages, risks and required safety controls to ensure safe setup;
- Have sufficient skills and be practiced in the setup and operation of the equipment, hazardous voltages, risks and required safety controls used in the experiment; and
- Have sufficient knowledge of the essential safety requirements of the equipment to ensure safe setup.

Persons operating equipment shall:

- Have sufficient experience and be practiced in safe use of the specific equipment, power and required safety controls to ensure safe operation;
- Have sufficient skills and be practiced in safe use of the specific equipment, power and required safety controls used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements, power, and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency; and
- Be suitably supervised if they do not have sufficient skills, knowledge, and experience.

Essential Experimental Setup Checklist

- Persons setting up the equipment meet the Essential Competency Requirements.
- Electrical conductors are not exposed and cannot be contacted by persons when the equipment is energized (IP2X achieved).
- Guarding: Sufficient guarding is in place to achieve IP2X, where open conductors are needed (e.g., for sample contact).
- Component ratings are suitable for the working voltages / currents.
- Protective devices are in place and appropriate for the duties of the equipment – consider voltages and current when examining RCD, MCBs, fuses, etc.
- Power status: It is clear and unambiguous when the equipment is live or powered off.
- Stored energy: Where there is a stored energy risk, components are discharged or shorted as part of the make-safe process.
- Energy setting of the equipment (voltage, current, power, etc.) has been set to the lowest level possible for the work.

- Grounding: Where appropriate, equipment and test set-ups are grounded with sufficient capacity cable / braid.
- Electrical safety devices are in place (e.g., emergency stop) and tested & confirmed as functional.
- Remote shutdown is enabled for all electrical experimental equipment.
- Visual inspection of the setup.
- Manufacturer's instructions (where applicable) have been followed during setting up.
- Modifications (where applicable) from planned setup have been checked by a competent person.
- Signage and labelling are sufficient to warn of hazards and risks.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements.
- Visual check of the setup is carried out before every operation.
- Modifications to the planned setup are done by a competent person and checked against the Essential Experimental Setup Checklist.
- Safety controls stated in the User Experimental Risk Assessment (ERA) (or lab form) are applied, and the ERA has been graded and validated.
- Safety controls stated in both the beamline risk assessment and any Diamond equipment risk assessment are applied.
- Lone-working prohibition is in place and understood by all persons supervising the experiment.
- Suitable supervision of the experiment is in place to ensure safety.
- Failure modes of the set-up are understood by all persons supervising the experiment.
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage.
- Emergency conditions and required action is understood by all persons supervising the experiment.
- Emergency actions on equipment failure, un-commanded energy discharge or "trip" (of e.g., supplies) is understood by all persons supervising the experiment.
- Emergency action on the fire alarm sounding is understood by all persons supervising the experiment.
- Emergency action / first aid action on electrocution is understood by all persons supervising the experiment.
- Emergency action on gas detection sounding is understood by all persons supervising the experiment.
- Emergency action on power outage is understood by all persons supervising the experiment.
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment.

Essential Hazard & Failure Mode Checklist

The main hazards are:

- Electrical energy burns from contact with energized circuit / stored energy;
- Electrocution from contact with energized circuit / stored energy;
- Arc-flash from high voltage failure;
- Hot surface contact;
- Fire resulting from ignition of flammable materials due to spark / overheating;
- Fire resulting from ignition of equipment / cabling / samples;
- Explosion resulting from catastrophic failure of equipment / component (e.g., HV capacitor failure); and
- Physical injury resulting from constant current supply shorting (e.g., across rings on fingers).

Principal failure modes are:

- Poor equipment and / or system design;
- Poor installation / setup;
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- An unsafe system of work; and
- Operator error, poor training / supervision.

Source page = /Users/SHE/Experimental-Instructions/Hazardous-Voltages.html

Gas & Gas Flow Cells

Scope

This experimental work instruction applies experiments using gas and gas flow cells.

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

- Essential Information Requirements (see below).

Assurances that User-provided equipment achieves the relevant

- Essential Safety Requirements (see below).

Assurances that Users coming to Diamond achieve the relevant

- Essential Competency Requirements (see below).

Assurances that the equipment is compliant with the safety requirements of the home institution.

Diamond Local Contact shall ensure compliance with the following for Diamond provided equipment:

- Essential Information Requirements (see below);
- Essential Safety Requirements (see below);
- Essential Competency Requirements (see below).

Pre-experiment

Diamond Local Contact shall ensure that the above pre-visit requirements for User provided equipment is reviewed by a competent technician or engineer. This shall include inspection of the equipment.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist (see below).

Essential Safety Requirements

Equipment shall be:

- Rated and compatible for the intended pressure, temperatures, substances, flow rate, sample environment and setup conditions at Diamond;
- Suitably tested by a competent person or body to ensure safe operation at Diamond. Non-standard set-ups shall be commissioned and tested prior to coming to Diamond;
- Safely packaged & transported to Diamond to prevent damage that could affect safe operation;
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls (ref Essential Hazard & Failure Mode Checklist);
- Fitted with suitable safety devices (e.g., flow restrictor specific to the sample environment / gas);

- Labelling: Equipment CE / UKCA marked or has an appropriate declaration of conformity;
- Remote operation enabled as far as possible; and
- Local Exhaust Ventilation (LEV) is suitable and tested for the gases used in the experiment (check LEV log book).

Essential Information Requirements

Information required:

- A full description of the proposed experimental setup & technical specifications;
- Reagent details including gas name, gas purity / grade, volume, etc.;
- Sample environment details including pressure, flow rate, temperature range, possible unsafe reactions, conditions, by-products, etc.;
- Safe operating procedure / instructions for any equipment not provided by Diamond;
- Unique Identification mark of any equipment not provided by Diamond, i.e., its serial number;
- Assurances and evidence of adequate pressure testing for pressure cells (where applicable); and
- Assurances and evidence that all equipment has full up-to-date test and calibration certificates (where applicable).

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, test and operation of the equipment, gases, risks and required safety controls to ensure safe setup;
- Have sufficient skills and be practiced in the setup and operation of the equipment, gases, risks and required safety controls used in the experiment; and
- Have sufficient knowledge of the essential safety requirements of the equipment to ensure safe setup.

Persons operating equipment shall:

- Have sufficient experience and be practiced in safe use of the specific equipment, gases and required safety controls to ensure safe operation;
- Have sufficient skills and be practiced in safe use of the specific equipment, gases and required safety controls used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements, gases, and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency; and
- Be suitably supervised if they do not have sufficient skills, knowledge, and experience.

