

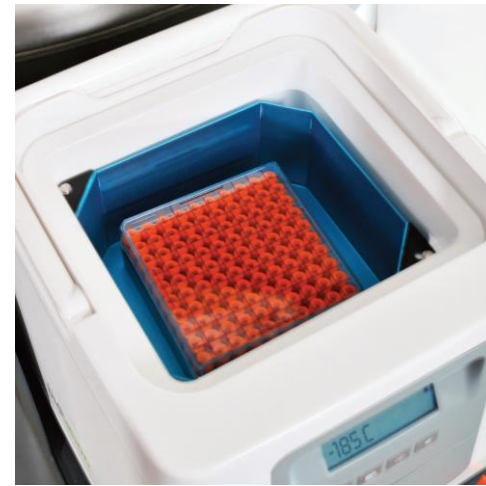
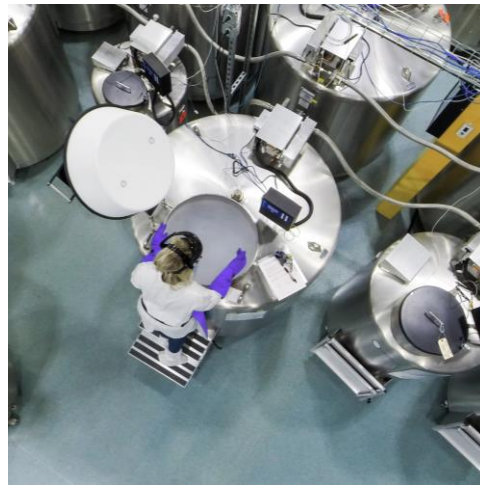
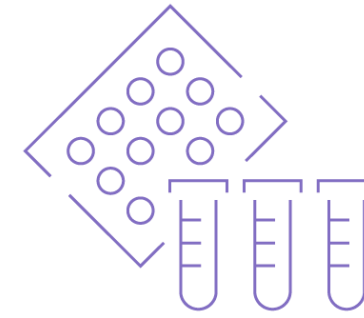
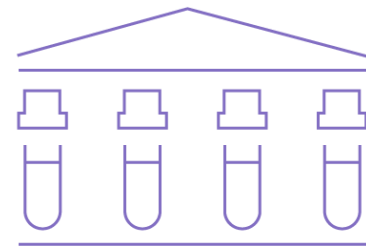
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CryoPod™ & Filling Station Product Overview

DISTRIBUTOR TRAINING

January 31, 2024

Product Overview



01

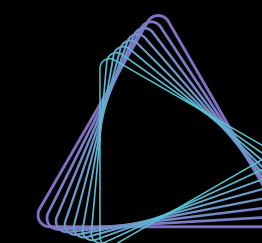
Why Azenta
Created Cryo
Products

02

CryoPod™
Carrier

03

CryoPod™
Filling Station



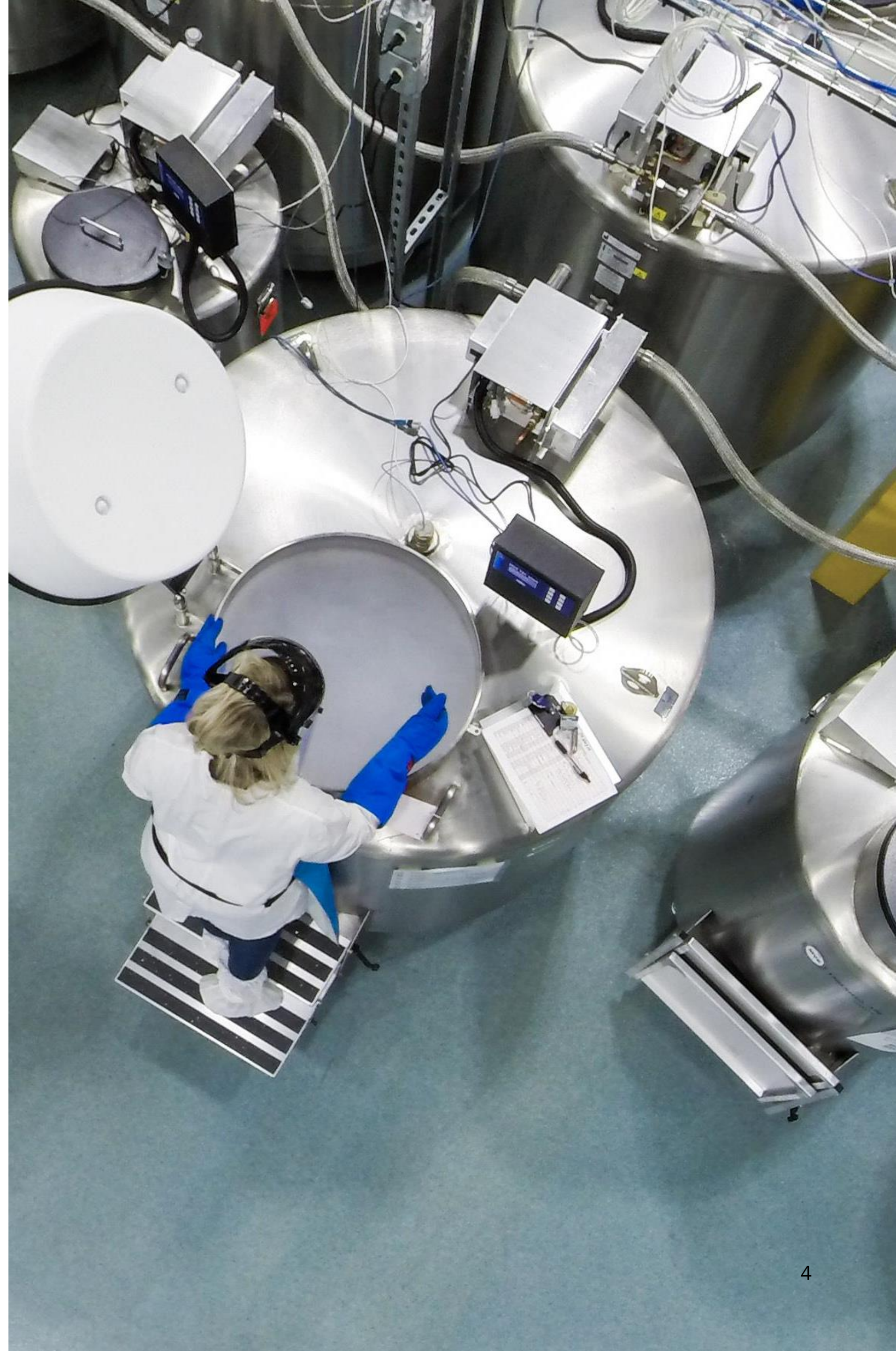
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WHY AZENTA CREATED CRYO PRODUCTS

01

Challenges with Manual Freezer Workflows

- Sample exposure to harmful transient warming events
 - 1,000+ innocent samples per rack
 - Searching for samples increases time out of freezer
- Less efficient
- Uncontrolled and unmonitored
 - Variability in documentation and tracking
- High risk of injury due to poor ergonomics



