Freezer Management Policy

1. OVERVIEW AND PURPOSE

1.1. General information

1.1.1. An ultra-low temperature freezer (ULT) is a specialized piece of equipment that is designed to store material at very low temperatures, typically between -70°C and -80°C and are usually specialist 'laboratory grade' units. Freezers storing material at -20°C may be specialist units made for scientific use but may also be domestic, although domestic units provide less resilience and are not recommended, therefore should be prioritised for replacement. Material stored in ULT and –20°C conditions is predominantly biological, such as DNA, RNA, and proteins. Some chemicals and geological materials may also need to be stored at these temperatures. The majority of freezer holdings within the University are biological, therefore this policy focusses mainly on material of this nature and in some cases, separate, specialist guidance or exceptions may apply.

1.1.2. Proper management of freezers by all users is critical to maintain the integrity and quality of stored material, health and safety, as well as being part of taking a responsible attitude towards environmental sustainability and fair use of limited space.

1.1.3. This policy has been written as part of a wider review of freezer usage across the University of Exeter. The review is facilitated by Technical Strategy & Operations (TSO) and is primarily academic led with representatives whose role is to support and steer us in the review ensuring any outcomes are fit for our academic community. The group have reviewed and approved the policy before the release of the final version.

1.2. Aims

1.2.1. The aim of this policy is to provide a framework for the consistent management of freezer storage across the institution. The principles around which the policy has been developed are:

i. **Effective space management, security and optimisation of usage**; enabling effective use of our institutional freezer capacity, in order to optimise the footprint of freezers on campus.

ii. **Environmental sustainability**; storage conditions will be determined based on sample requirements as determined by consideration of scientific evidence, such that appropriate protection is balanced with sustainability criteria. Institutional and funder commitments to sustainability improvements will be considered in every aspect of this policy.

iii. **Resilience and risk management;** mitigations, management procedures and monitoring will be ascribed to units based on value and overall risk to ensure effort and investment is used fairly, appropriately and consistently and that robust systems are in place to protect the most precious materials.

iv. **Health and Safety;** risks to and impacts on the health, safety and wellbeing of users and any other individuals must be minimised and this principle is implemented throughout the policy by carefully considering how operations are carried out and by whom.

2. SCOPE

2.1. This policy considers the management of all freezer storage (at -20°C, -80°C and any -150°C) within laboratories and technical spaces. Currently out of scope are refrigerated and liquid nitrogen storage units.

Document Control					
Document No		**Version**	1.2	**Date Issued**	20/11/2023
Charlotte Cook, TSO Partner HLS Emma McArdle, Project & Operations Manager Charlotte Murphy, Director of Technical Strategy and Operations		**Reviewed by**	Freezer Review Task and Finish Group	**Department**	Technical Strategy & Operations

2.2. All freezers in technical spaces (workshops, labs, clinical areas) within the University (supported by Technical Strategy & Operations or not) are in scope. This includes freezers that are in spaces that are NHS owned and under University of Exeter management.
2.3. The policy will be shared with tenants of University of Exeter property, where we know they keep freezers on site, to encourage best practice.

3. RESPONSIBILITIES

3.1. This policy applies to all users of freezer storage across the institution. In some places this policy clarifies where Technical Strategy & Operations will undertake specific responsibilities. At present, there are no freezers in spaces that are not supported by Technical Strategy & Operations, but should this arise, all appropriate management actions as set out in this policy will become the responsibility of the freezer owner. Otherwise, it is the responsibility of all users to ensure this policy is followed. This comes with the benefit of resilience, support, insurance and management of your own samples which won't be leveraged to the same extent without evidence of following the policy.
3.2. Academic managers are responsible for ensuring that their staff and students are aware of the content of this policy and are adhering to it.
3.3. Technical Strategy & Operations in collaboration with users are responsible for keeping this policy up to date and ensuring their own staff are aware of the content and are adhering to it.

4. POLICY

4.1. **Access and security**

4.1.1. Access to freezers should be limited to authorised personnel only. The recommendation is that this is controlled via the ARX swipe system as this provides robust security, is configurable, does not compromise fire safety/control and enables emergency access to those charged with responsibility to respond to such events. This need not be directly controlling access to the freezer room itself, provided that access to the general space is limited to those trained to use the freezers.
4.1.2. Only authorised personnel should be granted access after short training / induction on the proper use of freezers and the procedures for storing and retrieving samples. This training may be included within an overall laboratory induction or given as standalone training, alongside provision of this policy.
4.1.3. Access to freezers containing poisons or controlled drugs should be further controlled i.e. units kept locked when not in use.
4.1.4. Additional training will be provided to ensure compliance with specific requirements such as DEFRA licensing, controlled drugs, commercially sensitive materials. Please contact your line manager or lab manager in the first instance.
4.1.5. Any unusual, suspicious or unauthorized activity should be reported to the laboratory manager, TSO Partner, or Head of Department, immediately.