Essential Experimental Setup Checklist

- Persons setting up the equipment meet the Essential Competency Requirements.
- Guarding: Components which could fragment under pressure are sufficiently guarded.
- Compatibility: The gas lines and components are compatible with the substances to be used.
- Component ratings are suitable for the working pressures. Components are correctly rated for the conditions, materials and temperatures that will be experienced.
- Gas regulators / pressure gauges / valves are the correct type for the gas in use, within test date, in good condition and installed correctly (with the correct grade of hose).
- Gas cylinders (where installed) are in-date, of the correct grade gas, and appropriately supported (stand, trolley or chained / strapped to the right size bracket).
- Pressure relief systems are in place, functional, and set to relieve at reasonable pressures. These systems release to a safe place away from people.
- Gas monitoring is in place and functional (where hazardous gases used).
- Joints are mechanical only with no use of adhesives / sealants unless this is unavoidable and then they must be of a type compatible with the gas(es) in use.
- Purging: The system has been purged of previous substances.
- Pressure setting: The pressure is set to the lowest level practical for the experiment.
- Flow controller(s) / restrictor(s) are installed and set to lowest practical flow rate for the experiment.
- Leak testing: The assembled system has been adequately leak-tested (e.g., with nitrogen)
- Remote shutdown is enabled for all experimental equipment.
- Visual inspection of the setup.
- Manufacturer's instructions (where applicable) have been followed during setting up.
- Labelling: Gas / air lines and connectors (where applicable) are clearly & correctly labeled.
- Modifications from planned setup have been checked by a competent person.
- LEV: Local exhaust ventilation is functioning, is within date (green label), and correctly positioned. The capture hood is positioned as close to vent / leak sources as practicable and appropriate to the characteristics of the substance being captured (e.g., pressure, density, etc.). Exhaust lines must be at least 30 cm into LEV.
- Exhausts are open and cannot lead to pressurisation of the system.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements.
- Visual check of the setup is carried out before every operation.
- Modifications to the planned setup are done by a competent person and checked against the Essential Experimental Setup Checklist.
- Safety controls stated in the User Experimental Risk Assessment (ERA) (or lab form) are applied, and the ERA has been graded and validated.
- Safety controls stated in both the beamline risk assessment and any Diamond equipment risk assessment are applied.
- Lone-working prohibition is in place and understood by all persons supervising the experiment.
- Suitable supervision of the experiment is in place to ensure safety.

- Failure modes of the set-up are understood by all persons supervising the experiment.
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage.
- Emergency conditions and required action is understood by all persons supervising the experiment.
- Emergency actions on a gas leak during the experiment, the set-up / preparation (including peripheral lab use) have been written (identifying the foreseeable emergencies) and are understood by all persons supervising the experiment.
- Emergency action on the fire alarm sounding is understood by all persons supervising the experiment.
- Emergency action on gas detection sounding is understood by all persons supervising the experiment.
- Emergency action on power outage is understood by all persons supervising the experiment.
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment.

Essential Hazard & Failure Mode Checklist

The main hazards are:

- Exposure to hazardous substances resulting from uncontrolled release of hazardous / flammable gases;
- Exposure to hazardous substances resulting from slow leak of hazardous / flammable gases;
- Exposure to hazardous substances resulting from inadequate leak testing;
- Exposure to hazardous substances resulting from incorrect gas delivery / mixing;
- Exposure to hazardous substances resulting from failure of joints;
- Exposure to hazardous substances resulting from inadequate exhaust setup (e.g., exhaust line falling out of LEV trunking);
- Over-pressurisation resulting from blocked outlets / incorrect setup;
- Hot surface contact (if applicable);
- Fire resulting from overheating of equipment / heating elements (if applicable);
- Fire resulting from release of flammable gas; and
- Incompatibilities resulting from failure of gas lines or components due to incompatibility with gas / liquids

Principal failure modes are:

- Poor equipment and / or system design;
- Poor installation / setup;
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- an unsafe system of work; and
- Operator error, poor training / supervision

Source page = /Users/SHE/Experimental-Instructions/Gas---Gas-Flow-Cells.html

Explosives

Scope

This experimental work instruction applies to the use of explosives / energetics in experiments at Diamond.

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

- Essential Information Requirements (see below).

Assurances that User-provided materials and equipment achieves the relevant:

- Essential Safety Requirements (see below).

Assurances that Users coming to Diamond achieve the relevant:

- Essential Competency Requirements (see below).

Assurances that the experiment and equipment is compliant with the safety requirements of the home institution.

Diamond Local Contact shall:

- Verify with the Principal Beamline Scientist that the experiment is within the beamline safe operating envelope (see Diamond User Experimental Safety HAS-PRC-0078) and meets the requirements of Safe & Secure Explosive Operations HAS-PRC-0080 (including authorisation to store and use explosive materials); and
- Ensure compliance with the Essential Competency Requirements (see below)

Ensure compliance with the following for Diamond provided equipment or materials:

- Essential Information Requirements (see below);
- Essential Safety Requirements (see below).

Pre-experiment

Diamond Local Contact shall ensure that:

- The above pre-visit requirements for User provided equipment and materials are reviewed by a competent scientist or technician; and
- The beamline and persons supervising the experiment meet the requirements of Safe & Secure Explosive Operations HAS-PRC-0080.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist (see below).

Essential Safety Requirements

Equipment shall be:

- Rated and compatible for the intended pressure, substances, sample environment and setup conditions at Diamond;
- Suitably tested by a competent person or body to ensure safe operation at Diamond. Non-standard set-ups shall be commissioned and tested prior to coming to Diamond;
- Safely packaged & transported to Diamond to prevent damage that could affect safe operation; and
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls (ref. Essential Hazard & Failure Mode Checklist).
- Fitted with suitable safety devices (e.g., bursting discs / blow-off ports, earthing straps, etc.);
- Labelling: Equipment CE / UKCA marked or has an appropriate declaration of conformity; and
- Remote operation enabled as far as possible.

Materials shall be:

- The lowest energy & quantities possible for the experiment; and
- Compliant with legal requirements for transportation, handling, storage, and security, whilst at Diamond.

Essential Information Requirements

Information required:

- A full description of the proposed experimental setup & technical specifications;
- Explosives / energetics details including names, formulas, states, quantities (which must be below that which requires a license or regulatory permission), legal requirements for handling and storage, security requirements, etc.;
- Safety risks including potential response to heating, drop / shock, electrostatic discharge, laser illumination, incompatible substances, direct x-ray exposure, etc.;
- Copies of licenses / regulatory permissions for the use of the materials at Diamond, unless below the regulatory threshold;
- Safe operating procedure / instructions for any equipment not provided by Diamond;
- Unique Identification mark of any equipment not provided by Diamond, i.e., its serial number; and
- Assurances and evidence that all equipment has full up-to-date test and calibration certificates (where applicable).

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, test and operation of the equipment, explosives / energetics, risks and required safety controls to ensure safe setup;
- Have sufficient skills and be practiced in safe setup and operation of the equipment, explosives / energetics, risks and required safety controls used in the experiment;
- Have sufficient knowledge of the essential safety requirements of the equipment to ensure safe setup; and
- Be aware of their responsibilities associated with the necessary legal permissions for safe handling and storage of the specific explosives / energetics.

Persons operating equipment shall:

- Have sufficient experience and be practiced in safe use of the specific equipment, explosives / energetics and required safety controls to ensure safe operation;
- Have sufficient skills and be practiced in safe use of the specific equipment, explosives / energetics and required safety controls used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements, explosives / energetics, and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency;
- Be suitably supervised if they do not have sufficient skills, knowledge, and experience; and
- All Diamond persons handling or supervising explosives experiments and operations shall meet the requirements of Safe & Secure Explosive Operations HAS-PRC-0080 and have completed Explosives Safety training.

