MVE Variō™ Series

With Chart MVE,
the best keeps getting better.

The Award-Winning innovative, energy-efficient alternative for ultra-low temperature to cryogenic storage.

Key Points

The MVE Variō™ Series is the new innovative and energy efficient alternative for ultra low temperature to cryogenic storage. The completely dry sample storage area will maintain a user-defined temperature anywhere between -20°C and -150°C. The MVE Variō Series significantly reduces the possibility of sample contamination via contact with LN2 while providing the safety margin and consistent temperature profile, even with the lid open, that is associated with LN2 based cryogenic storage. The MVE Variō Series is able to provide all of this with less than 1% of the power consumption and approximately 70% overall operating cost savings when compared to the leading mechanical freezers.

Unparalleled Performance

- User defined temperature within -20 °C to -150 °C operating range
- Completely dry storage area
- Consistent temperature profile
  - Unaffected by lid openings
  - No recovery time needed
- LN2 consumption at -80 °C: 1500 only 9 L/day; 1800 only 12 L/day
- Power consumption, only 8 W
- Improved sample processing time due to rapid temperature recovery upon introduction of warm racks or samples
- Safety margin (LN2 supply removed until -60 °C)
  - 4 days from -80 °C
  - 9 days from -150 °C
- 72 hour rechargeable battery backup
- Significant ambient noise reduction
- Password protected controller
- Alarms and Monitoring
  - 4-20 mA temperature output
  - Dual chamber temperature sensors
  - Event Log contains up to 30,000 unalterable, time stamped events (approx. 10 years)
  - 15 user defined audio/visual alarms
  - High temperature, lid open, and stuck valve discrete alarms
  - RS-485 communication for remote monitoring or control

Return on Investment

- Higher up-front cost, but unmatched long-term value
- Affordable and simple preventative maintenance
  - No expensive compressors to replace
- Approximately 70% operating cost savings compared to leading mechanical freezers (-80 °C)
  - Based on power consumption and LN2 costs
  - Does not include additional HVAC requirements for mechanical freezers, which will further enhance Variō ROI
  - Please see the MVE Variō™ Cost Calculator for an ROI estimate based on your circumstances
- Convertible asset
  - Can be field retrofitted to be a traditional LN2 freezer

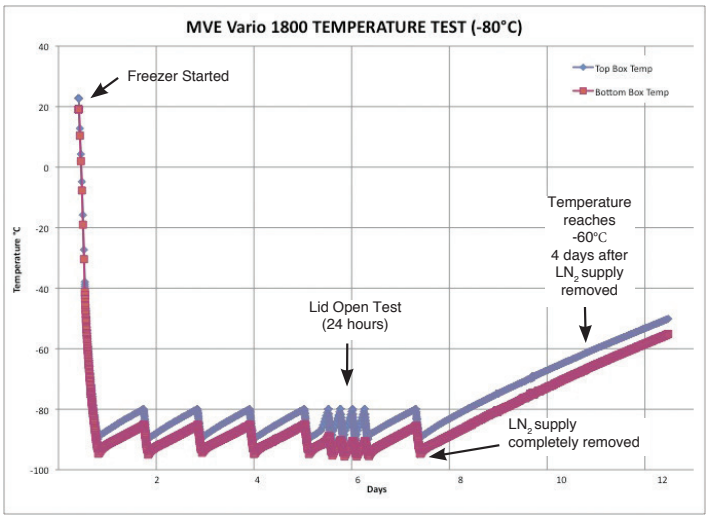
Green: Environmentally Friendly

- Less than 1% of the electricity consumption compared to leading mechanical freezers (-80 °C)
- No additional HVAC required due to negligible to negative thermal load
- No ozone depleting chlorofluorocarbon (CFC) or hydrofluor carbon (HFC) refrigerants
- Zero CO2 emissions
- No disposal issues; over 90% recyclable

-80°C Storage

Whether at -80°C or -150°C, the MVE Variō™ Series supplies a consistent temperature profile regardless if the lid is open. While the lid is open, the MVE Variō™ automatically compensates by shortening the cooling cycle interval so that the storage space temperature does not increase above the desired range. Changing operating temperature is as simple as keying in the desired value and letting the MVE Variō stabilize at the new temperature.

