MVE Cryopreservation for Life Sciences

Storage & Transport Systems for MVE Cryopreservation

SECURITY THROUGH MVE SYSTEMS®

www.chartbiomed.com
844-MVE-CRYO

Contents

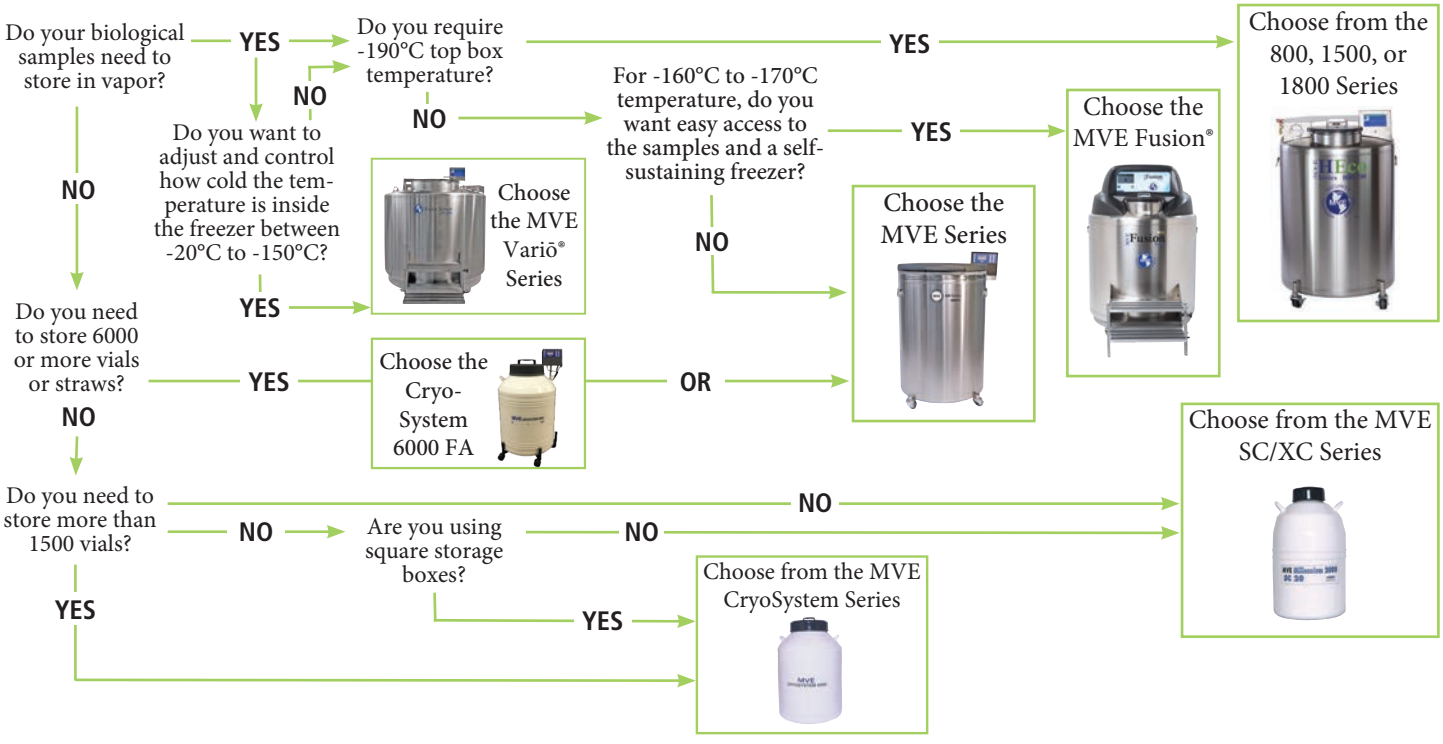
Temperature Chart

Chart MVE is the leading global manufacturer of vacuum insulated products and cryogenic systems. More than fifty years ago, we set the standard for storage of biological materials at low temperatures. Today, we continue to exceed these standards. Industries from around the world look to Chart MVE for excellence and innovation. Our solutions empower industries to better utilize cryogenic technology. In this manner, Chart MVE continues to make a vital contribution in today's biomedical Life Sciences industry.

Recommended maximum temperature for storage of biological samples.

MATERIAL TO BE STORED	VOLUME	CONTAINER	INVENTORY CONFIGURATION	CRITICAL TEMPERTAURE
Algae	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Blood	0.5 - 500 mL	Cryovial/Blood Bag	Boxes or canes/bag rack	-150°C
Cells:				
Animals / Human	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Plant	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Embryos		Straw	Canes	-150°C
Fungi:				
Mycelium	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Hybridomas	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Phage:				
Libraries	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Protozoa	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Viruses: Animal In Cells	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C

Product Selector Guide



Visit www.chartbiomed.com for more information.

MVE Fusion® Series

Features include

- Self-sustaining
- Dry sample storage
- Lowest liftover height
- Two tier folding step

Introducing the MVE Fusion® Freezer, the world's first self-sustaining cryogenic freezer. The MVE Fusion is a refrigerated liquid-based bio-storage freezer, similar in appearance and construction to an MVE High Efficiency LN_2 freezer. The design of the MVE Fusion is to provide cold storage capabilities, with no need for liquid cryogen during normal operation. The MVE Fusion can be used in remote locations, isolated rooms, high elevation facilities, and facilities with little or no vacuum jacketed pipe infrastructures. The MVE Fusion does not require constant LN_2 supply.