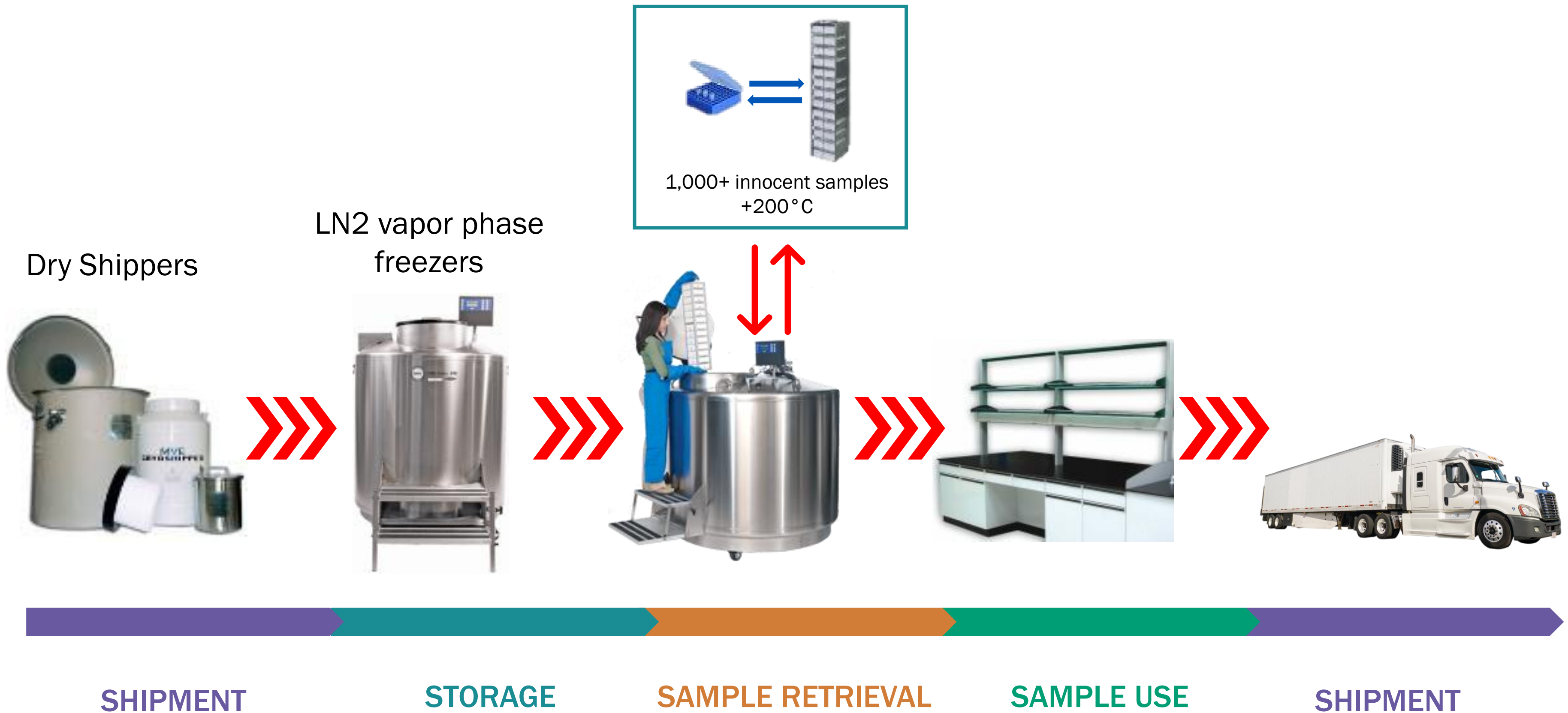
Storage Challenges

CHALLENGES TODAY

- Human Variability
- HVAC and Energy Efficiency
- Equipment Reliability
- Thermal Performance of Equipment
- Risk Mitigation
- Documentation



Everyday Innocent Exposures & Warming



Removing Samples Manually from LN2 Freezer

01 Put on full PPE



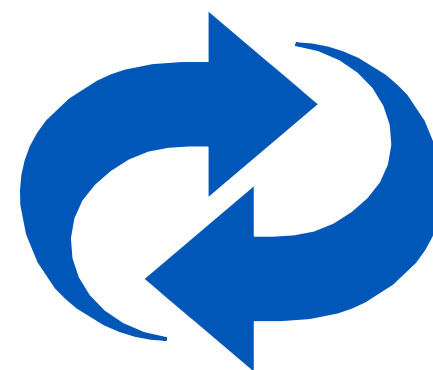
02 Climb up the steps
Open the lid



03 Reach inside
Pull out ~20lb (~9kg) rack



05 Reverse all the steps



Climb down with entire rack
04 Pick samples

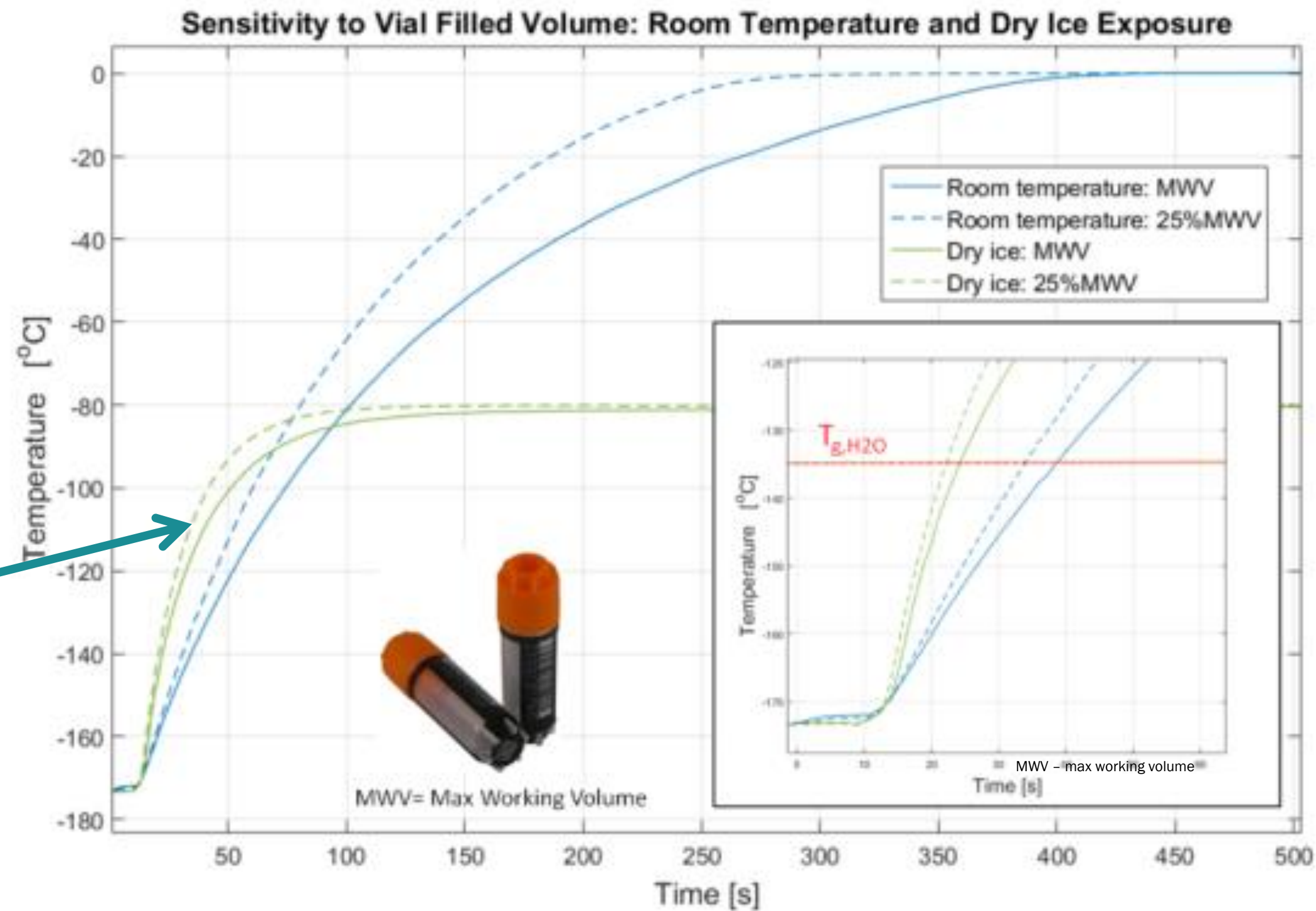


Should Cryo Vials Be Handled on Dry Ice?

→ NO!