Temperature Test Graph

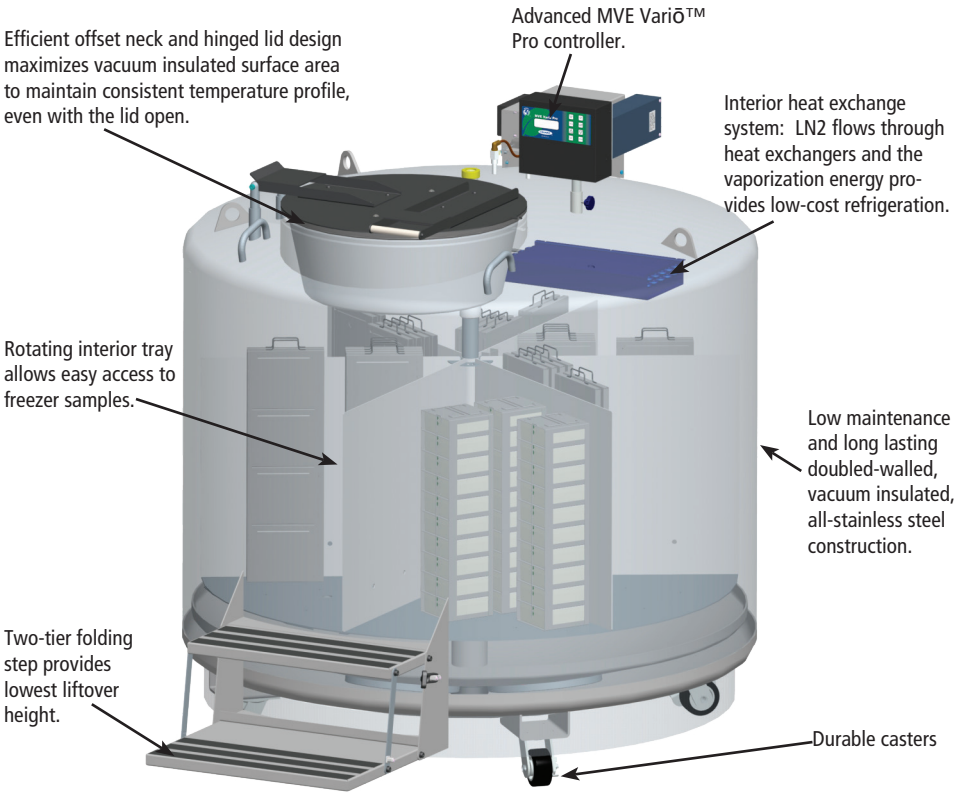


* Temp Test indicates typical performance of MVE Variō Series freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

Design

MVE Variō™ Series' innovative, patent-pending refrigeration system: LN2 flows through a heat exchange system located in the top head of the freezer, and the vaporization energy of the LN2 cools the freezer. This heat transfer system was developed by MVE to fully utilize the heat capacity of LN2 while simultaneously purging frost and moisture from the storage space. The MVE Variō Pro monitors and meters the amount of LN2 introduced into the heat exchangers so that the completely dry storage space maintains the user defined operating temperature (+/- 5°C) anywhere from -20°C to -150°C.

The efficient offset neck design and double-walled, vacuum insulated, all-stainless steel construction provide superior performance and allow the Variō to be field-retrofitted to a traditional -190°C LN2 vapor freezer.



Competition

Power Consumption

The MVE Variō™ Series consumes less than 1% of the electricity of the leading upright ultra-low temperature competitors.