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	MVE Fusion®		
Maximum Storage Capacity			
1.2 & 2 ml Vials (Internally Threaded)	31,200		
Number of Racks 100 cell boxes	20		
Number of Racks 25 cell boxes	16		
Number of Stages per Rack	13		
Performance			
LN_2 Capacity L	50 (inner pressure vessel)		
LN_2 Capacity Under Tray L	(not necessary)		
Unit Dimensions			
Neck Opening in. (mm)	12.5 (318)		
Usable Internal Height in. (mm)	29.6 (752)		
Inner Diameter in. (mm)	38.4 (975)		
Overall Height in. (mm)	65 (1625)		
Overall Depth in. (mm)	57 (1450)		
Liftover Height in. (mm)	37.1 (944)		
Door Width Requirement** in. (mm)	43.5 (1105) with handles		
Weight Empty est. lb. (kg)	750 (340) estimated		
Weight Liquid Full* (Freezer with 50L and Cryocooler) est. lb. (kg)	830 (377) without racks estimated		
Blood Bag Capacities	**Total Bags**	**Bags/Frame**	**No. Frames**
791 OS/U (25 ml)	2296	7	328
4R9951 (50 ml)	1484	7	212
4R9953 (250 ml)	752	4	188
4R9955 (500 ml)	592	4	148
DF200 (200 ml)	416	4	104
DF700 (700 ml) (will not fit through neck opening)			

* Without inventory

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

Rack Layout

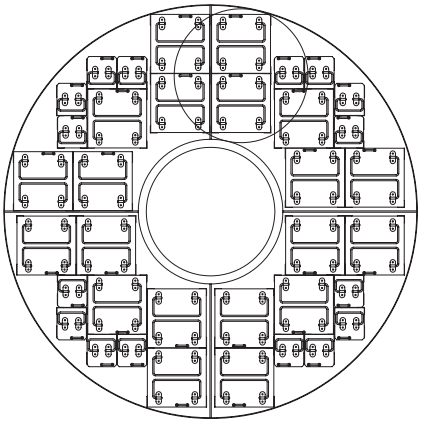

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Chart MVE TS (Touch Screen)

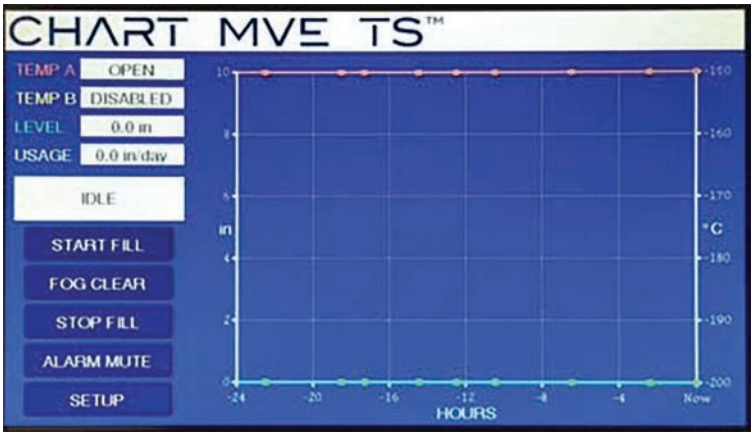


Chart MVE TS employs a variety of advanced features that enable the controller to monitor and control the environment inside a freezer with a high level of precision.

The new screen features X, Y graph for quick view of temperature and liquid nitrogen level!

Liquid Nitrogen Level Measurement

Chart MVE TS uses a differential pressure system to determine the LN_2 level to an accuracy of ± 0.5 in. (15 mm) and a resolution of 0.1 in. (5.0 mm). Unlike alternative level sensing systems, differential pressure allows the exact level to be measured and displayed. Using the simple single point calibration in a range of 3.0 in. to 48.0 in. (75 mm to 1220 mm), the patented, self-maintaining, closed-loop system displays in inches, millimeters, or a percentage full.

Automatic Liquid Nitrogen Level Control

The fully automated LN_2 level control system is based on user-defined parameters that can be electronically adjusted over the entire level range. The parameters include Low Level Alarm, Low Level Fill Point, High Level Fill Point and High Level Alarm. The redundant Dual Solenoid Valves for overfill protection run on 24 VDC, 1.0 amp (max).

Liquid Usage

This exclusive feature provides an estimation of liquid usage to track LN_2 consumption and can provide an early failure warning to allow sufficient time to implement corrective action and save irreplaceable samples.

User-Defined Alarms

A total of 18 audio/visual alarms are used to alert the user to any potential or developing problems. The alarms include: High Temperatures, Low Temperatures, High Level, Low Level, Liquid Usage, Maximum Fill Time, Gas Bypass, Stuck Open/ Closed, Temperature Calibrations, Low Battery, Power Failure, Lid Open and Communication Loss.

Remote Alarm Monitoring

Alarm monitoring includes Global/Discrete Remote Alarm Relay.

Temperature Measurement

Two independent temperature measurement channels are employed to accurately measure the temperature across the entire storage space. The two platinum RTD sensors have an accuracy of ± 1.0°C and a resolution of 0.1°C. The temperature can be displayed in °C, °F or K. The single or two point calibration also has altitude compensation for the highest accuracy.

Temperature Inlet Settings (Hot Gas Bypass)

This unique feature is able to vent warm nitrogen gas from the supply line before initiating a fill. This prevents warm gas from entering the freezer space, which helps maintain a stable temperature gradient and increases the efficiency by reducing excess LN_2 evaporation.

Event Log / Data Storage

Store vital, unalterable, time-stamped data in nonvolatile memory. This is a great tool for assessing freezer performance and troubleshooting any problems. The memory can store 30,000 events, an estimated 10 years of storage capacity. The data includes time-stamped temperatures, LN_2 level, liquid usage, and any alarms or events.

Password Security

The multilevel security system comprised of up to ten user-specific programmable passwords and four security levels can be customized to grant or restrict personnel access to certain menus and settings.