Essential Experimental Setup Checklist

- Persons setting up the equipment meet the Essential Competency Requirements.
- Persons setting up the equipment shall be covered by the necessary regulatory licenses or permissions.
- Amounts within the regulatory permission or are below the threshold which requires a license or regulatory permission.
- Security: The necessary security arrangements (both physical and procedural) are available to accommodate the samples during the set-up, running, and decommissioning of the experiment.
- Storage: There is a secure place for the materials to be stored when unattended (e.g., a lockable metal cupboard).
- Materials are insensitive and will not initiate under normal or any foreseeable accident conditions.
- Visual inspection of the setup.
- Manufacturer's instructions (where applicable) have been followed during setting up.
- Remote shutdown is enabled for all experimental equipment.
- Modifications from planned setup have been checked by a competent person.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements.
- Non-essential persons are prevented from entering experimental areas.
- Sample accounting requirements are implemented.
- Visual check of the setup is carried out before every operation.
- Modifications to the planned setup are done by a competent person and checked against the Essential Experimental Setup Checklist.
- Safety controls stated in the User Experimental Risk Assessment (ERA) (or lab form) are applied, and the ERA has been graded and validated.
- Safety controls stated in both the beamline risk assessment and any Diamond equipment risk assessment are applied.
- Lone-working prohibition is in place and understood by all persons supervising the experiment.
- Suitable supervision of the experiment is in place to ensure safety.
- Failure modes of the set-up are understood by all persons supervising the experiment.
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage.
- Emergency conditions and required action is understood by all persons supervising the experiment.
- Emergency action on unplanned detonation / deflagration or other energetic event, or potential for this to occur is understood by all persons supervising the experiment.
- Emergency action on the fire alarm sounding is understood by all persons supervising the experiment.
- Emergency action on gas detection sounding is understood by all persons supervising the experiment.

- Emergency action on power outage is understood by all persons supervising the experiment.
- Emergency action on loss of sample is understood by all persons supervising the experiment.
- Sample return / disposal requirements implemented.
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment.

Essential Hazard & Failure Mode Checklist

The main hazards are:

- Explosive initiation resulting from electrical energy (e.g., static discharge);
- Explosive initiation resulting from radiation energy (both Ionising and Non-ionising);
- Explosive initiation resulting from kinetic energy (drop / shock);
- Explosive initiation resulting from ageing or degradation;
- Explosive initiation resulting from service failures (cooling water, inert atmosphere, power supply;
- Over-pressurisation resulting from no or incorrect bursting disc(s) / incorrect setup;
- Fire resulting from detonation / deflagration / decomposition of explosive material; and
- Incompatibilities detonation / deflagration / decomposition due to incompatibility with other experimental components.

Principal failure modes are:

- Poor equipment and / or system design;
- Poor installation / setup;
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- An unsafe system of work; and
- Operator error, poor training / supervision.

Source page = /Users/SHE/Experimental-Instructions/Explosives.html

Liquid Flow Cells

Scope

This experimental work instruction applies to the use of Liquid Flow Cells using hazardous substances, or where there are significant physical risks (e.g., high speed ejection on failure).

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

- Essential Information Requirements (see below).

Assurances that User-provided equipment achieves the relevant

- Essential Safety Requirements (see below).

Assurances that Users coming to Diamond achieve the relevant

- Essential Competency Requirements (see below).

Assurances that the equipment is compliant with the safety requirements of the home institution.

Diamond Local Contact shall ensure compliance with the following for Diamond provided equipment:

- Essential Information Requirements (see below);
- Essential Safety Requirements (see below);
- Essential Competency Requirements (see below).

Pre-experiment

Diamond Local Contact shall ensure that the above pre-visit requirements for User provided equipment is reviewed by a competent mechanical technician or engineer. This shall include inspection of the equipment.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist (see below).

Essential Safety Requirements

Equipment shall be:

- Rated and compatible for the intended substances, flow rate, sample environment and set-up conditions at Diamond;
- Suitably tested by a competent person or body to ensure safe operation at Diamond. Non-standard set-ups shall be commissioned and tested prior to coming to Diamond.
- Safely packaged & transported to Diamond to prevent damage that could affect safe operation;
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls (Ref Essential Hazard & Failure Mode Checklist);
- Fitted with suitable safety devices (e.g., flow restrictor specific to the sample environment);
- Labelling: Equipment CE / UKCA marked or has an appropriate declaration of conformity; and
- Remote operation enabled as far as possible.

Essential Information Requirements

Information required:

- A full description of the proposed experimental setup & technical specifications.
- Reagent / substance details including flow rates, volume of system, temperature range, etc.
- Sample environment details including flow rates, volume of system, temperature range, etc.
- Safe operating procedure / instructions for any equipment not provided by Diamond.
- Unique Identification mark of any equipment not provided by Diamond, i.e., its serial number.
- Assurances and evidence that all equipment has full up-to-date test and calibration certificate s (where applicable).

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, test and operation of the equipment, gases, risks and required safety controls to ensure safe setup;
- Have sufficient skills and be practiced in safe setup and operation of the equipment, gases, risks and required safety controls used in the experiment; and
- Have sufficient knowledge of the essential safety requirements of the equipment to ensure safe setup.

Persons operating equipment shall:

- Have sufficient experience and be practiced in safe use of the specific equipment, substances and required safety controls to ensure safe operation;
- Have sufficient skills and be practiced in safe use of the specific equipment, substances and required safety controls used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements, substances and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency; and
- Be suitably supervised if they do not have sufficient skills, knowledge, and experience.

Essential Experimental Setup Checklist

- Persons setting up the equipment meet the Essential Competency Requirements.
- Guarding: Components which could fragment under pressure are sufficiently guarded.
- Compatibility: the liquid lines and components are compatible with the substances to be used.
- Component ratings are suitable for the working flow rates / pressures. Components are correctly rated for the conditions, materials and temperatures that will be experienced.
- Pressure relief / overflow systems are in place, functional, and set to relieve at reasonable pressures. These systems release to a safe place away from people.
- Spill protection is in place to ensure any leak is contained and beamline contamination is eliminated / minimised.
- Liquid cooling (where needed) is leak tested, has spillage protection installed and can be isolated / turned off in an emergency.
- Insulation where required to maintain temperature in sample loops, is non-flammable material and compatible with the reagents in use.
- Joints are mechanical only with no use of adhesives / sealants unless this is unavoidable and then they must be of a type compatible with the liquid(s) in use.
- Purging: The system has been purged of previous substances.
- Pressure setting: The pressure is set to the lowest level practical for the experiment.
- Flow controllers(s) / restrictor(s) are installed and set to lowest practical flow rate for the experiment.
- Visual inspection of the setup.
- Manufacturer’s instructions (where applicable) have been followed during setting up.
- Leak testing: The assembled system has been adequately leak-tested (e.g., with nitrogen)
- Remote shutdown is enabled for all experimental equipment.
- Modifications from planned setup have been checked by a competent person.
- LEV: Local exhaust ventilation (where required) is functioning, is within date (green label), and correctly positioned. The capture hood is positioned as close to vent / leak sources as practicable and appropriate to the characteristics of the substance being captured (e.g., pressure, density, etc.).
- Exhausts are open and cannot lead to pressurisation of the system.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements.
- Visual check of the setup is carried out before every operation.
- Modifications to the planned setup are done by a competent person and checked against the Essential Experimental Setup Checklist.
- Safety controls stated in the User Experimental Risk Assessment (ERA) (or lab form) are applied, and the ERA has been graded and validated.
- Safety controls stated in both the beamline risk assessment and any Diamond equipment risk assessment are applied.
- Suitable manning to ensure a suitable level of manning on the beamline.
- Suitable supervision of the experiment is in place to ensure safety.
- Failure modes of the set-up are understood by all persons supervising the experiment.
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage.
- Emergency conditions and required action is understood by all persons supervising the experiment.
- Emergency action on a liquid leak during the experiment, the set-up / preparation (including peripheral lab use) has been written (identifying the foreseeable emergencies) and is understood by all persons supervising the experiment.
- Emergency action on the fire alarm sounding is understood by all persons supervising the experiment.
- Emergency action on gas detection sounding is understood by all persons supervising the experiment.
- Emergency action on power outage is understood by all persons supervising the experiment.
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment.

