

SINGLE USE SUPPORT.

PIONEERING BIOPHARMA

*Compatible with single-use bags
of all manufacturers and sizes*



SCALE UP

RoSS.pFTU

Scalable Plate-Freezer

*Compatible with single-use bags
of all manufacturers and sizes.*



HARDWARE	<div>BENCHTOP up to 10L</div> 	<div>LAB up to 10L</div> 	<div>MID up to 100L</div> 	<div>LARGE up to 400L</div> 	<div>XL 500L</div> 
	BENCHTOP	LAB SCALE	MID SCALE	LARGE SCALE	LARGE SCALE
	volume per batch {up to 10L}	volume per batch {up to 10L}	volume per batch {up to 100L}	volume per batch {up to 400L}	volume per batch {500L}
					
	<div>Benchtop plate freezer for clinical studies, clinical trials and cell and gene therapies</div> <div>Low-volume freezing & thawing of one RoSS® shell or multiple RoSS.KSETs carrying up to 10L</div>	<div>Laboratory plate freezer for clinical studies, clinical trials and cell and gene therapies</div> <div>Low-volume freezing & thawing of one RoSS® shell or multiple RoSS.KSETs carrying up to 10L</div>	<div>Mid scale plate freezer for small batches and process validation</div> <div>Freezing & thawing of multiple small-sized RoSS® shells or RoSS.KSETs or max. 5 large-sized RoSS® shells carrying 20L bags</div>	<div>Routine batch freezing</div> <div>Plate-based freezing system for multiple RoSS.KSETs or up to 16 RoSS® shells carrying 20L bags or up to 24 RoSS® shells carrying 10L bags</div>	<div>Freezing of extra large volumes and bulk drug substances</div> <div>Plate-based freezing system for 10 RoSS® shells carrying 50L bags</div>

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FREEZE-THAW YOUR DRUG SUBSTANCE

- In any single-use bag*
- Easy to implement into existing infrastructure
- At highest possible speed & accuracy
- For best product stability results

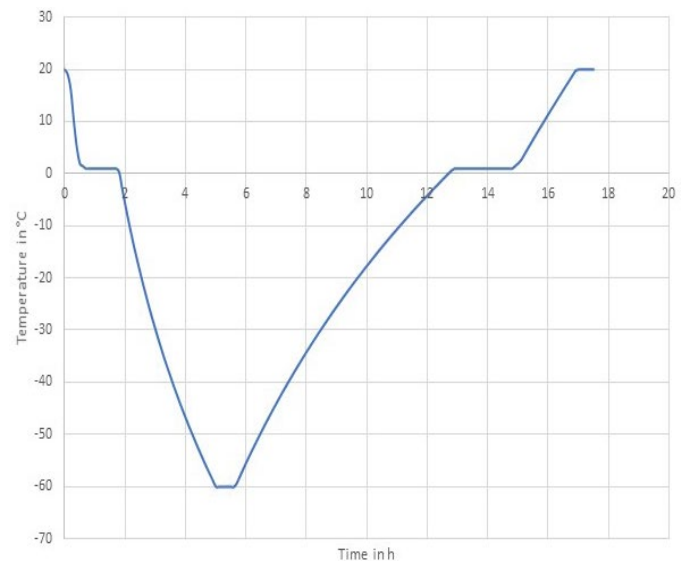
**protected by RoSS and designed to your preferred bag*

SCIENCE - FREEZING AND THAWING TEMPERATURE TREND

Freezing and thawing from 8 to 200L (up to 24 RoSS® Shells) and beyond

Conclusion

The freezing curves and kinetics are very similar and independent of the RoSS® shells loading (min. or full load) as long as the individual RoSS® Shells are identically set up (bag size and filling volume). That's one of the advantages and differentiators of the RoSS® shell that is achieved thanks to the design and combination of polyethylene sidewalls and stainless steel on top and bottom.



Advantages of plate based freezers over blast freezers

- Energy and heat transport take place directly
- The cooling comes from above and below simultaneously
- Last point of freeze is located at the edges of the symmetry axis. Thus, there is no entrapment of a liquid core that may lead to the bursting of the shell
- No impact on heat transfer because of different stacking or partial filling
- Allows for improved monitoring of the process
- Possibility of partial filling with consistent water column
- Improved scalability due to consistent water column

Reduced cryo concentration effects

- Reduced pH-shift
- Reduced protein aggregation
- Decreased exposure of the protein to extreme conditions (The cryo concentration leads to a pH-shift, high salt and protein concentration. This condition stresses the protein, which subsequently leads to denaturation.)
- Decreased interaction time with the ice front