Communication Capabilities

Two independent ports can be used to communicate with other Chart MVE TS controllers, a remote PC, serial printer, or other RS-485 networks and devices. Options include ASCII, MODBUS, Printer and One Fill All Fill (OFAF).

Ethernet Capabilities

One independent RJ45 port can be used for network connection.

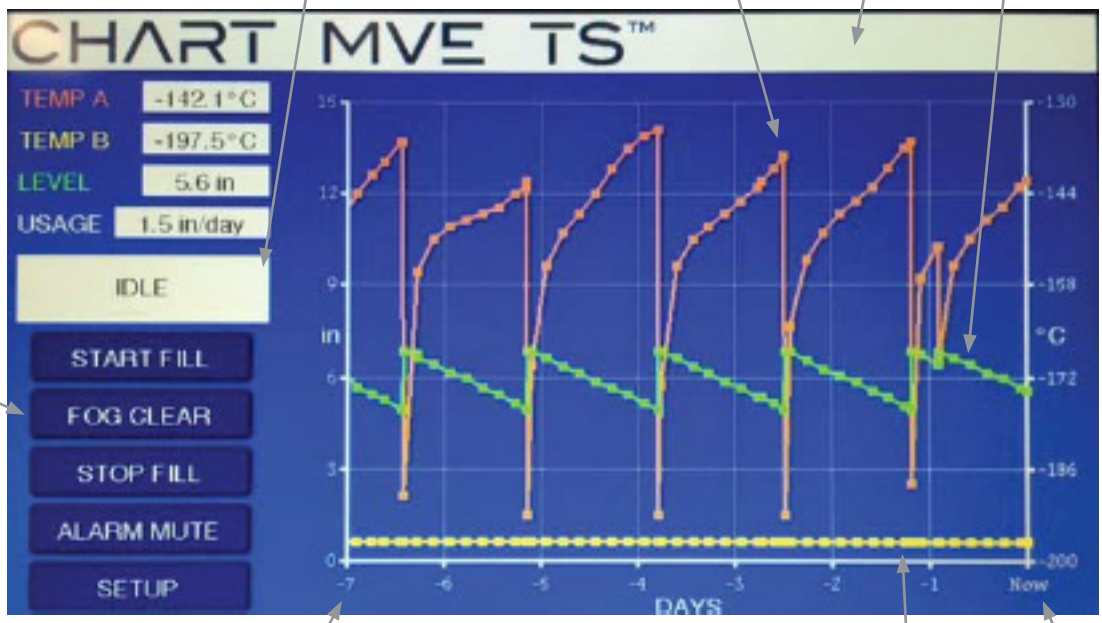
Temp A, B, and Level is displaced when navigating the Menus

Idle Status indicates freezer on standby. Changes to Bypassing or Filling

Alarm Status Indicator (changes to Red)

Temp A

Level

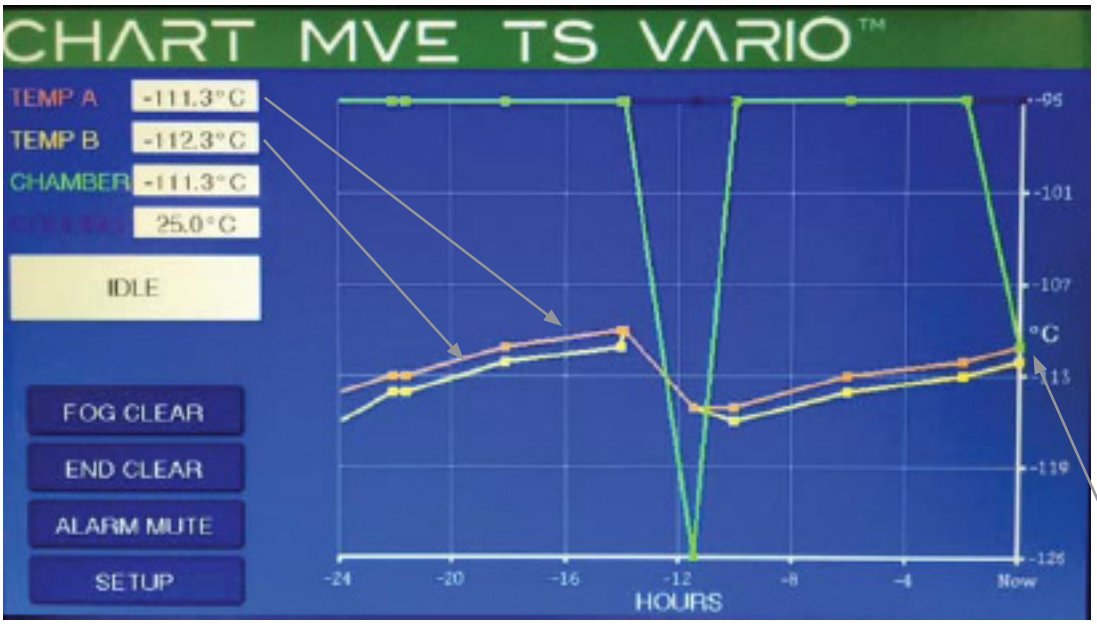


Fog Clear Icon (replaced Manual Fill Button)

Trend Data adjustable from one day, 7 days, or 30 days

Temp B

Now Data (Present Data)



Temperature A & B and Chamber Temp Display on Graph

MVE HEco™ 800 Series Freezers

- Standard One-Tier Step
- Optional Two-Tier Steps

Features include

- LN_2 efficiency
- Fully enclosed wiring and plumbing
- Vacuum jacketed transfer hose
- Dry sample storage
- -190°C top box temperature
- Lowest liftover height
- Single step standard
- Optional double-tier step