A CRYOGENIC 2ML VIAL (BELOW -150 °C) WILL WARM FASTER WHEN BURIED IN DRY ICE VS. IN AMBIENT AIR

→ ALWAYS HANDLE CRYOGENIC VIALS IN A CRYOGENIC ENVIRONMENT

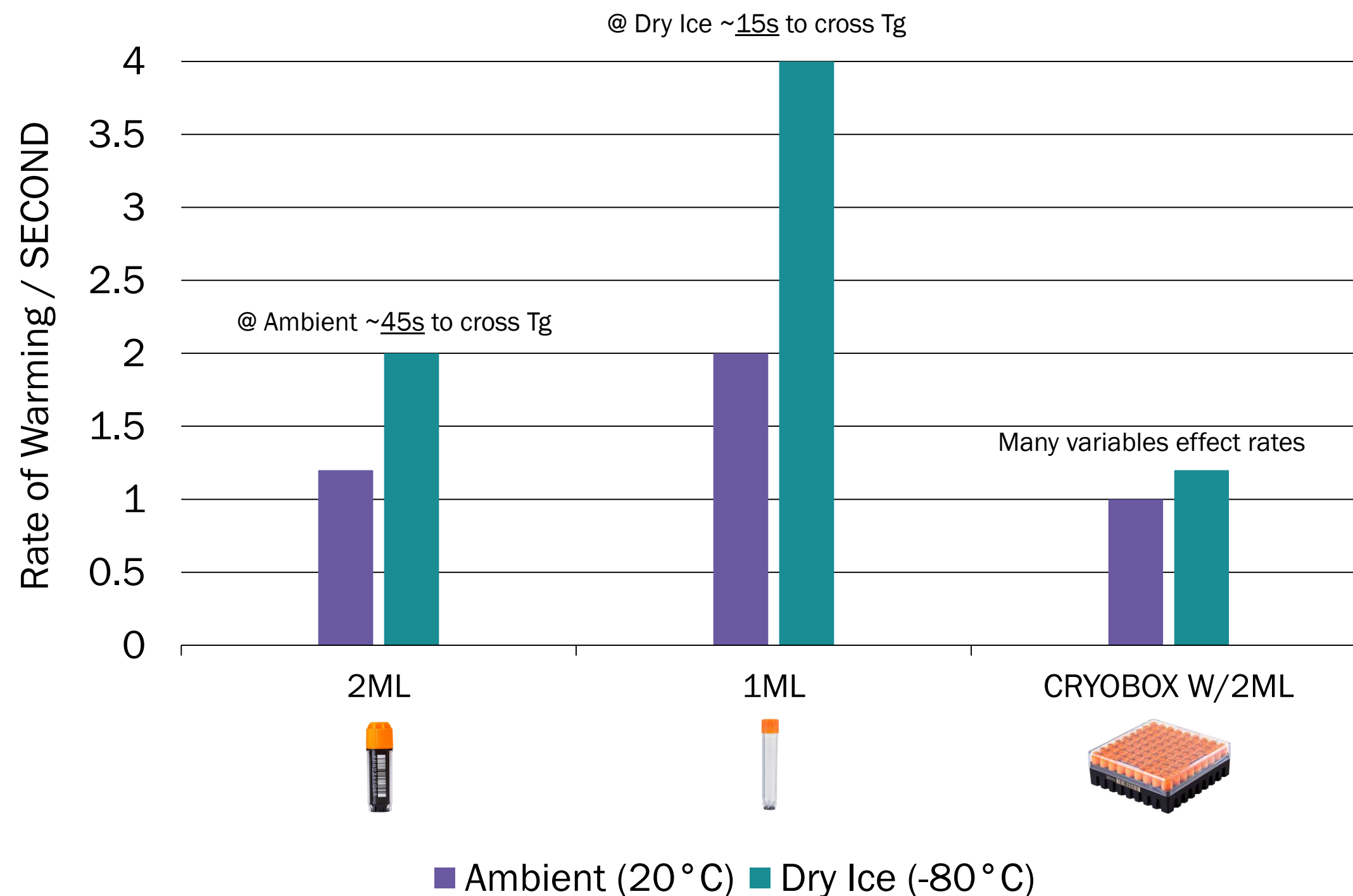


Vials on Dry Ice Warm Faster
Approx. 2X faster to -90C

How Quick Do Samples Warm? How long is “Transient”?

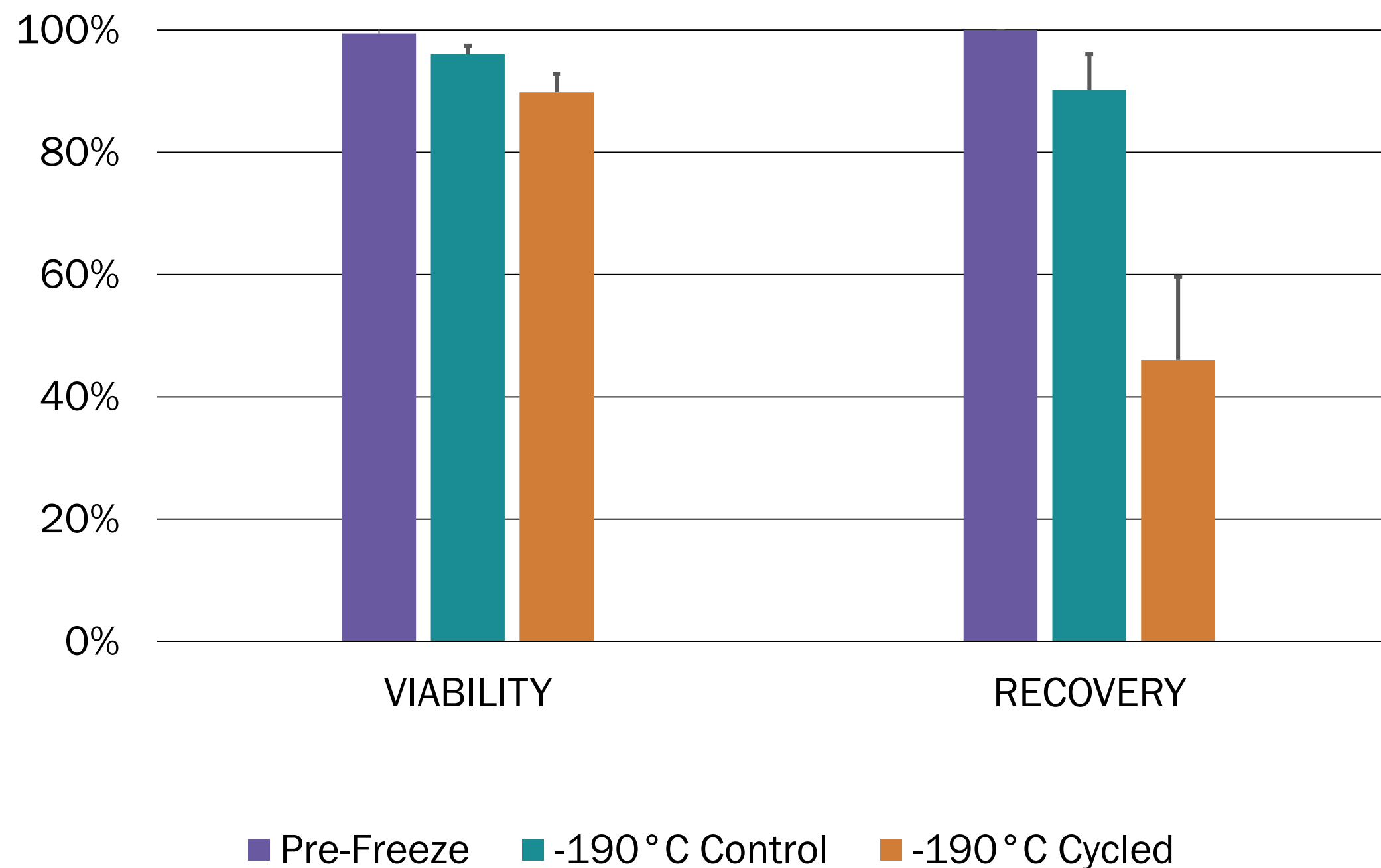
Dry Ice warms Vials ~2X as Fast vs. Ambient

Solution: Always keep samples in a Cryo environment



Transient Warming Reduces Cell Recovery

Viability and recovery of mesenchymal stem cells pre-freeze and post-thaw



Storage conditions

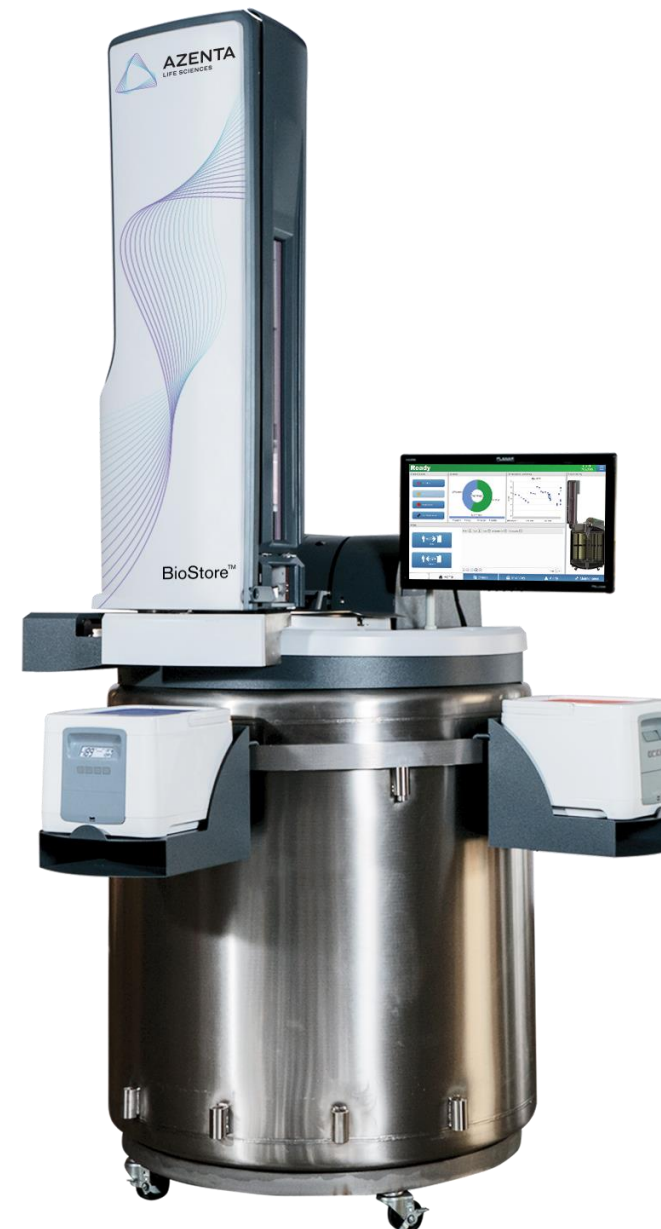
- 3 months at -190 °C with no exposures to warming events (control)
- 3 months at -190 °C with 20 exposures to -110 °C (cycled)

