Top considerations for selecting a ULT Freezer – facilities considerations

From application to environment, there are many aspects for consideration that will impact the type of ultra-low temperature (ULT) freezer to be selected for the given situation. Some of these aspects include: application environment, performance standards, space constraints and environment, facilities interactions, and service support. The freezer is often the "only" consideration in a product search. But reality is the location that the unit is going to be installed in has a dramatic impact on the freezer selection.

Key takeaways/benefits/separating features

- **Voltage requirements –** There are several voltages available from 115V to 230V in single phase or three phase. Understanding what the facility has ahead of time is critical.
- **Backup power –** although not mandatory, could also be a consideration. The backup power system also needs to conform to the intended ULT freezer requirements. Backup power systems often experience severe voltage fluctuation when a multitude of units/equipment start-up after a power failure. Some ULT freezers, like the Thermo Scientific™ TSX Series Ultra-Low Temperature Freezer, feature a built-in setting by which a user can input a power delay re-start to minimize these impacts. (Staggering the start-ups of equipment).
- **Backup systems –** In the event of a system issue, backup systems like LN_2 or CO_2 systems can be critical to sample storage. The problem with these systems is either the infrastructure and/or the maintenance of the systems to ensure the integrity of the backup system is intact in the time of need. The storage tanks for LN_2 or CO_2 can be large and often require their own space/room and safety considerations. Because the amount of gas can cause respiratory issues, there are often specific monitoring requirements around O_2 levels for worker safety.
- **Power circuits –** ULT freezers should only be installed on a dedicated power circuit. This avoids voltage drops (sag) which may impact normal ULT freezer operation.
- **Temperature –** The ambient temperature the unit will be exposed to has significant performance and storage impacts. A ULT freezer emits heat as it maintains sample temperature. This means heat is added to the surrounding environment. The air conditioning (HVAC) system needs to be sufficient to maintain the temperature of the room considering the added heat from the unit.
- **Preventative maintenance –** ULT freezers require routine preventative maintenance and access around the unit is paramount to facilitate these efforts.
- **Seismic restraints –** Depending on the geographical region, there may be seismic or other restraint considerations. For example: there are specific OSHPD requirements in the state of California that require seismic restraints on all large equipment. Other considerations may be as simple as locking wheels/casters to minimize unit movement under normal operation.
- **Mandated practices –** Depending on the facility type, there may also be GMP or other mandated practices that could impact monitoring of the unit. This monitoring may be specific to the unit or maybe the unit will need to connect to an existing facility system. Understanding the capabilities of the unit and how it may need to harmonize with the facility infrastructure is critical.
- **Alarms –** ULT freezers come standard with specific alarms, although these can vary from unit to unit by manufacturer. In general the on-board alarms will include (at a minimum) audible/visual alarms for warm and cold temperature excursion, door opening/ajar, power failure,

and system failure. While these alarms are on the unit specifically, these can also be transmitted by remote connections like 4-20mA, RS485 or RS232, and dry contacts. Using these systems, ULT freezers can be linked to facility monitoring systems (like BMS or building management systems) to watch over equipment 24-7-365. The TSX ULT Freezer also comes standard with built-in Wi-Fi capability. This allows for direct linking to the Thermo Fisher Connect environment and monitoring of your unit and/or cold storage fleet can be done on your phone or laptop from anywhere in the world with an internet connection. Push notifications alert you not only that there is an alarm, but also of the criticality of the alarm to avoid unwarranted response – sample security without the 3:00 am nuisance.

In review

To promote a healthy lifespan for your cold storage equipment due diligence needs to be done ahead of time to ensure the facility supports the needs of the equipment. Voltage, spacing, and alarm infrastructure, among many others, are keys to promoting well-performing and long lasting cold storage equipment. Thermo Fisher Scientific has special teams that work collectively with our sales representatives to aid in the planning of new installations. These groups know what to ask and what to focus on to make sure we fit the unit along with the facilities capabilities.

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