Essential Hazard & Failure Mode Checklist

The main hazards are:

- Hazardous substances resulting uncontrolled release of hazardous / flammable fluids;
- Hazardous substances resulting slow leak of hazardous / flammable fluids;
- Hazardous substances resulting from inadequate leak testing;
- Hazardous substances resulting from incorrect liquid delivery / mixing;
- Hazardous substances resulting from failure of joints;
- Hazardous substances resulting from inadequate exhaust setup (e.g., exhaust line falling out of LEV trunking);
- Over-pressurisation / ejection resulting from blocked outlets / incorrect setup.
- Hot surface contact (if applicable);
- Fire resulting from overheating of equipment / heating elements (if applicable);
- Fire resulting from release of flammable liquid; and
- Incompatibilities resulting from failure of liquid lines or component due to incompatibility with liquids or other substances.

Principal failure modes are:

- Poor equipment and / or system design;

- Poor installation / setup;
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- an unsafe system of work; and
- Operator error, poor training / supervision.

Source page = /Users/SHE/Experimental-Instructions/Liquid-Flow-Cells.html

Lasers, AOR, UV

Scope

This experimental work instruction applies to the use of lasers, artificial optical radiation (AOR), and UV Light.

Pre-visit

User Principal Investigator shall provide the following to the Diamond Local Contact at least eight weeks prior to the experiment at Diamond:

- Essential Information Requirements (see below) for User-provided equipment.

Assurances that User-provided equipment achieves the relevant:

- Essential Safety Requirements (see below).

Assurances that Users coming to Diamond achieve the relevant:

- Essential Competency Requirements (see below).

Assurance that the equipment is compliant with the safety requirements of the home institution.

Diamond Local Contact shall ensure compliance with the following for Diamond provided equipment:

- Essential Information Requirements (see below);
- Essential Safety Requirements (see below);
- Essential Competency Requirements (see below).

Pre-experiment

Diamond Local Contact shall ensure that the above pre-visit requirements for User provided equipment is reviewed by a laser competent person (e.g., a Laser Responsible Officer). This shall include inspection of the equipment.

Experimental Setup

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Experimental Setup Checklist (see below).

Operation

Diamond Local Contact & User Visit Principal Investigator shall collaborate to ensure adherence to:

- Essential Operational Checklist (see below).

Essential Safety Requirements

Equipment shall be:

- Suitable for task, and the lowest hazard class and power output practicable;
- Safest feasible option for all activities, including operation, different modes, alignment, etc.;
- Rated and compatible with the intended experiment, laser, AOR or UV light, sample environment and set-up conditions at Diamond;
- Suitably tested by a competent person or body to ensure safe operation at Diamond. Non-standard set-ups shall be commissioned and tested prior to coming to Diamond;
- Safely packaged & transported to Diamond to prevent damage that could affect safe operation;
- Suitably risk assessed, identifying failure modes, safety controls and emergency controls.(Ref Essential Hazard & Failure Mode Checklist and Checklist of Controls for Laser Systems by Classification) or Checklist of Controls for UV Systems by Risk Group, as applicable;
- Fitted with suitable safety devices (e.g., over-temperature cut-outs, enclosure interlocks);
- Labelling: Equipment CE / UKCA marked or has an appropriate declaration of conformity;
- Remote operation enabled as far as possible; and
- Diamond provided laser equipment shall be assessed and compliant with Laser Safety (HAS-PRC-0023

Essential Information Requirements

Information required:

- A full description of the proposed experimental setup & technical specifications.
- Artificial Optical Radiation (AOR) details including wavelength(s), type of source, power density, total power output(s), etc.
- Laser details including:
    - Type of laser
    - Laser class (1 – 4)
    - Wavelength (nm)
    - Mode (continuous wave or pulsed)
    - Power output (W)
    - Pulse energy (W)
    - Pulse duration (s)
    - Pulse rate (pulses / s)
- Sample environment details including power levels, sample temperatures, safe distances, etc.
- Safe operating procedure / instructions for any equipment not provided by Diamond.
- Unique Identification mark of any equipment not provided by Diamond, i.e., its serial number.
- Manufacturing QA documents.
- Assurances and evidence that all equipment has full up-to-date test and calibration certificates (where applicable).
- Interlock details, if linking with the beamline hutch interlocks.

Essential Competency Requirements

Person setting up experimental equipment shall:

- Have sufficient experience of setup, test and operation of the equipment, gases, risks and required safety controls to ensure safe setup;
- Have sufficient skills and be practiced in safe setup and operation of the equipment, gases, risks and required safety controls used in the experiment; and
- Have sufficient knowledge of the essential safety requirements of the equipment to ensure safe setup.

Persons operating equipment shall:

- Have sufficient experience and be practiced in safe use of the specific equipment, substances and required safety controls to ensure safe operation;
- Have sufficient skills and be practiced in safe use of the specific equipment, substances and required safety controls used in the experiment;
- Have sufficient knowledge of the essential equipment safety requirements, substances, and safety controls to ensure safe operation. This includes knowing when to stop operations and what to do in the case of an emergency; and

- Be suitably supervised if they do not have sufficient skills, knowledge, and experience.

Essential Experimental Setup Checklist

- Persons setting up the equipment meet the Essential Competency Requirements.
- Interlocks: enclosures are suitably equipped with interlock systems.
- Appropriate warning signage is displayed both on the equipment and the outer hutch doors.
- Shielding is in place to enclose sources of AOR or UV light radiation.
- Electrical safety devices (e.g., emergency stops) are in place and confirmed functional.
- Power status: it is clear and unambiguous when the equipment is live or powered off.
- Energy setting of the equipment (voltage, current, power, etc.) has been set to the lowest level for the work.
- Electrical safety: equipment has been electrically checked by a competent person.
- Visual inspection of the setup.
- Manufacturer's instructions (where applicable) have been followed during setting up.
- Remote shutdown is enabled for all experimental equipment.
- Modifications from planned setup have been checked by a competent person.

Essential Operation Checklist

- Persons operating the equipment meet the Essential Competency Requirements.
- Visual check of the setup is carried out before every operation.
- Modifications to the planned setup are done by a competent person and checked against the Essential Experimental Setup Checklist.
- Safety controls stated in the User Experimental Risk Assessment (ERA) (or lab form) are applied, and the ERA has been graded and validated.
- Safety controls stated in both the beamline risk assessment and any Diamond equipment risk assessment are applied.
- Lone-working prohibition is in place and understood by all persons supervising the experiment.
- Suitable manning to ensure a suitable level of manning on the beamline.
- Suitable supervision of the experiment is in place to ensure safety.
- Failure modes of the set-up are understood by all persons supervising the experiment.
- PPE identified on the risk assessment is provided, it fits, it is in good condition, and all operators are proficient in its correct usage.
- Emergency conditions and required action is understood by all persons supervising the experiment.
- Emergency action on uncontrolled AOR / UV light exposure is understood by all persons supervising the experiment.
- Emergency action on the fire alarm sounding is understood by all persons supervising the experiment.
- Emergency action on gas detection sounding is understood by all persons supervising the experiment.