Lower viability and recovery observed for temperature cycled cells compared to control.

Cryogenic Storage Solutions



SOLUTIONS FOR EVERY STORAGE NEED



CryoStore Manual
-190 °C Non-Automated
Freezer

CryoStore PICO
-190 °C Automated
Storage System
(A32)

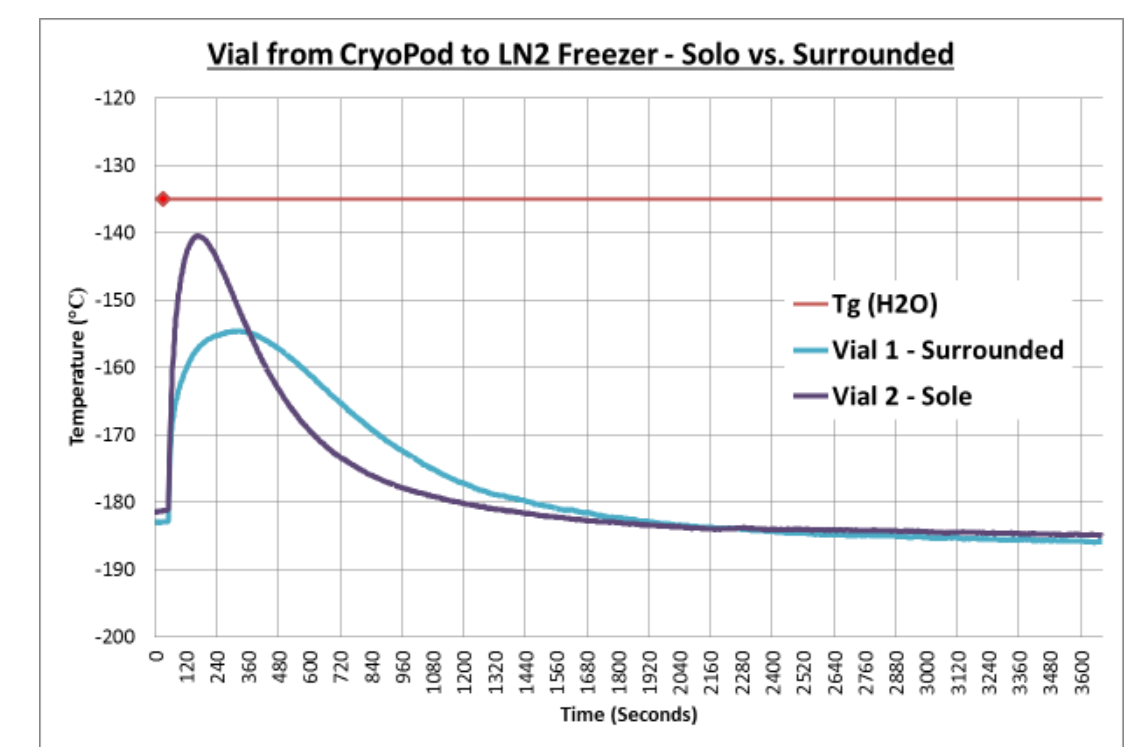
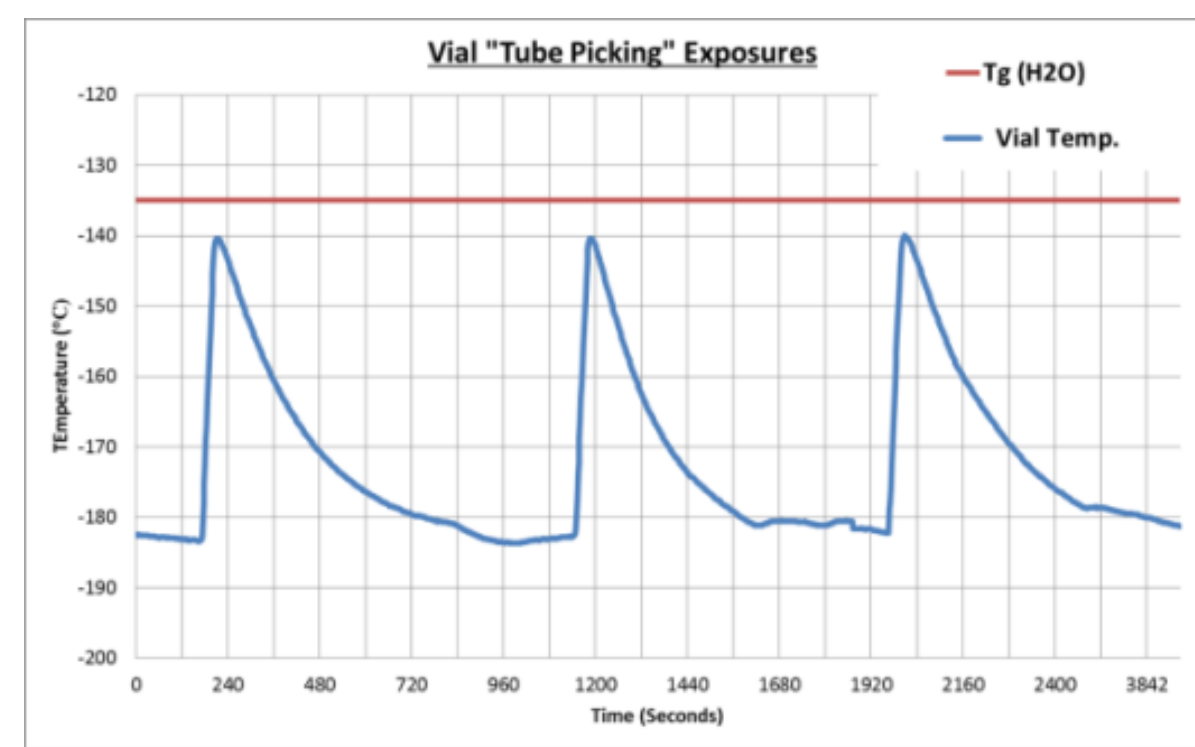
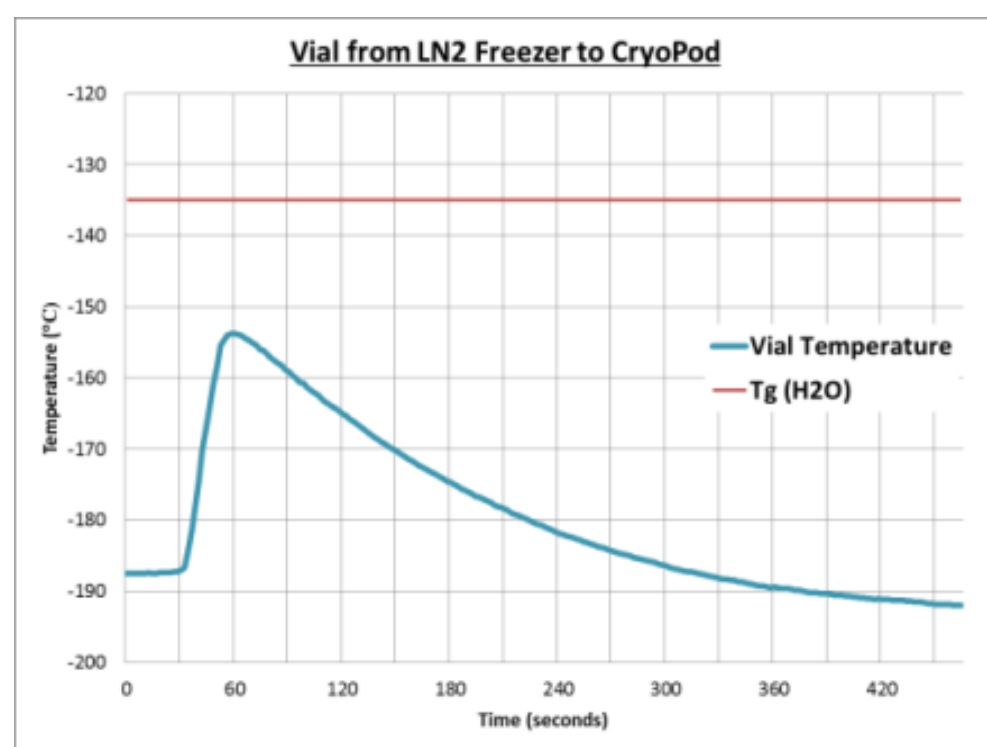
CryoStore
-190 °C Automated
Storage System
(M42/A45)