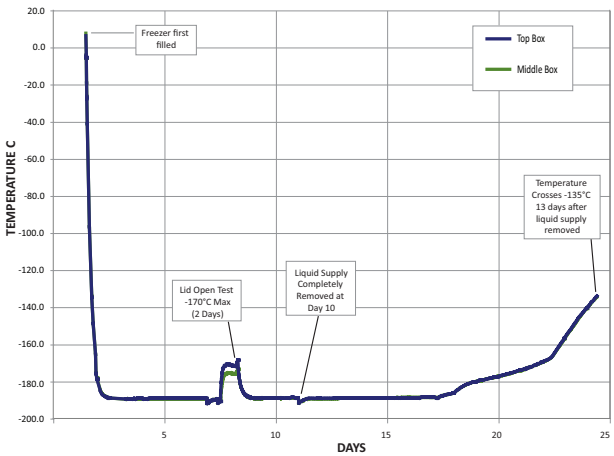
Dura-Cyl® 230 Liquid Cylinders for LN_2 use

Featuring the Chart MVE Touch Screen & TEC 3000

The MVE HEco Series is the next generation High Efficiency freezer from Chart MVE. With their unique shroud design, streamlined LN_2 plumbing, and vacuum jacketed transfer hose, the MVE HEco 800 Series freezers provide efficient use of LN_2, making them the most efficient vapor freezers available. These next generation high efficiency freezers incorporate hinged work surfaces that fully enclose all electronics and plumbing to enhance overall safety and usability.

The technical and visual improvements combine to create a more aesthetically pleasing freezer that offers greater functionality. As with all of MVE's cryogenic freezers, the MVE HEco 800 Series freezers are available in three unique sizes and provide maximum storage density as well as the longest hold time and highest sample security in the industry.

MVE HEco 800 Temperature Test*



Temperature Test Graph

* Temperature test indicates typical performance of HEco Series freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

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	MVE HEco 815P-190			MVE HEco 818P-190			MVE HEco 819P-190		
Maximum Storage Capacity									
1.2 & 2 ml Vials (Internally Threaded)	15,600			18,200			19,500		
Quantity of Large Racks 100 cell boxes	12			12			12		
Quantity of Mini *Racks* 25 cell boxes	4			4			4		
Number of Shelves per Rack	12			14			15		
Performance									
LN_2 Capacity w/o Inventory L est.	349			403			446		
LN_2 Capacity at Vapor Platform L est.	51			55			55		
Unit Dimensions									
Neck Opening in. (mm)	12.5 (317)			12.5 (317)			12.5 (317)		
Usable Internal Height in. (mm)	26.5 (673)			30.7 (781)			34.5 (877)		
Inner Diameter in. (mm)	28.8 (731)			28.8 (731)			28.8 (731)		
Overall Height in. (mm)	49.5 (1257)			53.9 (1370)			57.70 (1465)		
Liftover Height in. (mm)	39 (991)			43.8 (1115)			47.63 (1209)		
Door Width Requirement** in. (mm)	32.0 (813)			32.0 (813)			32.0 (813)		
Door Width Requirement, with handles** in. (mm)	33.2 (843)			33.2 (843)			33.2 (843)		
Weight Empty* lb. (kg)	475 (215)			495 (225)			515 (234)		
Weight Liquid Full* lb. (kg) est.	1134 (514)			1168 (530)			1340 (608)		
Blood Bag Capacities	**Total Bags**	**Bags/ Frame**	**No. Frames**	**Total Bags**	**Bags/ Frame**	**No. Frames**	**Total Bags**	**Bags/Frame**	**No. Frames**
791 OS/U Medsep (25 ml)	1,224	6	204	1428	7	204	1,836	9	204
4R9951 (50 ml)	768	6	128	896	7	128	1024	8	128
4R9953 (250 ml)	416	4	104	416	4	104	520	5	104
4R9955 (500 ml)	304	4	76	304	4	76	380	5	76
DF200 (200 ml)	236	4	59	236	4	59	295	5	59

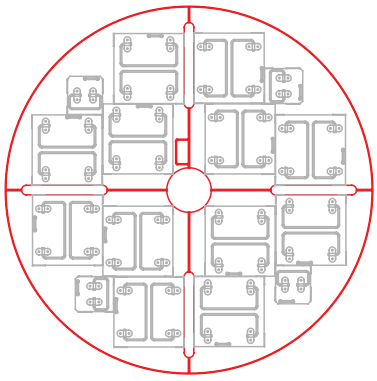
TWO Year Parts Warranty • FIVE Year Vacuum Warranty

* Without inventory

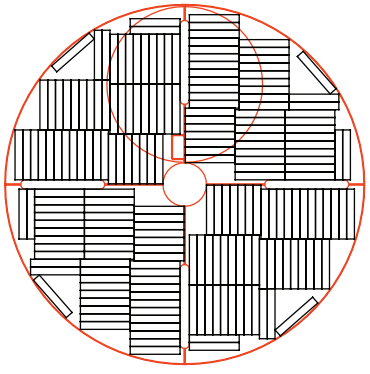
**Minimum width required for vessel to pass through opening. Footprint may vary. Contact Tech Service for detailed drawings.