4.2. **Temperature control and monitoring**

4.2.1. The University has a contract with CheckIt for freezer temperature monitoring. An annual subscription for CheckIt is paid for on the basis of the number of probes used and monitoring is prioritised. Units are eligible for CheckIt monitoring if they contain material that:

i. Is valued above £10,000, and/ or,
ii. Is otherwise irreplaceable and where there is an existing benefit of maintaining, or,
iii. Is protected under license (e.g. through the Human Tissue Act).

4.2.2. ULTs should be set to control temperature at -70°C, unless there is evidence to support a scientific justification for storage at a colder temperature[1]. Where there is a case to store material at a colder temperature, approval should be sought from the Director of Technical Strategy & Operations, after consultation with your local Technical Strategy & Operations Faculty Partner[2].

4.2.3. Any temperature fluctuations or deviations outside the controlled temperature range should be investigated and addressed promptly. It is the responsibility of all users of freezer storage to ensure that this is done and to ensure familiarity with emergency protocols. Emergency protocols must be specific to each space, therefore should be stored on LabCup (attached as a file to the specific freezer asset).

4.2.4. If a temperature deviation outside of accepted parameters occurs, CheckIt will send alerts via phone call, text, or email, depending on the priority of the unit, to an ascribed freezer call out list (via CheckIt).

4.2.5. Freezer call out lists will be comprised of a minimum of 3, and up to 7, individuals who own material stored in within the unit. On receipt of a CheckIt alert, it is the expectation that any individual deals with the freezer issue as a whole unit, as opposed to rescuing their own material only. Should support be needed where the task is unmanageable for one person within a reasonable time frame, it is recommended that you contact others who share the freezer in the first instance. If help is not available this way, then you may contact the Technical Strategy & Operations Partner on call via Estate Patrol.

4.2.6. During temperature deviation events, freezer emergency protocols should be followed. If there is not sufficient capacity in designated back up freezers, it is the expectation that material may be rescued by placing in any suitable unit where there is capacity. The Laboratory Sustainability Team have produced a literature review and hub of information regarding the safe storage of samples at -70°C.

4.2.7. Temperature data will be recorded and accessible for up to 30 years, via CheckIt. If there are specific temperature monitoring and data requirements, e.g. for HTA materials, please discuss with the local laboratory manager.

4.3. Location of freezer storage

4.3.1. Cold storage should be located with consideration of environmental conditions that may impact operating efficiency of the units.

4.3.2. Ambient temperature is a critical factor affecting the efficient running of cold storage- the higher the ambient temperature around the unit, the harder the chiller must work, therefore decreasing the working life of the unit as well as increasing energy consumption.

4.3.3. Ambient temperature should either be controllable i.e. with air conditioning or heating, or cold storage should be placed in well-insulated locations where temperatures reliably remain within the ambient operating range specified for the cold storage units within.

4.3.4. It is equally important (but perhaps not as relevant in the mild South-West climate) that cold storage units are not subject to temperatures below their defined ambient operating range.

4.3.5. Ambient operating range data, or climate classification information is specified within technical data sheets, which are available via supplier webpages.

---

[1] The Laboratory Sustainability Team have produced a literature review and hub of information regarding the safe storage of samples at -70°C.

[2] Charlotte Murphy, Director of Technical Strategy & Operations. Find your local Faculty Partner.

4.4. **Labelling and organisation**

4.4.1. All freezers should be labelled with the standardised freezer signage template, completed with relevant information[3]. Some freezers may require additional signage to cover locally specific management requirements.

4.4.2. All materials stored in the freezer should be properly labelled and organised for safety reasons, as well as to facilitate retrieval and tracking. Door labelling should show where in the freezer samples are, to minimise the amount of time the door should be open

4.4.3. Labels must include the material name or ID, the date of storage, and the researcher's name (in full).

4.4.4. Materials should be stored in a logical and consistent manner, such as by project, sample type, or alphabetical order. Organisation should take into consideration how materials might be moved and subsequently retrieved, as detailed in a contingency plan, in the event of freezer malfunction or power failure. Samples that are regularly accessed should be stored at the front of the freezer if possible

4.4.5. It is recommended that the lower compartments of freezers should be prioritized for storing materials that are particularly susceptible to degradation as temperatures are the most stable here.