- Emergency action on power outage is understood by all persons supervising the experiment.
- If safety issues are identified, the Principal Beamline Scientist (PBS) must be contacted, and the issues resolved before continuing with the experiment.

Essential Hazard & Failure Mode Checklist

The main hazards are:

- Light / laser exposure damage to eyes (Arc eye, blindness, permanent damage);
- Light exposure damage to skin (burns, increased risk of cancer);
- Hot surface contact;
- Fire resulting from failure of components (e.g., heating element, supply leads, power leads, power supply or other component);
- Fire resulting from ignition of flammable / combustible material from laser / AOR exposure;
- Electrocution resulting from contact with energized circuit (high voltage / current);
- High voltage current burns resulting from contact with energized circuit;
- Hazardous gases;
- High voltage current burns; and
- Skin exposure to UV causing injury to skin (erythema) or eye damage (cornea, lens, or retina).

Principal failure modes are:

- Poor equipment and / or system design;
- Poor installation / setup;
- Misaligned optics and upwardly directed beams (reflections from windows and beam splinters);
- Poor maintenance of equipment;
- Inadequate repairs or modifications;
- An unsafe system of work;
- Operator error, poor training / supervision;
- Poor installation / setup;
- Incorrectly specified, selected, availability, or wearing of eye protection;
- By-passing of interlocks;
- Addition of reflective materials into the beam paths;
- Lack of protection from non-beam hazards;
- Improper methods of handling high voltage;
- Operating unfamiliar equipment or working outside of competence limits;
- Loose optical components on an optical table; and
- Overconfidence leading to complacency in safety requirements.

Checklist of Controls for Laser Systems by Classification

Class	1 / 1M	2	2M	3R	3B	4
Engineered Controls						
Protective enclosures					**X**	**X**
Beam paths enclosed as far as reasonable			**X**	**X**	**X**	**X**
Beam paths directed away from doors and windows			**X**	**X**	**X**	**X**
Interlocks on removable housings					**X**	**X**
Service access panels only removable by tooling					**X**	**X**
Beam stop or beam attenuator					**X**	**X**
Emergency stop button			**X**	**X**	**X**	**X**
Activation warning system					**X**	**X**
Key control					**X**	**X**
Remote interlock connector					**X**	**X**
Mat black surfaces and tooling					**X**	**X**
Viewing portals, display screens, and collecting optics					**X**	**X**
Remote laser firing and monitoring					**X**	**X**
Admin Controls						
Risk Assessment	**X**		**X**	**X**	**X**	**X**
Local Rules	**X**		**X**	**X**	**X**	**X**
Laser controlled area					**X**	**X**
Equipment labels	**X**		**X**	**X**	**X**	**X**
Laser area warning signs			**X**	**X**	**X**	**X**
NOHD determined and marked					**X**	**X**
Training for people at risk			**X**	**X**	**X**	**X**
Competence assessment of operators	**X**		**X**	**X**	**X**	**X**
PPE						
Eye protection				**X**	**X**	**X**
Skin protection					**X**	**X**

Checklist of Controls for UV Systems by Risk Group

Risk Group	RG0	RG1	RG2	RG3
Controls				
Read the manufacturer's instructions.	**X**	**X**	**X**	**X**

Follow the control in the procedure.	**X**	**X**	**X**	**X**
Avoid unnecessary exposure to eyes or skin	**X**	**X**	**X**	**X**
Do not expose others or modify the experimental setup agreed with the local contact.	**X**	**X**	**X**	**X**
Connect the UV power supply to the hutch interlock where possible. Don't defeat interlock.			**X**	**X**
Don't remove the covers.	**X**	**X**	**X**	**X**

PPE

Wear standard laboratory clothing, including a fully buttoned lab coat, long trousers, and closed-toe shoes, while paying attention to the gaps around the neck and wrist areas.		**X**	**X**	**X**
Face / Eye protection – EN 166 - EN 170 certified face shield must be worn to protect the face and eye. In addition, if the spectrum extends over 400 nm, protective eyewear must be worn with the face visor to prevent blue light hazards.		**X**	**X**	**X**
Gloves – wear gloves, ensuring the gaps are covered between the tops of the gloves and the bottom of the lab coat sleeves.		**X**	**X**	**X**

IEC 62471 describes the degree of risk from potential optical radiation hazards to minimise the need for further control measures for risk management. The defined risk groups are Exempt Group (RG0) for no risk, Risk Group 1 (RG1) for low, Risk Group 2 (RG2) for medium and Risk Group 3 (RG3) for high risk. For more information, read the UV radiation safety guide (CEO-HP-PRC-0022).

Source page = /Users/SHE/Experimental-Instructions/Lasers-AOR-UV.html

Lab Handbooks

Instructions for Users

Read and adhere to the handbooks relevant to the laboratory type that you shall be using at Diamond.

Source page = /Users/SHE/Lab-Handbooks.html

Chemical Lab Handbook

Good laboratory practice (GLP) and good hygiene standards shall be adhered to in chemical labs at all times, including:

- Safety glasses, protective gloves and lab coat shall be worn.

- Additional personal protective equipment shall be worn as directed by signage or risk assessment (e.g. face shield shall be worn for splash risks).
- Prescription safety glasses, or over-specs shall be worn by spectacle wearers.
- Prescription safety glasses, free from contamination, can be worn outside the lab.
- Other PPE shall be removed before leaving lab and suitably stored / laundered / disposed of, as appropriate.
- No eating, drinking, chewing or applying cosmetics within the lab.
- Hands shall be washed with soap and running water after handling chemicals and before leaving the laboratory.
- Do not handle contact lenses (unless in emergency).
- Long hair shall be tied back.
- Loose clothing and dangling jewellery items shall be removed / tied / covered.
- Cuts and sores shall be covered with suitable dressing (e.g. plaster).
- Footwear shall be sturdy, closed toe, cover the top of foot, and protect from chemical splashes. Ballet pumps, flip-flops, sandals, and similar type footwear are prohibited.
- Mobile phones / earphones / earbuds shall not be used / handled to limit potential contamination spread.
- Personal items (coats, bags, etc) shall not be taken into labs.
- Operatives shall have suitable skills, knowledge and experience for the designated activities.
- High standards of cleanliness and housekeeping shall be maintained at all times.
- The instructions of the lab manager / supervisor shall be followed.
- All incidents shall be reported to the lab manager / supervisor / local contact.

Hazardous Substances

All processes using or generating hazardous substances require a COSHH assessment prior to starting the work. For users, this can generally be covered in the experimental risk assessment and lab assessment forms.