Rack Layouts

Square Rack Layout (P)



791 OS/U Layout



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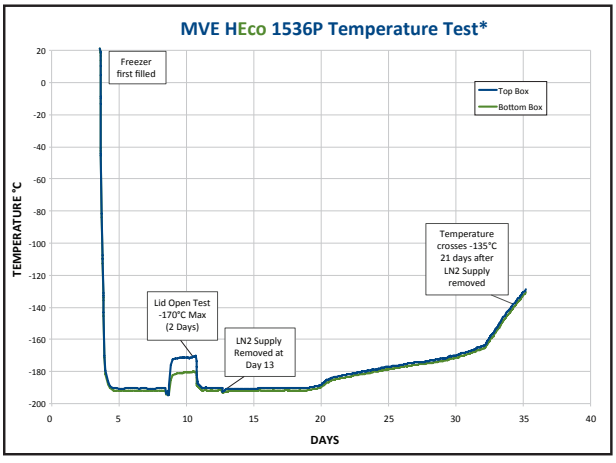
MVE HEco™ 1500 Series Freezers

Features include

- LN_2 efficiency
- Fully enclosed wiring and plumbing
- Vacuum jacketed transfer hose
- Dry sample storage
- -190°C top box temperature
- Lowest liftover height
- Two tier folding step

Featuring the Chart MVE Touch Screen & TEC 3000

The MVE HEco 1500 Series freezers provide efficient use of LN_2, making them the most efficient vapor freezers available. These next generation high efficiency freezers incorporate a hinged work surfaces that fully enclose all electronics and plumbing to enhance overall safety and usability. The technical and visual improvements combine to create a more aesthetically pleasing freezer that offers greater functionality. As with all of MVE's cryogenic freezers, the MVE HEco 1500 Series freezers are available in three unique sizes and provide maximum storage density as well as the longest hold time and highest sample security in the industry.



Temperature Test Graph

* Temperature test indicates typical performance of HEco Series freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

	MVE HEco 1536P-190			MVE HEco 1539P-190			MVE HEco 1542R-190		
Maximum Storage Capacity									
1.2 & 2 ml Vials (Internally Threaded)	36,400			39,200			42,000		
Quantity of Large *Racks* 100 cell boxes	24			24			26		
Quantity of Mini ***Racks*** 25 cell boxes	16			16			16		
Number of Shelves per Rack	13			14			14		
Performance									
LN_2 Capacity w/o Inventory L est.	730			768			768		
LN_2 Capacity at Vapor Platform L est.	115			115			115		
Unit Dimensions									
Neck Opening in. (mm)	17.4 (442)			17.4 (442)			17.4 (442)		
Usable Internal Height in. (mm)	28.7 (730)			30.2 (767)			30.8 (782)		
Inner Diameter in. (mm)	38.5 (978)			38.5 (978)			38.5 (978)		
Overall Height in. (mm)	54.7 (1389)			56.8 (1442)			56.8 (1442)		
Liftover Height in. (mm)	37.3 (947)			39.4 (999)			39.4 (999)		
Door Width Requirement** in. (mm)	42.0 (1067)			42.0 (1067)			42.0 (1067)		
Door Width Requirement, with handles** in. (mm)	43.3 (1099)			43.3 (1099)			43.3 (1099)		
Weight Empty* lb. (kg)	700 (318)			700 (318)			700 (318)		
Weight Liquid Full* lb. (kg) est.	2000 (907)			2100 (953)			2100 (953)		
Blood Bag Capacities	**Total Bags**	**Bags/ Frame**	**No. Frames**	**Total Bags**	**Bags/ Frame**	**No. Frames**	**Total Bags**	**Bags/ Frame**	**No. Frames**
791 OS/U Medsep (25 ml)	2,905	7	415	3,320	8†	415	3,184	8†	398
4R9951 (50 ml)	1,488	6	248	1,736	7	248	1,687	7	241
4R9953 (250 ml)	812	4	203	812	4	203	768	4	192
4R9955 (500 ml)	608	4	152	608	4	152	576	4	144
DF200 (200 ml)	496	4	124	496	4	124	488	4	122
DF700 (700 ml)	256	4	64	256	4	64	264	4	66

TWO Year Parts Warranty • FIVE Year Vacuum Warranty

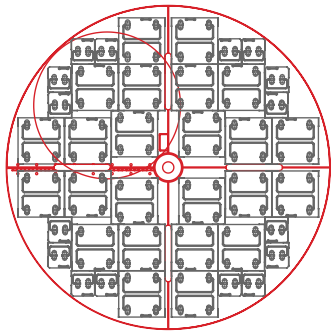
* Without inventory

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

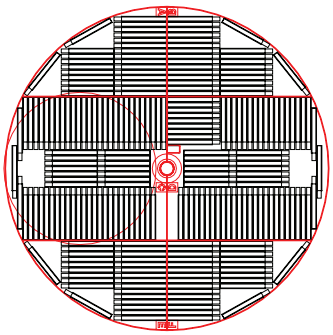
† Between usable height and clearance. Please refer to specifications.

Rack Layout

Square Rack Layout (P)



4R9951 Layout (R)



CHART®

Visit www.chartbiomed.com for more information.

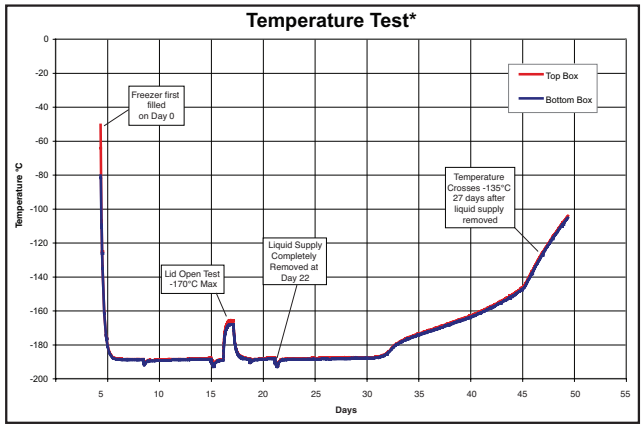
MVE HEco™ 1800 Series Freezers

Features include

- LN_2 efficiency
- Fully enclosed wiring and plumbing
- Vacuum jacketed transfer hose
- Dry sample storage
- -190°C top box temperature
- Lowest liftover height
- Two tier folding step

Featuring the Chart MVE Touch Screen & TEC 3000

The MVE HEco 1800 Series freezers provide efficient use of LN_2, making them the most efficient vapor freezers available. The 1800 series provides the option for greater storage in one freezer. These next generation high efficiency freezers incorporate a hinged work surfaces that fully enclose all electronics and plumbing to enhance overall safety and usability. The technical and visual improvements provide an aesthetically more pleasing freezer while offering greater functionality. As with all of MVE's cryogenic freezers, the MVE HEco 1800 Series freezers provide maximum storage density as well as the longest hold time and highest sample security in the industry.