4.4.6. Chemicals should also be clearly labelled and stored in sealed containers of a suitable material. Safety and the preservation of other stored materials stored within the same freezer should be considered in relation to storing chemicals in a freezer. Non-compatible chemicals should be stored in separate freezers, as with ambient storage practices.

4.4.7. An inventory should be kept of materials stored within each unit using the standardised template[4]. For more in depth tracking or where the HTA applies, please use ProCuro - see section 4.4.8.

4.4.8. The University has a contract with ProCuro for in depth and auditable tracking. Please contact your local TSO Manager or faculty TSO Partner if access to ProCuro is needed. It is a requirement under the Human Tissue Act that any HTA relevant material is tracked. In the first instance, the University Human Tissue Authority Designated Individual should be contacted if it is thought you may be working with HTA relevant material[5].

4.4.9. Any material or sample that is identified as priority 1 in the inventory should be split and a duplicate stored in a freezer in another building, ideally on a different campus. Assistance for sample splitting across campuses/ buildings can be provided by contacting your local TSO Manager or faculty TSO Partner. Alternate locations of sample duplicates must be included in the inventory. Sample owners are responsible for annual audit of duplicates alongside originals.

4.4.10. Any changes to the organization or labelling system must be clearly communicated, in writing, to all relevant authorized personnel.

4.5. **Optimisation of capacity**

4.5.1. Space within all freezers should be used maximally, within the parameters of usability, safety and efficient operation of the unit. This may involve a collegiate approach to freezer usage and sharing where possible is encouraged.

4.5.2. A review of contents and space usage within each freezer should be undertaken annually, by the users, to ensure appropriate disposal (or archiving) and record keeping. A QR code will be attached to each unit, which links to an annual review questionnaire[6]. Without a review units will not be considered for replacement.

4.5.3. Samples and materials should be disposed of when they have surpassed recommendations for their longevity or when they are no longer needed, whichever is sooner[7].

---

[3] 2023 TEMPLATE Freezer Door Info - open in app for correct formatting.docx

[4] 2023 TEMPLATE Freezer Inventory.xlsx

[5] hta-return@exeter.ac.uk

[6] 2023 SOP Annual Freezer Review.docx

[7] For guidance on the longevity of different sample and material types please refer to the literature review and hub of information provided by the Technical Strategy & Operations Sustainability Team

4.5.4. The annual review and disposal process will also provide management information to underpin any necessary cases for archival storage, new freezer units, successful insurance claims and is important as an indicator of resilience levels in terms of spare capacity.

4.5.5. Users should always fill the freezer from the bottom shelf up. Any gaps can be filled with polystyrene pieces to assist in maintaining the temperature until the freezer is full.

4.5.6. A shelf should be filled before moving on to the next shelf to maximise the cooling efficiency and number of samples that can be stored.

4.5.7. Samples should be stored in racks, where samples that are used the most are at the front for easy access. This optimises freezer space usage and energy efficiency[8] and increases the time the freezer will remain cold for in the event of a power or system failure.

4.5.8. The front of the freezer should clearly display a map of where each rack is, who it belongs to and what is contained in it for ease of locating the rack with the sample that is required, prior to opening the freezer door.

4.5.9. Minimise the time the freezer door is open to assist with maintaining samples at the correct temperature and reduce power consumption to comply with sustainability goals.

4.6. Maintenance and cleaning

4.6.1. Maintenance and cleaning is the responsibility of Technical Strategy & Operations where freezers are stored in an area under Technical Strategy & Operations management. Otherwise, it is the responsibility of the group in ownership of the freezer.

4.6.2. A schedule should be in place for regular defrosting, cleaning and maintenance of freezers. Regular maintenance should include checking seals, filters, and replacing any faulty or worn-out parts (may require an engineer). Maintenance schedules should be logged via LabCup by ticking 'Needs periodic maintenance/repair' and inputting the maintenance date.

4.6.3. Cleaning should be performed using approved disinfectants and procedures to prevent cross-contamination or damage to the stored samples.

4.6.4. Standard operating procedures and risk assessments for maintenance and cleaning should be in place and followed[9]. It is the responsibility of those undertaking the task to ensure a RA is in place to cover the specifics of the activities.

4.6.5. Any maintenance or cleaning activities should be communicated to all authorised personnel, in advance such that access to samples is not interrupted when required.