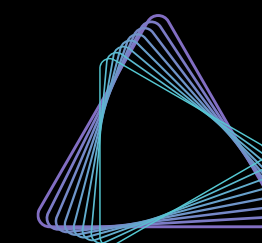
CryoStore Max
-190 °C Automated
Storage System
(M60/A60)

**CryoPod™ Carrier &
Filling Station**

Temperature of Sample During Typical Workflow

CryoStore to CryoPod to CryoStore
Samples stay below Tg (-135 °C) at all times





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CRYOPOD™ CARRIER

02

Cryogenic Sample Carriers (before)

HOW TO:

- Move cryogenic samples around the lab or campus (i.e. to bench)
- Store & work with cryogenic samples at bench during experiments
- Existing methods are either:
 - Large and cumbersome
 - Unsafe
 - Do not hold proper temperatures throughout



- Dry Shippers – large, heavy (for shipping)
- Open dewars – unsafe
- Homemade carriers – unsafe and bad temperature profile



CryoPod™ Carrier

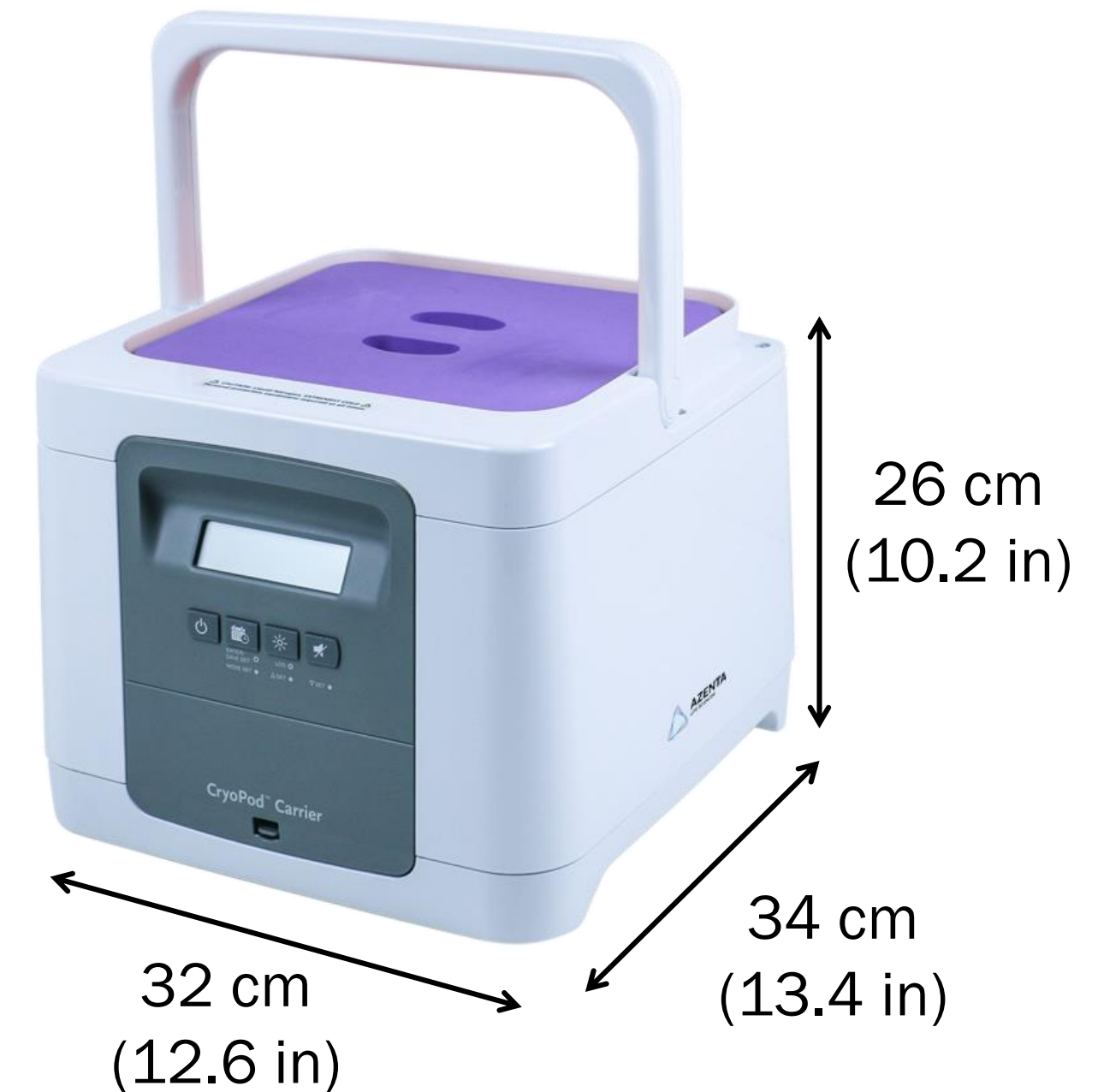


MOVE CRYOGENICALLY FROZEN MATERIALS SAFELY


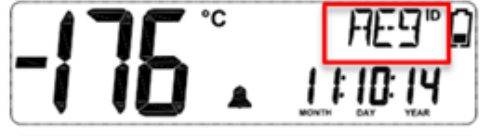


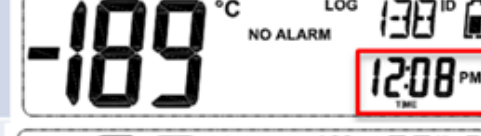




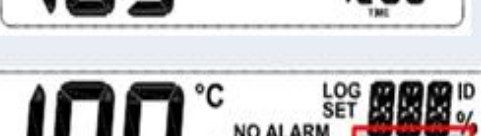

Protect your samples by maintaining the cryogenic cold chain over short distances for over 3 hours.


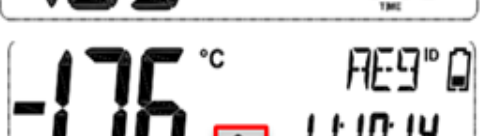

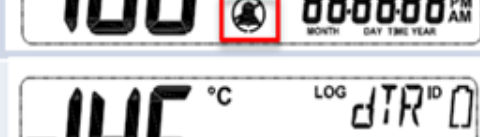
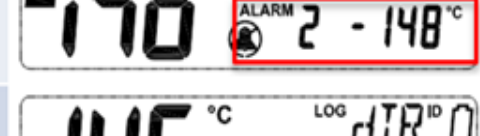

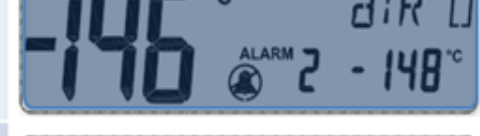
Ideal for moving samples or holding samples while picking/working

- **Portable** – less than 7kg (charged)
- **Reliable** – maintains below -150°C for over 3 hours
- **Flexible** - Fits 1 cryobox or 2 SBS plates or small cassettes
- **User Safety** - LN2 in absorber, under basket, lightweight, ergonomic
- **Sample Safety** – No sample contact with LN2 & consistent temperature
- **Quality & Audit** - Integrated temp monitoring, alarms, and logging