Fire Prevention and Precautions

- Quantities of flammable substances in-use shall be minimised as low as practicable.
- Bulk reagents stored away from the lab in the external chemical store.
- Flammables and oxidising substances shall be segregated from each other and other substances and stored in metal chemical / flammables cabinets.
- Ensure appropriate spillage control measures are in place, e.g. secondary containment, spill trays or bunded cabinets.
- Control ignition sources; restrict naked flames; select hot plates and heating mantles as a safer alternative, keep flammable materials away when working with ignition sources.

- Minimise the amount of combustible materials (e.g. cardboard packaging) in the laboratory.
- Clean up spills of substances immediately with suitable absorbent materials. Ensure the correct storage and disposal of this collected waste.
- Ensure understanding of the compatibility of wastes with other substances.
- Ensure that you are aware of the locations of fire escape routes and extinguishers.

Heat Sources

- Avoid the use of naked flames. Use heating mantles or hotplates in preference. Where heating e.g. round bottom flasks, the use of shaped metal heating blocks, water baths or sand baths are recommended.
- When using oil baths, an external thermocouple shall be used; the hot plate shall not be left unattended or otherwise unsupervised.

Where furnaces are used, the following precautions must be taken:

- Use tools to remove hot items from the furnace.
- Wear suitable PPE when handling hot items, e.g. heat resistant gloves.
- Use heat resistant mats for hot items.
- Maintain a clear area around the furnace to prevent fire.

Storage of Substances

Storage of hazardous or dangerous substances must be in accordance with the hazard classes and the compatibility of classes.

Lab Equipment General Considerations

- Only use equipment which you are authorised and trained to use. Only use equipment as the manufacturer intended.
- Make sure that use of the equipment has been risk assessed and that you understand the controls to ensure safe operation and the required action in case of emergency.
- Visually inspect all equipment before use – check for obvious damage including to power leads. Do not use equipment which is faulty or unsafe – report defects to the lab manager / local contact.

Local Exhaust Ventilation

<u>Fume Cupboard Working Practice</u>

Fume cupboards provide ventilation and partial containment of substance risks. Risk and COSHH assessments will inform you of when a fume cupboard is required.

Before use

- Check that the fume cupboard has been inspected and tested within the last 14 months – do not use if it is out of date, report this to the lab manager / local contact.
- Before starting using the fume cupboard, make sure that the air flow is working by checking the air flow indicator at the side of the unit.
- Avoid the use of large items in the fume cupboard which can disturb the airflow; consider raising larger items on lab jacks to improve airflow.
- Minimise the equipment in the fume cupboard.
- Do not use them as storage for reagents or wastes.
- Maintain an area of free space of 150mm inside the front of the fume cupboard to prevent air being drawn out of the fume cupboard.
- Do not raise the sash front more than 500mm.
- Lower the sash whenever possible.
- Secure light weight items to prevent them from being drawn into the duct work and secure equipment.
- Keep heat sources at least 100mm away from the sides and back of the fume cupboard to prevent heat damage.
- Do not use naked flames inside a fume cupboard as they affect airflow.
- Avoid rapid movement, sudden releases of gas or rapid movements of the sash.
- Never put your head inside a fume cupboard.
- Clear up spillages as soon as it is safe to do so.
- Record the substances used, and the amounts in the fume cupboard using the LEV logbook sheets provided on the fume cupboard.
- After use, leave the fume cupboard in a clean and safe condition, returning any equipment or reagents and disposing of wastes.
- Emergency: If the ventilation fails or stops working – make safe inside the fume cupboard (only if safe to do so) then immediately close the sash as far down as it will go and move away from the fume cupboard. Inform other lab users. Contact the lab manager immediately and report the occurrence.

Chemical Spills

- COSHH assessments and safety data sheets (SDS) provide the information needed to deal with chemical spills. Ensure that you have access to them.
- Make sure that you have the appropriate spill kit, equipment and reagents to hand and that you know what to do with them.

For hazardous spills (less than 1 litre) you should take the following action:

- Make safe, leave the area and warn others.
- Get advice from the Experimental Hall Coordinators (EHCs) or the lab manager.
- Plan the response.
- Clear up the spill in a safe way with assistance as needed.

For larger spills (greater than 1 litre):

- Make safe, leave the area and warn others.
- Contact the EHCs 8787.

Security

- Lab access is controlled by swipe access granted by the Diamond laboratory manager / supervisor / local contact.
- Do not allow other persons to enter the laboratory if they have not been authorised. Do not loan others your access card to others allow them access.
- You are responsible for the safety of any person that you allow to enter the laboratory.

Source page = /Users/SHE/Lab-Handbooks/Chemical-Lab-Handbook.html

Biological Lab Handbook

Good laboratory practice (GLP) and hygiene standards shall be adhered to in biological labs at all times, including:

- Safety glasses, protective gloves and lab coat with overlapping front, tight cuffs shall be worn.

- Additional personal protective equipment shall be worn as directed by signage or risk assessment (e.g. face shield shall be worn for splash risks).
- Prescription safety glasses, or over-specs shall be worn by spectacle wearers.
- Prescription safety glasses, free from contamination, can be worn outside the lab.
- Other PPE shall be removed before leaving lab and suitably stored / laundered / disposed of, as appropriate.
- Glass pipettes and sharps must not be used unless there is no suitable plastic alternative.
- Used glass / plastic ware must be rinsed before being put to wash. Refer to COSHH assessments for disposal of rinses.
- No mouth pipetting, eating, chewing, drinking, smoking/vaping, storing food and medicines, applying cosmetics etc.
- Hands shall be washed with soap and running water before leaving the laboratory and when contamination is suspected.
- Do not handle contact lenses (unless in emergency).
- Long hair shall be tied back.
- Loose clothing and dangling jewellery items shall be removed / tied / covered.
- Cuts and sores shall be covered with suitable dressing (e.g. plaster).
- Footwear shall be sturdy, closed toe, cover top of foot, and protect from chemical splashes. Ballet pumps, flip-flops, sandals, and similar are prohibited.
- Mobile phones shall not be used / handled to limit potential contamination spread.

- Personal items (coats, bags, etc) shall not be taken into labs.
- Operatives shall have suitable skills, knowledge and experience for the designated activities.
- High standards of cleanliness and housekeeping shall be maintained at all times. Benches must be cleaned and disinfected after each work activity and at the end of day.
- Equipment manuals and the instructions of the lab manager / supervisor shall be followed.
- All incidents and any breakages shall be reported to the lab manager / supervisor / local contact.
- Workplace and environmental exposure to any biological material should be kept to the lowest reasonably practicable level.

Biological Materials

All biological work must be risk assessed and approved by an appropriate person and Biological Safety Officer (BSO) before the work starts. For Users, this can generally be covered in the experimental risk assessment and lab assessment forms.

All biological material being transferred between laboratories must be carried within a secondary container. The outer container must be decontaminated before leaving the laboratory. Therefore, no gloves must be worn outside of the laboratories.

All vessels containing substances must be clearly labelled at all times with contents, date and owner. Where possible, plastic storage containers should be used in preference to glass ones.

Aerosol production should be minimised and where an aerosol risk has been assessed by risk assessment, all work with HG2 agents shall be carried out in a Microbiological Safety Cabinet (MSC)

Storage of Biological Material

All biological material must be stored such that their containment cannot be breached. The containers should be labelled, leak-proof and their outer surfaces cleaned and/or decontaminated.

Refrigerators and freezers in which biological materials are kept must be labelled with biohazard labels.