4.7. Backup and emergency procedures

4.7.1. The laboratory manager will create and communicate a contingency plan that details the protocol to follow in the event of equipment failure and a wider power outage.

4.7.2. The contingency plan should ensure that samples can be retrieved and transferred to an alternative storage location in the event of a freezer malfunction or power outage. This may involve use of a freezer that is kept with spare capacity, solely as a back-up unit. Back up units should be kept at the highest possible holding temperature (usually –50c for ULTs) unless in use as part of an emergency response. This is to reduce unnecessary carbon emissions and to prevent back up freezers being used as spill-over/otherwise temporary storage, that may block usage at a critical time. If you have multiple back up units, consider holding only one at a reduced temperature and the others staying off until an incident is taking place.

4.7.3. Dry ice can be used to keep materials cool during emergency moves but availability is dependent on whether there has recently been a local delivery and it must not be transported in an enclosed environment e.g. a car to point of use. NB dry ice sublimates at -78.5°C, therefore should not be stored in freezers as sublimation creates an asphyxiating atmosphere and risk of over-pressurisation

[8] The Laboratory Sustainability Team have produced a literature review and hub of information that includes guidance on the use of racking

[9] 2023 SOP Freezer Defrost and Filter Replacement.docx

within the freezer. It is therefore recommended that regular ice is used for moving cold storage items.

4.7.4. Emergency procedures should be established and communicated to all authorised personnel to ensure that they know what to do in case of a freezer failure or other emergency.

4.7.5. The contingency plan should be reviewed and updated regularly and after any significant changes, to ensure that it remains effective and relevant.

4.7.6. Users and Technical Strategy & Operations staff are equally responsible for dealing with freezer emergencies upon discovery within normal working hours. It is the expectation that individuals involved work through the appropriate contingency measures as a team.

4.7.7. Outside of normal working hours and/or during lone working, freezer emergencies will be notified to the ascribed call lists via CheckIt. It is the responsibility of individuals on the call list to respond according to the appropriate contingency plan and may call upon others on the call out list to enlist help. If multiple units have been impacted, assistance from the Technical Strategy & Operations Partner on call may be requested via Estate Patrol.

4.8. Replacement and new purchases

4.8.1. Freezers will be regularly reviewed for replacement based on asset information held in LabCup, therefore it is important for all units to be added to the LabCup asset inventory[10].

4.8.2. Purchase date, cost and any other relevant tags should be included when adding to the LabCup inventory, as this information will be used to inform freezer replacement schemes. If it is not logged, then the freezer will not be included in freezer replacement schemes.

4.8.3. This information can also be requested ad hoc via your lab manager or TSO Partner, when there is opportunity to strategically replace old freezers as part of grant funding applications.

4.8.4. Where capacity is optimised and it is determined that an additional freezer is required, please discuss with the lab manager or a TSO Partner, as there may be opportunities for bulk buying if others are making purchases with the same supplier.

4.8.5. Where multiple units are being purchased, consultation with the lab manager and/ or faculty TSO Partner will be required so that we can work with DMs and DFOs to ensure space is allocated appropriately across departments.

4.8.6. The University strongly advises that new freezer models purchased should have an estimated KwH of <10. New –20 freezers or fridges purchased must be commercial units which are 'spark-free'. Domestic models are not appropriate. If a model with a higher KwH is required, approval will be needed from the Director of Technical Strategy & Operations, after consultation with your local Technical Strategy & Operations Faculty Partner[11]

4.8.7. Purchasing new freezers should be done via the LUPC Procurement Framework, which is a pre-agreed framework of suppliers for purchasing sustainable cold storage in universities and ensures the best prices. Support for procurement of new units can be sought from the Technical Strategy & Operations Lab Sustainability Team[12].

If you have any questions that are not answered by this policy, please contact either your local lab manager or TSO Faculty Partner, who will be able to help you.

[10] 2023 LabCup Adding Storage Assets Crib Sheet.pptx

[11] Charlotte Murphy, Director of Technical Strategy & Operations. Find your local Faculty Partner.

[12] LEAF@exeter.ac.uk

Review / Contacts / References	
Policy title:	Freezer Management Policy
Date approved:	To be approved
Approving body:	Research Impact Executive Committee
Last review date:	Not yet reviewed
Revision history:	First draft
Next review date:	Sept 2024
Related internal policies, procedures, guidance:	*Freezer Management Policy linked docs*
Policy owner:	*Technical Strategy & Operations*
Lead contact / author:	*Director of Technical Strategy and Services*