Cold storage

Built with biobanks in mind: enhancing productivity and sample management with TSX Universal Series ULT freezers

Biobanks and best practices

Biobanking is a critical process in the field of biomedical research, serving as the cornerstone for preserving and maintaining the integrity of biological samples. These samples are invaluable for a multitude of research purposes, including genomics, personalized medicine, disease research, and drug development. Biobank facilities are optimally suited to handle the entire workflow from acquisition, processing, and cold storage followed by transport or analysis. To successfully accomplish this operation, directors, managers, and technicians are tasked with incorporating the latest best practices and scientific innovations.

By providing a diverse and well-maintained collection of biological samples, biobanks enable researchers to conduct studies that can lead to groundbreaking discoveries. They allow for longitudinal, typically high-throughput research in which samples collected from the same individuals over time can be analyzed to understand disease progression and the long-term effects of treatments. Biobanks often support large-scale genomic studies that can identify genetic markers associated with diseases, helping to pave the way for the development of targeted therapies. By providing high-quality, well-documented samples, biobanks can help increase confidence that future studies can be replicated and validated by other researchers.

When considering storage equipment that can help maximize productivity, biobanks should look for exceptional temperature uniformity and stability, minimal door opening recovery time, and energy efficiency that can result in significant cost-savings. The Thermo Scientific™ TSX Universal Series Ultralow Temperature (ULT) freezer is designed and developed to meet the stringent collection needs of biobankers, helping to ensure optimal storage conditions and easy access to samples. The features discussed here outline how the TSX Universal ULT freezer incorporates biobanking best practices, contributing to efficient sample management, including organization and maintenance.

Thermo Fisher Scientific is a Gold Sponsor of the International Society for Biological and Environmental Repositories (ISBER) and considered applicable elements from *Best Practices: Recommendations for Repositories*, 5th Edition, for the TSX Universal ULT freezers. The freezers incorporate the recommended practices by maintaining precise temperature control, helping to ensure specimen integrity, and providing secure storage conditions. They operate at ultralow temperatures, offering a range of –86°C to –40°C, thereby enabling the preservation of various specimen types, including cells, tissue samples, and biological fluids.

Efficient sample organization and access

Sample management is a key aspect of biobanking, encompassing the processes of sample acquisition, processing, storage, retrieval, and distribution. The TSX Universal ULT freezer facilitates efficient sample management by featuring an intuitive interface with a consistent temperature display. The freezer is offered in four cabinet sizes, each with an adjustable shelving system and various rack accessories that allow for organized storage of samples, enabling their easy identification and retrieval. Furthermore, the freezer is equipped with an advanced temperature monitoring system, helping ensure that samples are stored at their optimal preservation temperatures, thereby maintaining their viability and integrity.

In addition to keeping samples safe, the TSX Universal ULT freezer is built to support the busy biobanking activities in a laboratory or storage facility. The exceptionally quiet upright units now boast an improved door opening recovery time to return temperatures back to their stable programmed state quicker than ever. This helps minimize any variation within the cabinet that can subject precious biomaterials to transient warming events. Coupled with the noticeable decrease in re-entry time, a user can avoid the potential risk of extended periods with samples outside of the freezer when retrieving just a few tubes.

Notably, the TSX Universal ULT freezer operates with universal voltage compatibility. This access feature is particularly valuable for large institutions with multiple facilities, as it allows the same model to be used in different locations regardless of the local voltage requirements. This flexibility helps simplify the procurement and maintenance processes, as there is no need to purchase and manage different models for different sites. By standardizing on a single model that can operate in any electrical environment, institutions can reduce the complexity and cost of their equipment inventory. This standardization also simplifies training and maintenance, as staff become familiar with a single model rather than having to learn the specifics of different freezers.

Sustainable sample storage in a quality environment

Energy efficiency is a critical consideration for biobanks because of its direct impacts on operating costs and the institution's environmental footprint. As large institutions increasingly prioritize environmental responsibility, the energy efficiency of cold storage equipment becomes a key factor in the decision-making process. To help our customers make informed purchasing decisions when looking for more sustainable products, Thermo Fisher Scientific participates in the **ACT™ label program**, run by the nonprofit My Green Lab™ organization, which provides easy-to-use information about the environmental impact of our TSX Universal Series ULT freezers. Combining this with having earned ENERGY STAR™ certification, the TSX Universal ULT freezer has helped elevate industry standards by setting a benchmark for manufacturing quality, including end-of-life product development and innovation in scientific equipment. The freezer is equipped with V-drive adaptive control technology, which reduces energy consumption without compromising performance, thus helping to lower energy bills and reduce biobanks' environmental impact.

Securing high-quality and well-annotated samples for long-term storage in a biobank is a challenging task. The TSX Universal ULT freezer supports these efforts with advanced protection and quality features, including a comprehensive warning system and a light bar accessory. Equipped with multiple warning signals, the freezer alerts staff to any deviations from optimal storage conditions, allowing for prompt intervention and helping to minimize the risk of sample loss. The alerts can be customized to meet the specific needs of the biobank, helping to ensure that critical parameters are continuously monitored. Whether used as a backup system or to enhance collaboration, the TSX Universal ULT freezer efficiently meets the needs of biobankers, without imposing excessive downtime or operational costs.

An overall improvement to productivity

The TSX Universal ULT freezer is an innovative and energy-conscious solution for biobanking, incorporating best practices for sample storage, management, organization, and access. Its design features, coupled with its capability to be integrated with data management systems, make it an excellent choice for biobanks aiming to maintain the highest standards of sample preservation and management. The performance metrics of the TSX Universal ULT freezer directly translate into enhanced productivity for biobanks. This reliability allows biobank staff to focus on their core responsibilities without the constant need to monitor and adjust storage conditions.

By leveraging the capabilities of the TSX Universal ULT freezer, biobanks can help ensure the integrity and usability of their samples, thereby facilitating high-quality biomedical research and collaboration.

Conclusions

Here we have described how the TSX Universal ULT freezer is specifically designed to help meet the needs of biobanks by enhancing both productivity and sample management. Adhering to best practices recommended by the ISBER, the freezer helps ensure precise temperature control, efficient sample organization, and reliable access. Its features, including advanced warning systems and V-drive technology, support biobanks in maintaining sample integrity, helping to reduce operational costs, and minimizing environmental impact. The insights provided here aim to assist biobank managers and staff in selecting a storage solution that optimizes workflow efficiency, supports high-quality research, and contributes to sustainability efforts.

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