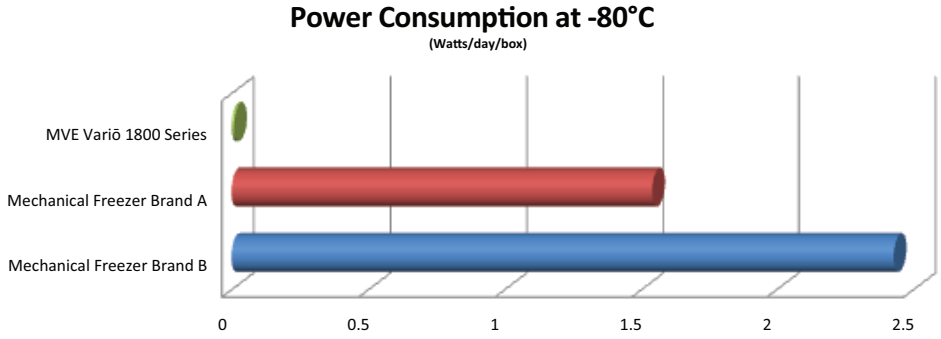
Temperature Profile

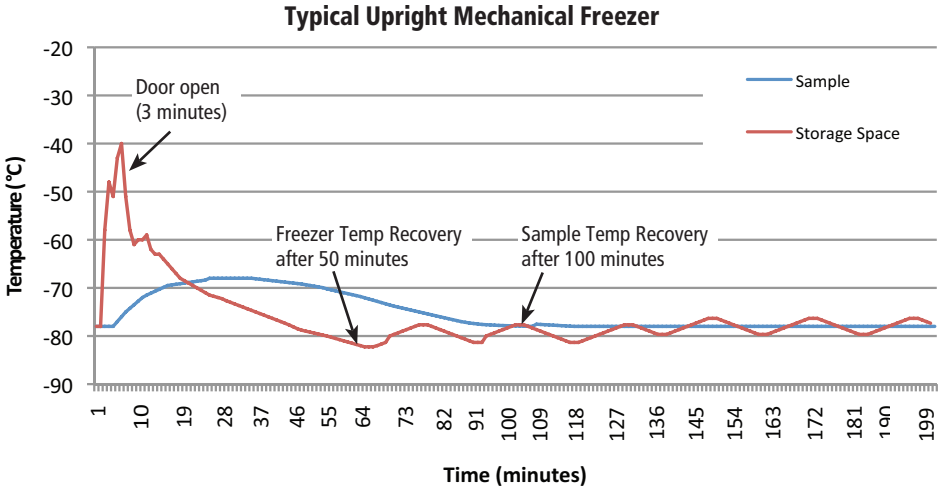
The MVE Variō™ Series provides a consistent temperature throughout the storage space. Even when the lid is open for routine sample retrieval or placement, the temperature will not rise above the desired temperature. This sample security is unmatched with any other type of ultra-low temperature storage modality.

With typical upright mechanical freezers, every time the door is opened, a large amount of heat enters the system. which results in a significant temperature change. It can take a substantial amount of time for the temperature to recover once the door is closed. Plot depicts the temperature of a typical upright mechanical freezer storing at -80°C when the door is open for three minutes.

Hold Time Safety Margin

The hold time safety margin describes the period of time from refrigeration system failure until critical temperature is reached. The MVE Variō™ 1800 Series provides by far the longest hold time in the industry. When the LN2 supply is depleted, it takes 4 days when storing at -80°C or 9 days when storing at -150°C for the chamber temperature to cross -60°C. Compared to mere hours for upright mechanical freezers, there just is no comparison.





Storage Density

Largest storage density—store up to 81,900 2 mL vials in about a 20 ft2 (1.85 m2) footprint.

MVE Variō™ Series

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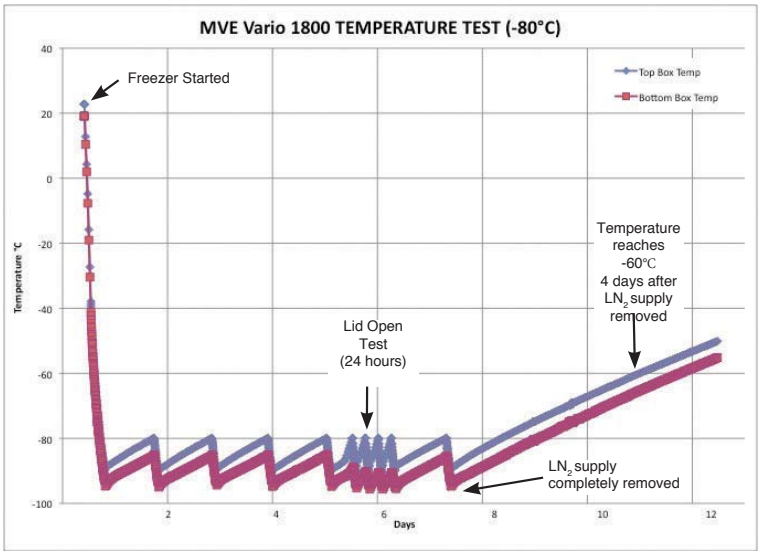
Features include:

- Approximately 70% operating cost savings compared to leading mechanical freezers (-80 °C)
- Less than 1% of the electricity consumption compared to leading mechanical freezers (-80 °C)
- Completely dry storage area
- Consistent temperature profile, even with lid open
- Improved processing time, minimal increase in temperature when warm samples introduced
- No thermal load; no heat introduced into room and no additional HVAC required
- No more expensive compressors to replace
- Convertible asset: can be retrofitted to expand temperature range to -190