Temperature Test Graph

* Temperature test indicates typical performance of HEco Series freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

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	MVE HEco 1879P-190			MVE HEco 1881R-190			MVE HEco 1892P-190			MVE HEco 1894R-190		
Maximum Storage Capacity												
1.2 & 2 ml Vials (Internally Threaded)	79,950			81,900			92,250			94,500		
Quantity of Large Racks 100 cell boxes	54			60			54			60		
Quantity of Mini Racks 25 cell boxes	30			12			30			12		
Number of Shelves per Rack	13			13			15			15		
Performance												
LN_2 Capacity L .	1516			1521			1737			1732		
LN_2 Capacity Under Tray L	292			305			282			300		
Unit Dimensions												
Neck Opening in. (mm)	24.7 (627)			24.7 (627)			24.7 (627)			24.7 (627)		
Usable Internal Height in. (mm)	29.5 (749)			29.2 (741)			34.5 (876)			34.2 (868)		
Inner Diameter in. (mm)	56.0 (1422)			54.8 (1391)			56.0 (1422)			54.7 (1389)		
Overall Height in. (mm)	63.7 (1618)			63.7 (1618)			68.6 (1742)			68.6 (1742)		
Liftover Height in. (mm)	38.8 (985)			38.8 (985)			44.0 (1118)			44.0 (1118)		
Door Width Requirement** in. (mm)	60.0 (1524)			60.0 (1524)			60.0 (1524)			60.0 (1524		
Weight Empty* lb. (kg)	1721 (781)			1721 (781)			1721 (781)			1721 (781)		
Weight Liquid Full* lb. (kg) est.	4830 (2191)			4830 (2191)			4875 (2211)			4875 (2211)		
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
791 OS/U Medsep (25 ml)	5,866	7	838	5,628	7	804	6,704	8	838	6,432	8	804
4R9951 (50 ml)	2,952	6	492	2,940	6	490	3,936	8	492	3,920	8	490
4R9953 (250 ml)	1,584	4	396	1,608	4	402	1,980	5	396	2,010	5	402
4R9955 (500 ml)	1,104	4	276	1,240	4	310	1,380	5	276	1,550	5	310
DF200 (200 ml)	960	4	240	984	4	246	1,200	5	240	1,230	5	246
DF700 (700 ml)	504	4	126	544	4	136	630	5	126	680	5	136

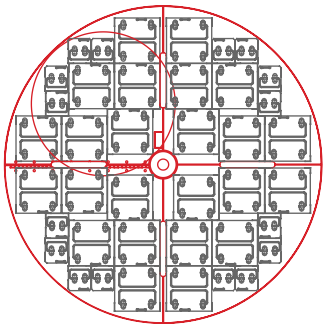
TWO Year Parts Warranty • FIVE Year Vacuum Warranty

* Without inventory

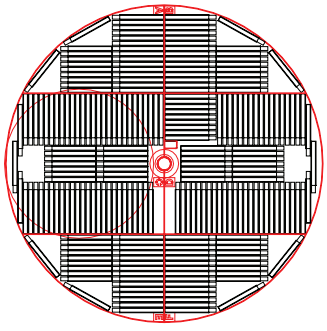
**Minimum width required for vessel to pass through opening. Footprint may vary. Contact Tech Service for detailed drawings.

Rack Layout

Square Rack Layout (P)



4R9951 Layout (R)



Visit www.chartbiomed.com for more information.

MVE High Efficiency 800 -190°C Series

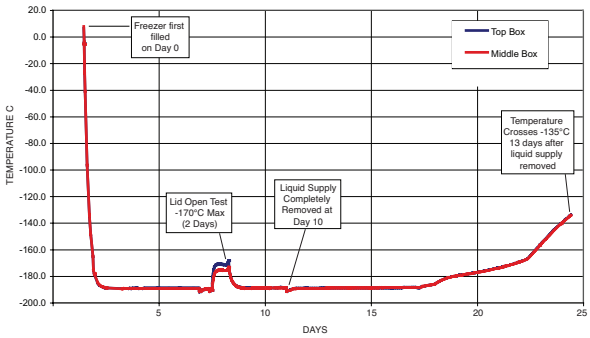
• Optional One-Tier and Two-Tier Steps

Features include

- Dry sample storage
- -190°C top box temperature
- Lowest liftover height
- Largest LN_2 capacity at vapor platform
- Optional Battery Backup

Featuring the TEC 3000

The MVE High Efficiency 800 Freezer Series provides vapor storage temperature at -190°C. Available in three unique sizes these freezers provide maximum storage density and provide the industry's longest hold time.



