

Protect Sample Viability by Never Exceeding T_g (-135° C)

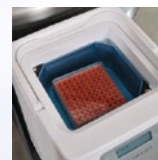
Brooks provides cryogenic (-190° C vapor phase) sample management solutions that offer proven automation, cold-chain management, and improved sample safety to customers requiring cryogenic biological storage and short-range transport.

Best practices recommend biosample storage and transport at temperatures always below T_g (the glass transition temperature of H₂O, -135° C). They also suggest no freeze-thaw cycles and protection of innocent samples from warming above T_g during transient events to preserve sample viability.

Experimental research shows that individual samples can warm as quickly as 101° C per minute when moved from a liquid nitrogen (LN₂) freezer into ambient air. Furthermore, a cryogenic sample placed in dry ice warms even faster and can exceed T_g from -175° C in less than 12 seconds!¹

Additional research demonstrated that innocent samples still continue to significantly warm for minutes after returned to the -190° C LN₂ freezer and therefore, risk crossing T_g unexpectedly. Even after the samples stop warming, it takes hours to equilibrate to the LN₂ freezer's temperature.²

The research recommends that to ensure viability, innocent samples should never be warmed above T_g. To achieve this, samples should be stored at the coldest possible temperature, transient exposures need to be controlled and protected, and all sample movement must be monitored and recorded. With this information and knowledge of the workflow, permissions and access controls should be put in place to minimize the risk of any sample crossing T_g during subsequent operations.



Brooks cryogenic sample management solutions include:

- BioStore III Cryo (-190° C) automated sample storage system
- CryoPod carrier and automatic filling station
- FluidX cryo storage consumables

The BioStore III Cryo storage system, CryoPod carrier, and FluidX cryovials have been shown to protect samples from crossing T_g during a typical workflow.³



Global Scale and Support Reduce Risk

Backed by the scale, stability, and customer support of a worldwide automation company, Brooks is the global partner that removes the risk and uncertainty from your sample storage process. Our solutions offer the highest sample and innocence protection via superior cold-chain management, improved chain of custody, proven reliability, and a safe, ergonomic user experience. Local service and support are backed by Brooks' worldwide network of technical specialists and distributors.

BioStore III Cryo Sample Storage System

Protect and manage your samples at -190°C .

BioStore™ III Cryo is the only cryogenic storage solution that combines the sample protection, safety, and accessibility of a manual high-efficiency LN_2 freezer with advanced automation features such as inventory control, cold-chain management, and an ergonomic, superior user experience.

Sample integrity: the BioStore III Cryo combines Chart MVE's proven, high-efficiency LN_2 stainless steel freezer plus Brooks' automation technology and software to ensure the highest sample integrity. Biosamples are stored in LN_2 vapor at -190°C , and are protected by an industry-leading 20-plus-day hold time with anytime manual access. Sample safety is further enhanced by protecting innocent samples during storage and retrieval transient exposures. The automated system quickly pulls a rack into an insulated sleeve, significantly slowing the rate of transient warming and allowing complete tracking and control of all innocent sample exposures.

Highly flexible: the system stores and manages up to 252 cryoboxes (49,392 1 mL FluidX vials). It accepts any consumable type that can fit inside a standard cryobox, and retrieves a box in less than 60 seconds. The BioStore III Cryo system comes with integrated sample inventory, tracking, audit trail, and LIMS connectivity. The software includes a sample integrity calculator that protects samples from excessive warming by predicting their temperatures based on experimental evidence. Sample security can be assured by administrator assignment of specific user-level controls and permissions. The entire system fits within the footprint of a standard 42-inch (107 cm) LN_2 freezer, and can be installed in nearly any lab space.

User safety: a highly ergonomic design provides designed-in user safety and easy sample access that minimizes the risk of repetitive or strain injuries. Gone are the days of climbing up steps to reach into an LN_2 freezer.

Cost-effective: the BioStore III Cryo has very low operating costs since it uses the same amount of liquid nitrogen as a manual high-efficiency LN_2 freezer.