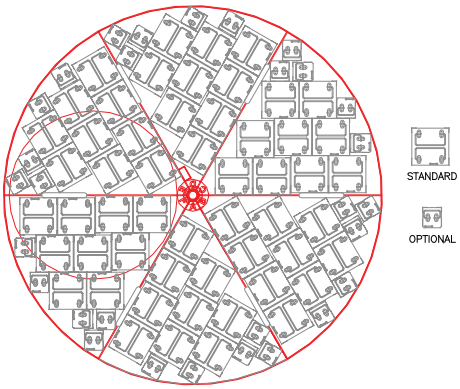
Temperature Test Graph

* Temp Test indicates typical performance of MVE Variō Series freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

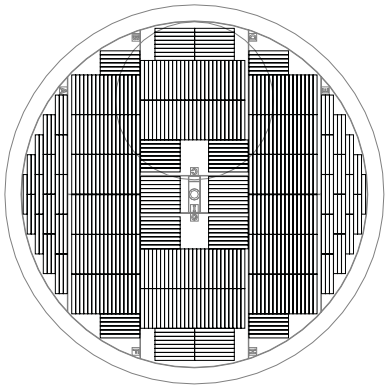
Visit www.chartbiomed.com for more information.

Rack Layouts

Square Rack Layout (P)



4R9951 Layout (R)



	MVE Varīo 1536P	MVE Varīo 1539R	MVE Varīo 1879P	MVE Varīo 1881R	MVE Varīo 1894R
Maximum Storage Capacity					
1.2 & 2 ml Vials (Internally Threaded)	36,400	39,000	79,950	81,900	94,500
Quantity of Large Racks 100 cell boxes	24	26	54	60	60
Quantity of Mini Racks 25 cell boxes	16	16	30	12	12
Number of Shelves per Rack	13	13	13	13	15
Performance					
Temperature Range	-20°C, -150°C	-20°C, -150°C	-20°C, -150°C	-20°C, -150°C	-20°C, -150°C
LN2 Usage at -80°C L/day	9	9	12	12	15
Power consumption (cont.) W	8	8	8	8	8
Unit Dimensions					
Neck Opening in. (mm)	17.5 (445)	17.5 (445)	25.0 (635)	25.0 (635)	25.0 (635)
Usable Internal Height in. (mm)	28.8 (732)	28.8 (732)	29.5 (749)	29.2 (741)	34.2 (868)
Inner Diameter in. (mm)	38.5 (978)	38.5 (978)	56.0 (1,422)	54.8 (1,391)	54.8 (1,391)
Overall Height in. (mm)	61.3 (1,556)	61.3 (1,556)	62.1 (1,577)	61.3 (1,556)	66.3 (1,683)
Door Width Requirement** in. (mm)	42.0 (1,067)	42.0 (1,067)	60.0 (1,524)	60.0 (1,524)	60.0 (1,524)
Weight Empty* lb. (kg)	690 (313)	690 (313)	1,606 (728)	1,721 (781)	1,721 (781)

Blood Bag Capacities	Total Bags	Bags/ Frame	No. Frames	Total Bags	Bags/ Frame	No. Frames	Total Bags	Bags/ Frame	No. Frames	Total Bags	Bags/ Frame	No. Frames	Total Bags	Bags/ Frame	No. Frames
791 OS/U Medsep (25 ml)	3,080	7	440	2,786	7	398	5,866	7	838	5,628	7	804	6,432	8	804
Compact (25 ml)	4,338	9	482	3,924	9	436	8,622	9	958	9,414	9	1,046	11,506	11	1,046
4R9951 (50 ml)	1,488	6	248	1,446	6	241	2,952	6	492	2,940	6	490	3,920	8	490
4R9953 (250 ml)	812	4	203	768	4	192	1,584	4	396	1,608	4	402	2,010	5	402
4R9955 (500 ml)	608	4	152	576	4	144	1,104	4	276	1,240	4	310	1,550	5	310
DF200 (200 ml)	496	4	154	488	4	122	960	4	240	984	4	246	1,230	5	246
DF700 (700 ml)	256	4	64	204	4	66	504	4	126	544	4	136	680	5	136

TWO Year Parts Warranty • FIVE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU. Freezer systems UL/C-UL Listed.

* Without inventory

**Minimum width required for vessel to pass through opening. Footprint may vary. Contact Tech Service for detailed drawings.