An up-to-date inventory shall be maintained. A list, with references to the location of hazardous biological material in fridges and freezers, should be held in the laboratory.

If moving or transporting biological material on site, adequate precautions must be taken to minimize the risk of leakage and spillage. If there is a requirement to transport hazardous materials to or from site, contact the local Health and Safety department.

Hazardous Substances

All processes using or generating hazardous substances require a COSHH assessment prior to starting the work. For Users, this can generally be covered in the experimental risk assessment and lab assessment forms.

Storage of hazardous or dangerous substances must be in accordance with the hazard classes and the compatibility of classes.

Lab Equipment General Considerations

- Only use equipment which you are authorised and trained to use. Only use equipment as the manufacturer intended.
- Make sure that use of the equipment has been risk assessed and that you understand the controls to ensure safe operation and the required action in case of emergency.
- Visually inspect all equipment before use – check for obvious damage including to power leads. Do not use equipment which is faulty or unsafe – report defects to the lab manager / local contact.

Fire Prevention and Precautions

- Quantities of flammable substances in-use shall be minimised as low as possible.
- Store bulk reagents away from the lab in the external chemical store.
- Flammables and oxidising substances shall be segregated from each other and other substances and stored in metal chemical / flammables cabinets.
- Ensure appropriate spillage control measures are in place, e.g. secondary containment, spill trays or bunded cabinets.
- Control ignition sources; restrict naked flames; select hot plates and heating mantles as a safer alternative, keep flammable materials away when working with ignition sources.
- Minimise the amount of combustible materials (e.g. cardboard packaging) in the laboratory.
- Clean up spills of flammable substances immediately with suitable absorbent materials. Ensure the correct storage and disposal of this collected waste.
- Ensure understanding of the compatibility of wastes with other substances.
- Ensure that you are aware of the locations of fire escape routes and extinguishers.

Heat Sources

- Avoid the use of naked flames. Use heating mantles or hotplates in preference. Where heating e.g. round bottom flasks, the use of shaped metal heating blocks, water baths or sand baths are recommended.
- When using oil baths, an external thermocouple shall be used - hot plate shall not be left unattended or otherwise unsupervised.

Where furnaces are used, the following precautions must be taken:

- Use tools to remove hot items from the furnace.
- Wear suitable PPE when handling hot items, e.g. heat resistant gloves.
- Use heat resistant mats for hot items.
- Maintain a clear area around the furnace to prevent fire.

Spillages

- The individual(s) who causes a biological spill is/are responsible for the ensuring the clean-up is completed promptly.
- Assistance should be sought from the Laboratory Manager for larger spills.
- Make sure that you have the appropriate spill kit, equipment and reagents to hand and that you know what to do with them.

Small Spill of Biological Material (<500ml) Outside of a MSC

- Wearing gloves cover the spill with paper towels and gently apply Virkon (or other suitable and effective disinfectant), proceeding from the outer edge of the spill to its centre, and leave in place for at least 30 minutes.
- Pick up the towels and discard into a biohazard container. Pick up any pieces of broken glass with forceps and place in a sharps container.
- Re-wipe spill area with disinfectant and thoroughly wash hands after glove removal.

Large Spill of Biological Material (>500ml) Outside of a MSC

- Leave the area immediately alerting others in area to do the same.
- Remove any contaminated clothing and put into a biohazard bag for later autoclaving.
- Wash hands and exposed skin and inform the Responsible person (e.g. PI/Supervisor/Laboratory Manager) of the spill.
- Isolate the room and warn others to stay out of the spill area; post a sign stating: "DO NOT ENTER, BIOHAZARD SPILL", contact (name and phone number) for information".
- Wait at least 30 minutes before re-entering contaminated area to allow aerosol dissipation.
- Put on protective clothing (lab coat, gloves, eye protection and, if indicated, suitable face mask and shoe covers) and assemble clean-up materials.
- Cover the spill with paper towels and gently apply Virkon powder (or other suitable disinfectant), proceeding from the outer edge of the spill to its centre. Leave in place for at least 30 minutes.
- Collect all treated material and discard in a biohazard container. Pick up any broken glass with forceps and place them into a sharps container.
- Re-wipe the spill area with disinfectant.
- Carry out final wipe down with 70% ethanol to remove corrosive Virkon traces.
- Wash hands thoroughly

Biological Spills inside a MSC

- LEAVE THE MSC TURNED ON
- With large biological spillages (>50 ml), or where liquid spills through the vents, leave the MSC running for at least 10 minutes before cleaning up the spillage with suitable disinfectant solution. Cleaning and decontamination of the spillage must include removal, cleaning and replacement of vents.
- With small biological spillages (<50ml), while wearing gloves, spray or wipe MSC walls, work surfaces, and equipment with disinfectant solution.
- Soak up disinfectant and spill with paper towels. Remove and clean underneath grills. Discard materials into biohazard container.

- Carry out a final wipe down with 70% ethanol in order to minimize the corrosive action of agents such as Virkon.
- Wash hands and any exposed surfaces thoroughly after the clean-up procedure.

Biological spillages in centrifuges and shaking incubators

- If a spillage is found once centrifuge/shaker door is opened, immediately close the centrifuge lid/shaker door with the samples remaining inside and turn the centrifuge/shaker off. If spillage suspected, do not open centrifuge lid/shaker door.
- It may be necessary to vacate the lab depending on the nature of the spilled material and its ability to generate an aerosol. If the lab needs to be vacated, secure the room such that others cannot gain access. Post signage indicating restricted entry.
- Notify Lab Manager, Principal investigators, supervisors and co-workers of the spillage as quickly as possible.
- Wait at least 30 minutes before entering the lab to allow aerosols to settle. Transfer intact centrifuge bottles/flasks to MSC and then treat as per spillages described above.
- Spillages must be reported to the responsible person(s) immediately and to the local Health & Safety Team in accordance with local reporting procedures (see section 4.18- Accidents and Incidents) as soon as possible.

Security

- Lab access is controlled by swipe access granted by the Diamond laboratory manager / supervisor / Local Contact.
- Do not allow other persons to enter the laboratory if they have not been authorised. Do not loan others your access card to others allow them access.
- You are responsible for the safety of any person that you allow to enter the laboratory.

Source page = /Users/SHE/Lab-Handbooks/Biological-Lab-Handbook.html

Lab Standard Risk Assessments

If the use of laboratory facilities is required, the following lab standard risk assessments (LSRA) are in place. The LSRAs are documents that assess routine work to be completed in the laboratory and these can be referred to and used, if lab access is required for these purposes. All investigators coming to Diamond should be familiar with the lab standards relevant to their experiments.

- LSRA 1 - Solvents
- LSRA 2 - Strong Acids and Bases
- LSRA 3 - Carcinogens, Mutagens and Sensitisers
- LSRA 4 - Nano Technology
- LSRA 5 - Pellet Preparation
- LSRA 6 - Flow Cells
- LSRA 7 - XChem Lab
- LSRA 8 - eBIC Preparation Labs
- LSRA 9 - Plunge freezing in the eBIC Lab
- LSRA 10 - Toxic gases

- LSRA 11 - Strong Oxidisers
- LSRA 12 - Cryogens
- LSRA 13 - Flammable gases

Source page = /Users/SHE/LSRAs.html

ITSF 2025

Source page = /Users/SHE/ITSF.html

1st Announcement

ITSF 2025

Announcement: The 2025 *International Technical Safety Forum (ITSF)* is 22nd - 26th September 2025 at Rutherford Appleton Laboratories (RAL), near Oxford, UK.

