



Ultra-Low Temperature (ULT) Freezer Best Practices

REFERENCE GUIDE

Issued: January 2024

Ultra-Low Temperature (ULT) freezers are vital pieces of equipment that are often used to store expansive, and potentially irreplaceable, sample inventories. It is important to note that ULT freezers consume substantial amounts of energy to maintain desired storage conditions. Improper care of ULT freezers can compromise unit function, potentially damaging samples and increasing energy burden. Please heed the following guidance in order to maximize ULT freezer efficiency and prolong unit life.

The following key aspects will be addressed:



Unit Staging



Unit Operation



Sample Management



Preventative Maintenance



Unit Staging

- ULT freezers should be staged near HVAC exhaust vents.
- Freezers should be tightly packed together.
- Maintain clearances of $\geq 8''$ of clear space above the freezer and $\geq 5''$ of space behind the freezer.
- Rooms at cooler temperatures ($< 72^\circ\text{F}$) can ease the energy load on the ULT.
- Don't place ULTs in hallways.
- Consider the proximity and/or availability of backup freezers in the unfortunate event of unit failure.
- If possible, ULTs containing critical samples should be connected to emergency power.



Unit Operation

- Consider "[chilling up](#)" the temperature setpoint to -70°C . This will significantly reduce energy consumption and prolong the longevity of a unit without sacrificing sample integrity.
- Units that are either staged in a shared access area or contain critical samples should be kept locked.
- Implement a remote monitoring system for critical inventories. This will provide ample notice in the event of a unit failure. Wi-Fi Data Logging ULT Freezer Thermometers are commercially available.
- Do not overfill freezers.
- Avoid leaving large empty spaces in freezers. If large areas of the freezer are empty, use spare polystyrene ice boxes to fill them.
- Reduce the amount of time ULT freezer doors are left open.



Sample Management

- Clearly label samples. Printed labels/identifiers or barcodes are recommended.
- Maintain an accurate inventory of contents. If applicable, detailed box maps are highly recommended.
- Keep samples organized.
- Regularly audit contents and properly dispose of samples that are no longer required.
- Always use cold-resistant gloves when handling ULT freezer samples.



Preventative Maintenance

- Regularly defrost ULT freezers:
 - Light frosting can be wiped off surfaces with a soft cloth.
 - A brush or scraper can be used to clean harder to reach places or more dense frost.
 - Be careful to not puncture the door gasket.
 - Regularly maintain ULT freezer filters:
 - Filters should be inspected at least quarterly.
 - Filters can be cleaned by vacuuming or washing with soap and water.
 - Heavily burdened or damaged filters should be replaced, as needed.
 - Regularly clean condenser coils. To do so:
 - Turn off the unit and **DISCONNECT THE POWER.**
 - Locate the coils. Condenser coils are thin, tube-like pieces that are connected with fins.
 - For upright -80°C freezers, condenser coils are normally located at the bottom front of the freezer, or mounted on the rear of the freezer. You may need to remove a covering panel or grill.
 - Otherwise, you will find the coils behind the freezer's access panel. You will need to remove the access panel, usually by unscrewing each corner.
 - Go over the condenser coils with a vacuuming hose.
 - Brush away stubborn dirt using a coil brush or a narrow paint brush.
 - If there are remaining build-ups on the coils, wipe them away with a rag dampened with warm, soapy water. When done, remove the moisture from the coils with a dry rag.
 - Replace any grills or panels, and plug the freezer back in.
-