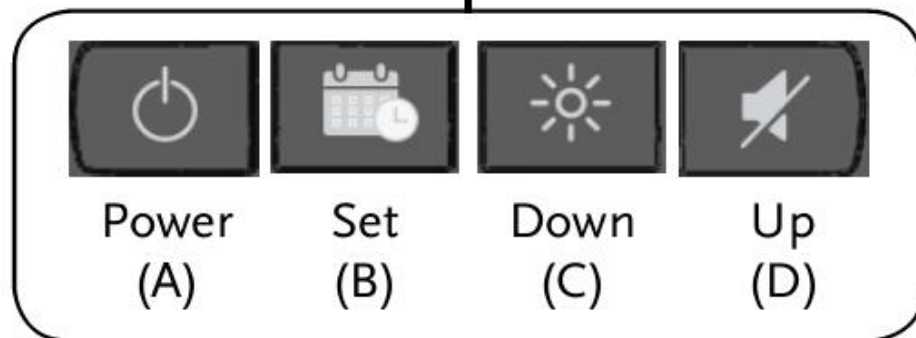
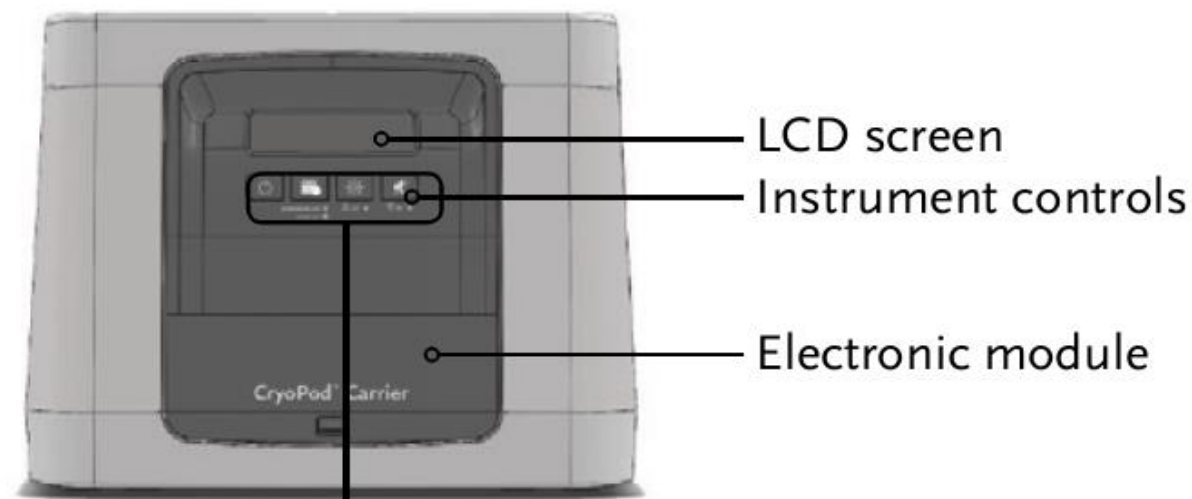
LCD System Display



LCD INDICATORS	FUNCTION
	Temperature display "°C" symbol
	ID number, error code "ID" symbol
	Battery life indicator (flashing when nearing no power)
	Date "MONTH DAY YEAR" & "TIME" indicators
	Time "AM", "PM" indicators
	Remaining hold temperature time left (algorithm) "TIME" indicator
	LN2 level inside cryopod (algorithm) "% " indicator
	Display temperature on LCD (flashing) until Cryopod is warm enough (config. Temperature) "STANDBY" indicator
	"LOG" indicator Displays "logging ON" condition (time stamp on log file)
	Button press "SERVICE" indicator Indicate service is needed after fixed amount of time (independent on use at cold temperature)
	"SET" indicator Displays cryopod is in "SET mode"





LCD INDICATORS	FUNCTION
	"NO ALARM" indicator Displays "all alarms disabled" condition
	Bell symbol Displays "sound alarms ON" condition
	Crossed Bell symbol Displays "sound alarms disabled" condition
	Alarm 1 (warning) Display type of alarm (1), alarm temp, "°C" indicator Alarm temperature user configurable (set mode)
	Alarm 2 (critical) Display type of alarm (2), alarm temp, "°C" indicator Alarm temperature user configurable (set mode)
	Blue backlight for alarm conditions
	White backlight for reading LCD in dark conditions Button press











LCD Control Buttons



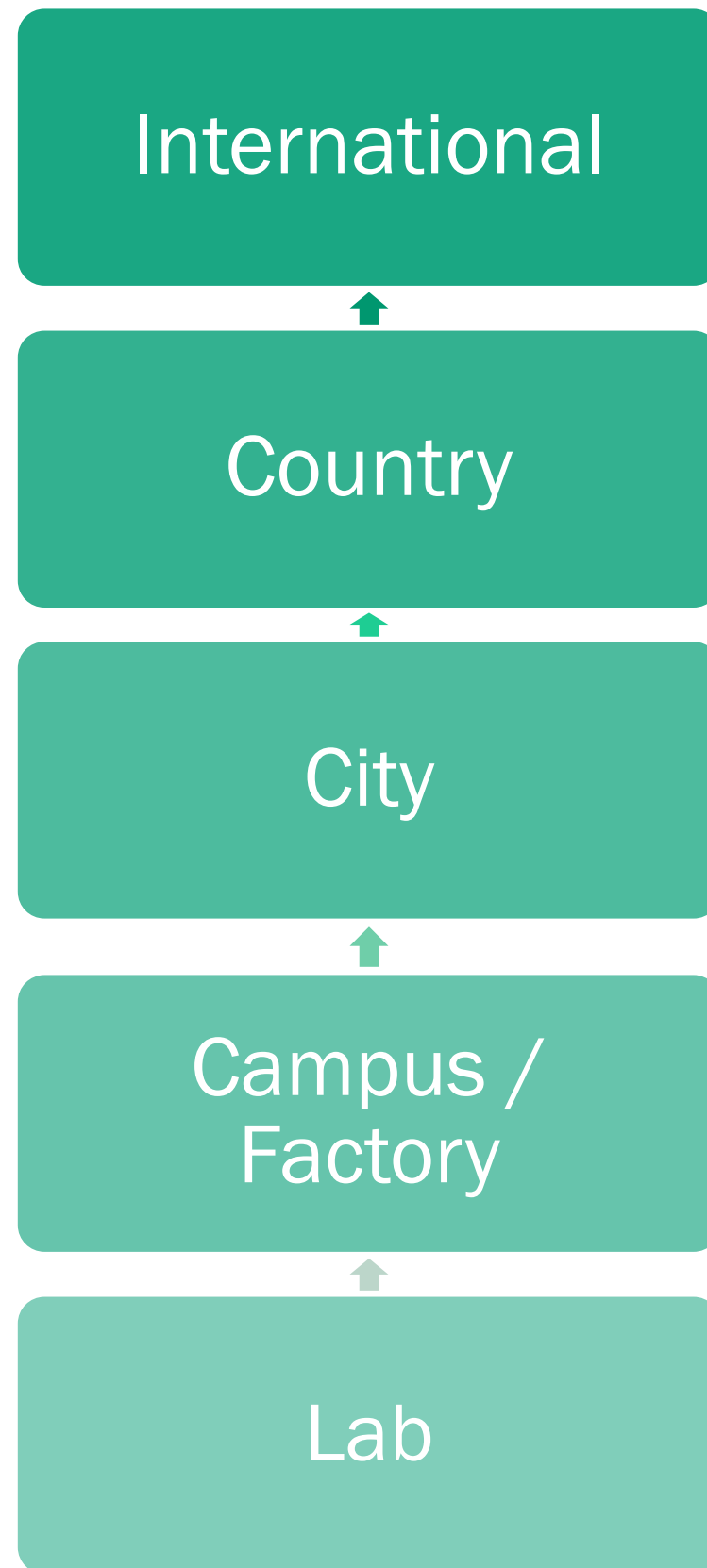
LCD Options	Manual Action
Turn white Back Light ON	Short press the star burst button  . NOTE: The white back light cannot be turned on when the red back light is flashing or the system is in standby mode.
Turn white Back Light OFF	Short press the star burst button  . NOTE: If the back light is not manually turned off, it will automatically turn off after 10 seconds.

Operation Mode – CryoPod Off and On (with no alarms running)				
				
Short Press	On	Toggle Date/Time	Back light On/Off	
Long Press	Off	Enter SET Mode	Log Event	

Alarm Engaged – Alarm being sounded				
				
Short Press		Toggle Date/Time	Back light On	Silent Alarm
Long Press	System Off		Log Event	

In Set Mode – Operator has already entered into SET Mode				
				
Short Press		Toggle through each setting	Change Value Up	Change Value Down
Long Press	Off	Save Changes (Beep confirmation)		
NOTE: If no button is actively pressed for 10 seconds when in SET Mode, the system will exit the SET Mode without saving any changes.				