Temperature Test Graph

* Temp Test indicates typical performance of 800 Series -190°C freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

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	MVE 815P-190			MVE 818P-190			MVE 819P-190		
Maximum Storage Capacities									
1.2 & 2 ml Vials (Internally Threaded)	15,600			18,200			19,500		
Quantity of Large Racks 100 cell boxes	12			12			12		
Quantity of Mini Racks 25 cell boxes	4			4			4		
Number of Shelves per Rack	12			14			15		
Performance									
LN_2 Capacity w/o Inventory L est.	370			420			463		
LN_2 Capacity at Vapor Platform L est.	52			55			55		
Unit Dimensions									
Neck Opening in. (mm)	12.5 (317)			12.5 (317)			12.5 (317)		
Usable Internal Height in. (mm)	26.5 (673)			30.7 (781)			34.5 (877)		
Inner Diameter in. (mm)	28.8 (731)			28.8 (731)			28.8 (731)		
Overall Height w/Autofill in. (mm)	57.0 (1448)			61.3 (1556)			65.0 (1651)		
Door Width Requirement** in. (mm)	32.0 (813)			32.0 (813)			32.0 (813)		
Door Width Requirement** with handles in. (mm)	33.2 (843)			33.2 (843)			33.2 (843)		
Weight Empty* lb. (kg)	475 (215)			495 (225)			515 (234)		
Weight Liquid Full* lb. (kg) est.	1134 (514)			1168 (530)			1340 (608)		
Blood Bag Capacities	**Total Bags**	**Bags/ Frame**	**No. Frames**	**Total Bags**	**Bags/ Frame**	**No. Frames**	**Total Bags**	**Bags/ Frame**	**No. Frames**
791 OS/U Medsep (25 ml)	1,224	6	204	1,428	7	204	1,836	9	204
4R9951 (50 ml)	768	6	128	896	7	128	1024	8	128
4R9953 (250 ml)	416	4	104	416	4	104	520	5	104
4R9955 (500 ml)	304	4	76	304	4	76	380	5	76
DF200 (200 ml)	236	4	59	236	4	59	295	5	59

TWO Year Parts Warranty • FIVE Year Vacuum Warranty

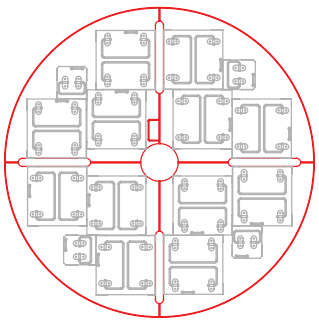
Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU. Freezer systems UL/C-UL Listed.

* Without inventory

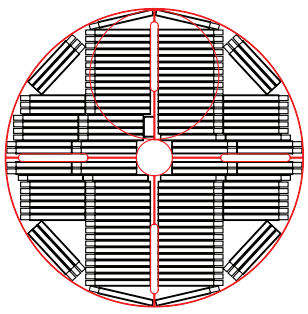
**Minimum width required for vessel to pass through opening. Footprint may vary. Contact Tech Service for detailed drawings.

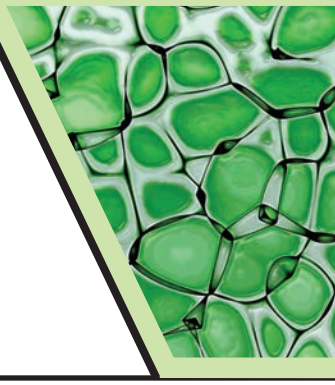
Rack Layout

Square Rack Layout (P)



4R9951 Layout (R)





CHART®

Visit www.chartbiomed.com for more information.

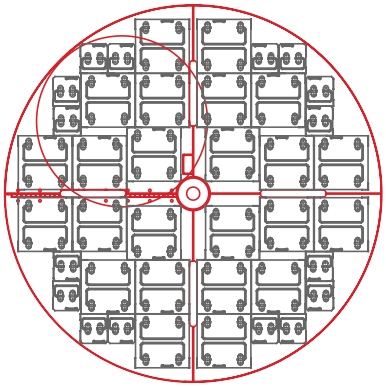
MVE High Efficiency 1500 -190°C Series

Features include

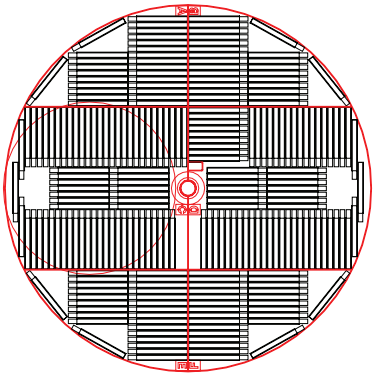
- Dry sample storage
- -190°C top box temperature
- Lowest liftover height
- Largest LN_2 capacity at vapor platform
- 2-tier folding step
- Optional Battery Backup

Rack Layouts

Square Rack Layout (P)



4R9951 Layout (R)



Featuring the TEC 3000

The MVE 1500 Series -190°C freezers provide cryogenic storage for up to 42,000 1.2 / 2.0 ml vials. Available in three unique sizes, these freezers provide maximum storage density and provide the industry's longest hold time.

