Tufts Office of Sustainability
ULT Freezers Best Practices Checklist

Action	Rationale
1.1 – Keep freezers full for maximum energy efficiency • Consolidate freezer space • Share freezers with other labs • If there is unused space, put in reusable ice packs	• One -80°C freezer uses as much energy as a single family home (18-28 kWh/day) • A fully loaded freezer has minimum temperature variation
1.2 – Set ULT freezers at the highest required temperature • Only cool samples to -80°C if absolutely needed • Set ULT freezers at -70°C	• Raising the temperature by 10 degrees saves the power used by the equivalent of one standard (-20°C) freezer • -70°C is adequate for most bio-molecules and many microbial cultures; DNAs can be store at -20°C*
1.3 – Inventory freezer contents • Clearly label the samples with the: date, name of sample, researcher • Attach an inventory to the outside of the door that includes the location of samples	• Minimize the time the door is open while assessing samples • Every time a ULT freezer door is opened it takes 10 min to recover its temperature back to its set point
1.4 – Defrost regularly • Defrost freezers at least annually, or when the frost prevents the door from sealing properly, or when ice build-up exceeds 1 inch within the cabinet near samples.	• Clear space for sample storage • If frost prevents proper door seal, it increases energy consumption and affects freezer performance • Ice build-up may block the removal of heat

1.5 – Discard unneeded samples • **Clean out old unwanted samples at least annually**	• **Normally at least 30% of the samples stored in ULFs are out-of-date or not useful for research** • **Free up space and avoid the need to buy new freezers**
1.6 – Place freezers in a well-ventilated place • **Avoid sources of heat such as sunlight or warm rooms** • **Leave 8" clear space on the top and around ULT freezers; Do not store items on top or around freezers**	• **Operating ULT freezers in warm environments (>85°F) increases energy consumption by as much as 24%** • **Poor heat dissipation is the leading cause of component failure leading to downtime and high repair bills**
1.7 – Clean dusty condenser filters	• **Freezers with dusty condenser filters use more energy to remove heat**
1.8 – Purchase efficient ULT freezers to replace old dysfunctional ones • **In Boston campus, new units that use under 25 kWh/day may be eligible for a utility rebate. Contact Office of Sustainability for more information on the rebate.**	• **When new, conventional ULT freezers use about 16 to 22 kWh per day. After years of service, many consume over 30 kWh per day** • **Energy efficient units use as low as 8 kWh/day**
1.9 – Install alarm device to monitor failure, if current units don't have it • **New freezers should have built-in alarm system** • **Install ULT freezer monitors for older units**	• **Monitor freezer performance and prevent failures that threaten your sample safety**

*Click the link below to see **a list of** samples currently stored safely at **-70°C** across the US.

https://www.freezerchallenge.org/score-sheet--resources.html