Cryo Carrier Positioning



Dry Shippers

- up to 2 wk hold time
- Perfect for long distance & shipping



Unmet market need.
Currently serviced by
combination of dry shippers
and homemade carriers

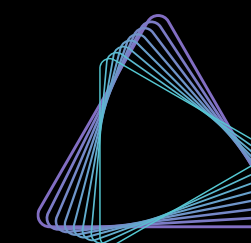
Home made carriers

i.e. foam ~\$10



CryoPod Positioning & Pricing



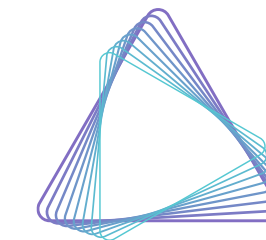


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FILLING STATION

03

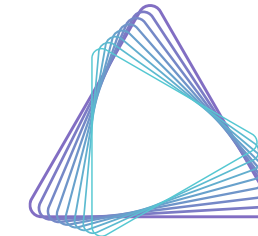
How Carriers Are Normally Filled (before)



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CryoPod™ Filling Station

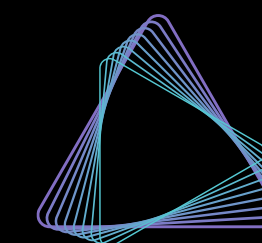


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SAFE, HANDS-FREE LN2 FILLING OF THE CRYOPOD. FULLY CHARGES IN 5-10MINS

- **Safe** – No user contact with LN2 or cold surfaces
- **Simple** – Single button operation
- **Consistent** – Exact fill every time
- **On Demand** – Recharge anytime, even with samples in the basket
- **Integrate** – Connects to portable or house LN2 supply













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COMPETITIVE LANDSCAPE

04

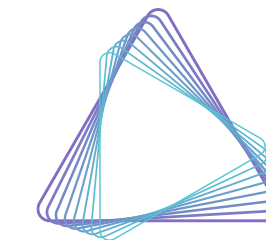
Competitive Landscape – Freezers

COMPANY	POSITION	DESIGN	COMPETITIVE POSITIONING
	1		<p>Pro: Largest installed base</p> <p>Pro: Most efficient performance (lowest LN2 Consumption)</p> <p>Pro: Only manufacturer with self-sustaining (plug in) and temperature controlled freezer</p> <p>Pro: High quality manufacturing</p> <p>Pro: Most complete product line – liquid storage, vapor storage, dry shipping, portable storage, plug in, temp control</p> <p>Pro: Lowest cost position</p> <p>Con: Poor ergonomics and industrial design</p> <p>Con: Control systems – antiquated 2000 era microprocessor with LCD screen and membrane pad (touchscreen optional); no connectivity</p>
	2		<p>Pro: Designs fit for purpose – not based on industrial tank heads</p> <p>Pro: All models have hinged lids, auto fog clear</p> <p>Pro: Large worksurface for ease of workflow</p> <p>Pro: Complete product line – liquid storage, vapor storage, dry shipping, portable storage</p> <p>Con: Poor ergonomics (lifter height)</p> <p>Con: Control system – less precise, less reliable. LCD screen with membrane pad; no connectivity</p>
	3		<p>Pro: Unique LN2 jacketed design can be used to tell a good story</p> <p>Pro: Good penetration into blood banking markets</p> <p>Con: Unique LN2 Jacketed design</p> <p>Con: Least efficient, worst performing unit on market</p> <p>Con: Reliability and after sale service/support</p> <p>Con: Control system - antiquated 2000 era microprocessor with LCD screen and membrane pad; no connectivity</p>
	3		<p>Pro: Best in class ergonomics/ease of use; lowest liftover height, largest steps, large worksurface</p> <p>Pro: All models have hinged lids, auto fog clear</p> <p>Pro: Best in class visibility with exclusive cryo-LED</p> <p>Pro: Best cost per sample stored</p> <p>Pro: Lead times and after sale support</p> <p>Pro: Most advanced control system, data capture/retention, wireless connectivity, text/email alerts and web based monitoring</p> <p>Con: Highest cost unit on the market</p> <p>Con: Least complete product line</p>


Competitive Landscape – Cryo Stores

COMPANY	POSITION	DESIGN	COMPETITIVE POSITIONING
	1		<p>Pro: Largest installed base (~281 units)</p> <p>Pro: Modular solution supports widest variety of consumables, including commercial manufacturing (AT, West, 250mL cassette)</p> <p>Pro: Active support for regulated environments (GMP support via software, Validation protocols)</p> <p>Pro: Global support infrastructure direct from Brooks</p> <p>Pro: Most robust disaster recovery support (MVE Freezer, Cryo Critical, Software)</p> <p>Pro: Upgrades to CryoExchange automation</p> <p>Pro: -Cryogenic (190°C) and Ultra Low (-80°C) LN2 storage options available</p> <p>Con: No 1:1 picking solution</p> <p>Con: System height (minimum 9')</p>
	2		<p>Pro: 1:1 tube picking automation</p> <p>Pro: Price point for single 'S' system ~\$340K</p> <p>Con: Askion systems are far less flexible in the consumables they support. Focus is on small tubes and the discovery market</p> <p>Con: Inability to maintain Tg in picking workflow (-110C chamber, -150C top tank temp)</p> <p>Con: Solution doesn't scale well (always 1:1 picker-to-tank) and cannot be linked effectively</p> <p>Con: High static LN2 usage (S: >22L/day, M:>59L/day, L:>118L/day) and <3-day hold time</p>
	3		<p>Pro: System height</p> <p>Pro: Cryobox/SBS support</p> <p>Pro: Linkage via robotic cart</p> <p>Con: Cost to scale with 1:1 picker (~\$400K/unit)</p> <p>Con: Lack of global infrastructure</p> <p>Con: No reliability record</p> <p>Con: No support for regulated environments</p>
	4		<p>Pro: Simpler design equals lower cost</p> <p>Pro: Leveraging strong LN2 tank manufacturer's network (Worthington)</p> <p>Con: No individual tube picking</p> <p>Con: Poor cold chain management</p> <p>Con: Limited software control</p>
	5		<p>Pro: Pick head enclosure filled with LN2 to keep sample cold</p> <p>Pro: Well funded R&D</p> <p>Con: Pneumatic system design with honeycomb storage rods inside Freezer; could get stuck if moisture inside rods</p> <p>Con: Limited to 2mL vials</p>

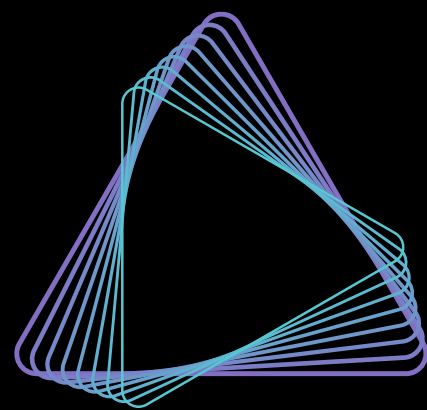
Competitive Landscape – Cryo Instruments