Hosts: STFC (RAL) UKAEA Culham Centre for Fusion Energy Diamond Light Source

Contact: itsf2025.secretariat@stfc.ac.uk

Background: ITSF is an informal practitioner led forum to exchange lessons learned and state of the art ideas, processes, procedures, and technologies in personnel, environmental, and equipment safety. The ITSF community ranges from large-scale high energy physics facilities through to spallation neutron sources, synchrotron radiation and cyclotron laboratories from across the world.

Recent ITSF Conferences:

ITSF 2024 - RIKEN/JPARC (Japan)

ITSF 2022 - CERN (Switzerland)

ITSF 2019 - ESS (Sweden)

ITSF 2017 TRIUMF (Canada)

ITSF 2016 - DESY (Germany).

Participants: Attendees are drawn from safety, health, environmental and sustainability functions for major science facilities and their operating teams.

Travel Information

RAL is located in south Oxfordshire and is easily accessible from London Heathrow or London Gatwick.

Although on-site participation is strongly encouraged, on-line participation will also be possible.

Past conference topics - participants are welcome to propose new topics around which we can facilitate discussion or specific workshop during the event. In addition to oral presentation sessions, poster sessions are also planned.

Please forward this to colleagues that you think would be interested in attending ITSF 2025. We welcome participation from all international science facilities, in particular those that are working in high energy physics that have not participated in the past ITSF conferences.

We are look forwarding to warmly welcoming you to the UK for ITSF 2025 and hope you will be able to attend!

Look out for more detailed information that will be announced in the coming months.

Best wishes,

UK co-chairs of ITSF 2025 Local Organising Committee

Julie Black (STFC)

Sam Jackson (UKAEA Culham)

Guy Thomas (Diamond Light Source)

International Organising Committee of ITSF

Helen Boyer (ESS)

Kanenobu Tanaka (RIKEN)

Kotaro Bessho (J-PARC)

Saverio La Mendola (CERN)

Sven Mohr (DESY)

Marcin Bielawski (MAX IV)

Source page = /Users/SHE/ITSF/1st-Announcement.html

2nd Announcement

Dear ITSF Community,

Happy New Year! Only 8 months to go until ITSF 2025 (22-26th Sep).

Further to the 1st Announcement, we are pleased to provide you with additional conference information:

ITSF 2025 Expression of Interest Form

Please submit a non-binding expression of interest as soon as possible, if you plan to attend the conference.

ITSF 2025 Website

All updates shall be posted here.

ITSF 2025 Promotional Poster

Please circulate to all your relevant contacts across the globe.

ITSF Linkedin Group

Please join this newly created group and circulate to all your relevant contacts. ITSF 2025 updates shall be posted on this feed. This group purpose is intended to extend beyond ITSF 2025.

Pre-Conference Timetable

Timelines for registration, abstracts, posters, etc.

Conference Topic List

Please view the topics of interest and start thinking about your contributions.

Travel

Information, options and booking from London airports to Oxford, and central Oxford to Conference.

Accomodation

We recommend delegates stay in central Oxford - we are planning to arrange daily transportation to the site from there. A list of accomodation to meet a range of budgets is provided.

Participation: In-person participation is preferred. Online participation is also an option.

We look forward to greeting you in September!

Julie Black (STFC), Sam Jackson (UKAEA), Guy Thomas (Diamond Light Source)

ITSF 2025 Local Organising Committee

Source page = /Users/SHE/ITSF/2nd-Announcement.html

Pre-Conference Timetable

20 JAN - 28 FEB: Expression of Interest period.

01 MAR - 20 APR: Abstract submission period.

01 MAR - 30 MAY: Registration period.

01 JUN - 31 JUL: Presentation and poster submission period.

22 SEP: Confrerence

Contact: itsf2025.secretariat@stfc.ac.uk

Source page = /Users/SHE/ITSF/Pre-Conference-Timetable.html

Conference Topic List

Oral sessions are planned for the following topics:

- Lessons learned from incidents, injuries or near misses
- New and novel health and safety challenges offered by new science projects and facilities
- Environmental protection and sustainability in high energy physics facilities
- Risks related to Safety, Health or Environmental matters
- Examples of continuous improvement in Safety, Health and Environmental matters
- Development of Health and Safety culture and behaviour
- Safety, Health and Environmental training
- Emergency preparedness
- Chemical safety management
- Experimental safety
- Contractor and sub-contractor safety management
- Fire safety management

Participants are welcome to propose additional topics or submit presentations on other related matters. In addition to oral presentation sessions, poster sessions will be arranged.

Source page = /Users/SHE/ITSF/Conference-Topic-List.html

Travel

Travelling to UK

Visit the UK

UK Government Guidance

Directions to ITSF Conference (RAL site on Harwell Campus)

Directions to ITSF Conference (RAL site)

Travelling from airports to central Oxford

Travelling from Oxford to RAL site on Harwell Campus

ITSF 2025 shall provide a daily return bus service from central Oxford to the conference. If you are unable to utilise this arrangment, the following details public transportation services:

GWR - view live trains, check trains, buy tickets

Oxfordbus - bus services, network map, timetables, buy tickets

Source page = /Users/SHE/ITSF/Travel.html

Accomodation

The Randolf Hotel, Beaumont Street, OX1 2LN

5-star, sumptuous, central location, walkable to the station, close to shops, attractions, theatre

The Store, 1-5 Broad Street Oxford OX1 3AG

5-star, central location, walkable to the station and close to key attractions

Courtyard by Marriott, 15 Paradise Street, OX1 1LD

4-star, central location, walkable to the station, close to Oxford Castle complex.

Vanbrugh Hotel, 20-24 St Michael's Street, OX1 2EB

4-star, central location, walkable to the station, close to colleges, Radcliffe Camera, St Mary's Church

Royal Oxford Hotel, Park End Street, OX1 1HR

3-star, very close to the station, walkable to amenities and attractions

George Oxford Hotel, George Street, OX1 2AY

3-star, plenty of pubs and restaurants nearby, central, walkable to station and attractions

Central backpackers, 13 Park End Street, OX1 1HH

Close to the railway station, central location, close to shops, bars, restaurants.

Source page = /Users/SHE/ITSF/Accomodation.html

Things to Do in Oxford

Museums / Libraries

Ashmolean Museum

History of Science Museum

University Natural History Museum

Bodleian Library

Radcliffe Camera

Story Museum

Historic Buildings

Colleges everywhere

Carfax Tower

Oxford Castle and prison

Oxford Castle Quarter

Sheldonian Theatre and Divinity School

Parks and Gardens

University Parks

Botanic gardens

Restaurants and Bars

Jerico and Walton Street

George Street

Westgate centre

Shopping

Westgate centre

High street

Historic covered market

Fun Things

Open top bus tour (if you like sitting)

Guided tours of the colleges (if you like walking)

Punting (if you like floating)

Ghost tours (if you like screaming)

Spotting Inspector Morse’s (and Lewis’s) crime scenes (if you like sleuthing)

Old World charm and service – afternoon tea at the Randolf!

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