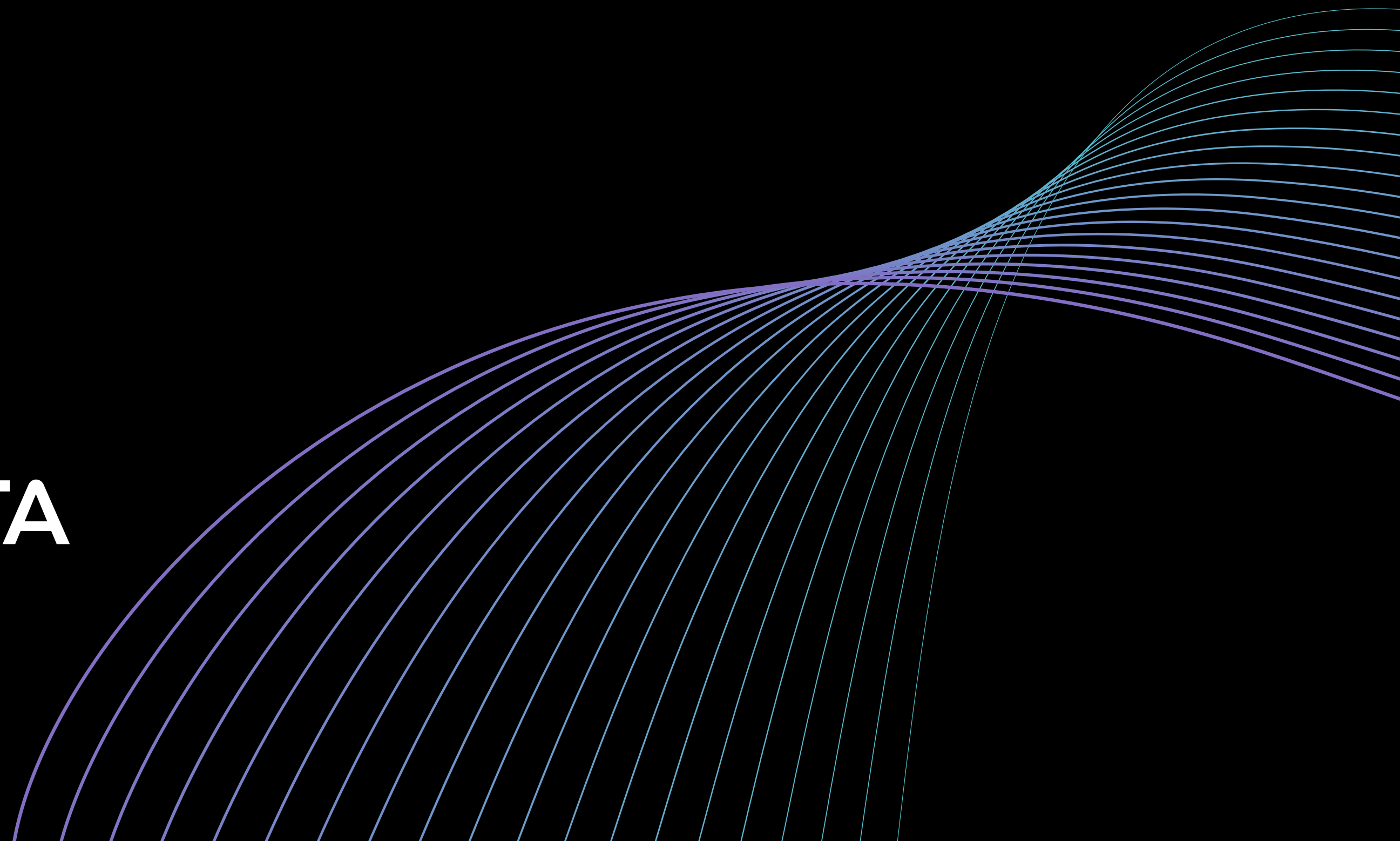
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COMPANY	POSITION	DESIGN	COMPETITIVE POSITIONING
 BIOLIFE SOLUTIONS cell and gene therapy tools	1		Pro: Dry shippers dominate CGT transport Pro: Often used as JIT device for delivering therapies to the patient bedside Pro: Hold time is often sufficient to hold product until patient coordination can be completed Con: Long charge times (hours vs. minutes with CryoPod) Con: Industrial, scary feel for patients Con: Large footprint Con: Heavy, requires dedicated transport cart
	2		Pro: Hundreds of units throughout the world Pro: Simple intuitive design Pro: Ergonomic solution compared to other man made or larger commercial options Pro: Fast 10-minute charge Pro: Accessible price point Con: Needs updates to support evolving use in clinical spaces
	3		Pro: On charge in case of unscheduled delays Pro: Removes complexities with shipping and coordinating patient delivery Pro: Partnered with World Courier Pro: promoted with full suite of Cytiva devices Con: Expensive Con: Not widely used to date
	4		Pro: Integrated AGV handling for lab station transport Pro: Electronic Access Control Con: Unknown market availability

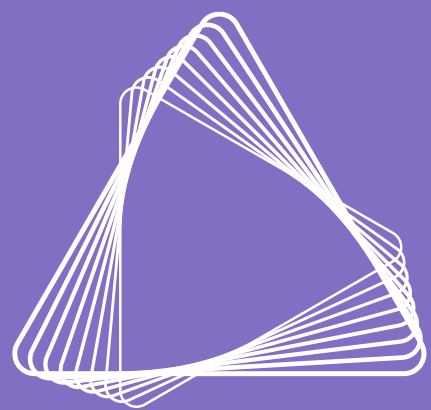
Thank you



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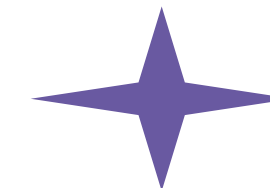
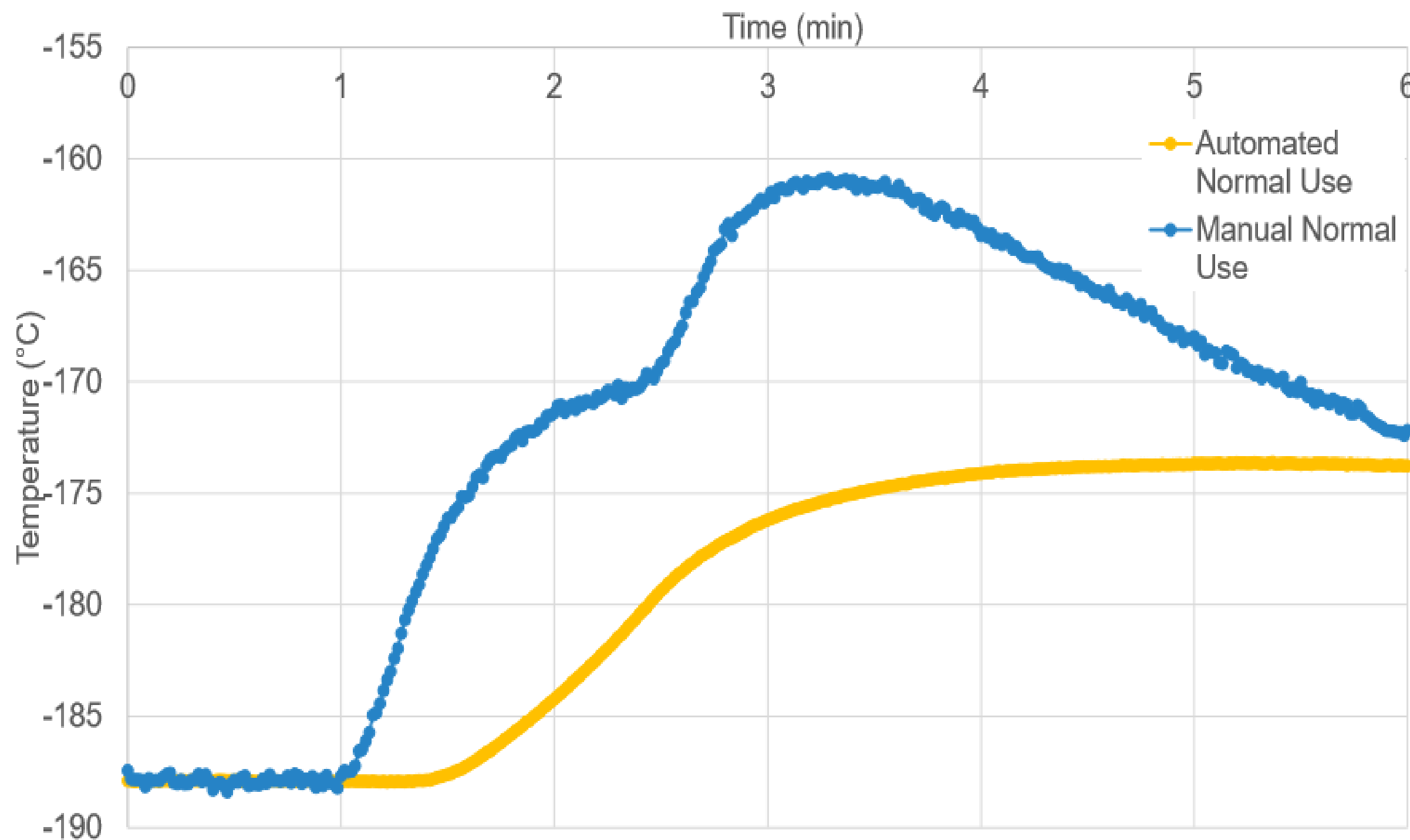
APPENDIX



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Cryo Products: Automated Freezers Sample Integrity

Comparison of Automated and Manual Sample Warmup



Thermal profiles of a cryobag sample retrieved using automation and using manual methods.