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844-MVE-CRYO

SECURITY THROUGH MVE SYSTEMS®

	MVE 1536P-190			MVE 1539P-190			MVE 1542R-190		
Maximum Storage Capacity									
1.2 & 2 ml Vials (Internally Threaded)	36,400			39,200			42,000		
Quantity of Large Racks 100 cell boxes	24			24			26		
Quantity of Mini Racks 25 cell boxes	16			16			16		
Number of Shelves per Rack	13			14			14		
Performance									
LN_2 Capacity w/o Inventory L est.	756			797			797		
LN_2 Capacity at Vapor Platform L est.	133			133			133		
Unit Dimensions									
Neck Opening in. (mm)	17.5 (445)			17.5 (445)			17.5 (445)		
Usable Internal Height in. (mm)	28.8 (732)			30.8 (782)			30.8 (782)		
Inner Diameter in. (mm)	38.5 (978)			38.5 (978)			38.7 (983)		
Overall Height w/ AutoFill in. (mm)	61.3 (1556)			63.3 (1608)			63.3 (1608)		
Liftover Height in. (mm)	37.1 (942)			39.2 (995)			39.2 (995)		
Door Width Requirement** in. (mm)	42.0 (1067)			42.0 (1067)			42.0 (1067)		
Depth of Extended Step in. (mm)	7.9 (201)			7.9 (201)			7.9 (201)		
Weight Empty* lb. (kg)	690 (313)			720 (327)			720 (327)		
Weight Liquid Full* lb. (kg) est.	2037 (924)			2140 (971)			2140 (971)		
Blood Bag Capacities	**Total Bags**	**Bags/ Frame**	**No. Frames**	**Total Bags**	**Bags/ Frame**	**No. Frames**	**Total Bags**	**Bags/ Frame**	**No. Frames**
791 OS/U Medsep (25 ml)	2,905	7	415	3,320	8†	415	3,184	8†	398
4R9951 (50 ml)	1,488	6	248	1,736	7	248	1,687	7	241
4R9953 (250 ml)	812	4	203	812	4	203	768	4	192
4R9955 (500 ml)	608	4	152	608	4	152	576	4	144
DF200 (200 ml)	496	4	124	496	4	124	488	4	122
DF700 (700 ml)	256	4	64	256	4	64	264	4	66

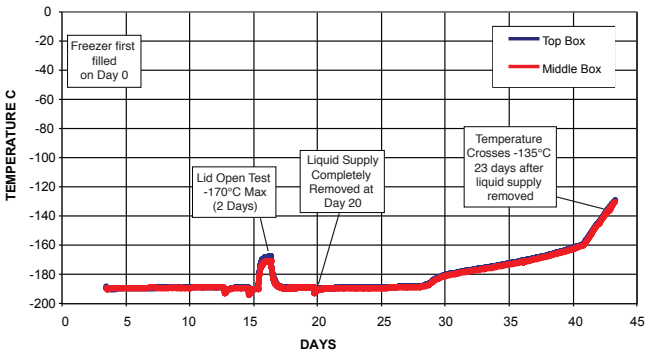
TWO Year Parts Warranty • FIVE Year Vacuum Warranty

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.

† Between usable height and clearance. Please refer to specifications.



Temperature Test Graph

* Temp Test indicates typical performance of 1500 Series -190°C freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

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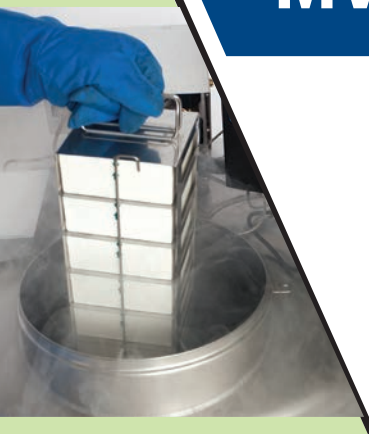
Visit www.chartbiomed.com for more information.

MVE High Efficiency 1800 -190°C Series

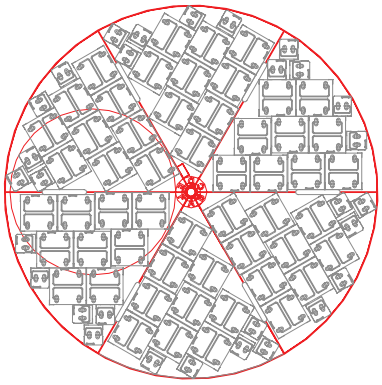


Features include

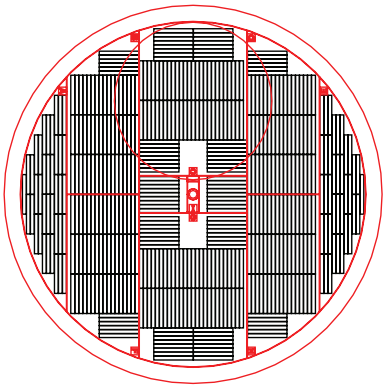
- Dry sample storage
- -190°C top box temperature
- Lowest liftover height
- Largest LN_2 capacity at vapor platform
- Two tier folding step
- Optional Battery Backup

Rack Layouts

Square Rack Layout (P)



4R9951 Layout (R)



Featuring the TEC 3000

The MVE 1800 Series -190°C freezers provide cryogenic storage for up to 94,500 1.2 / 2.0 ml vials. These freezers provide maximum storage density and provide the industry's longest hold time.

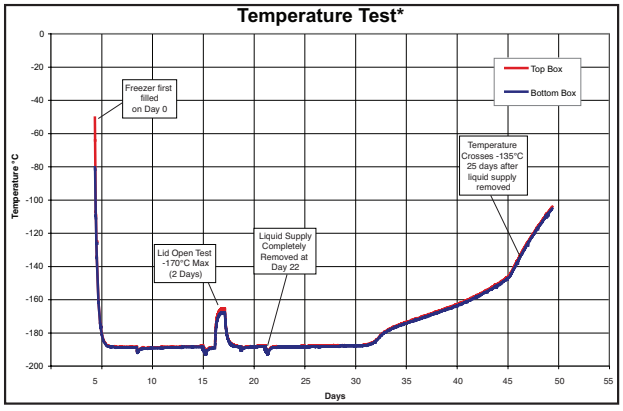
	MVE 1879P-190			MVE 1881R-190			MVE 1892P-190			MVE 1894R-190		
Maximum Storage Capacity												
1.2 & 2 ml Vials (Internally Threaded)	79,950			81,900			92,250			94,500		
Quantity of Large Racks 100 cell boxes	54			60			54			60		
Quantity of Mini Racks 25 cell boxes	30			12			30			12		
Number of Shelves per Rack	13			13			15			15		
Performance												
LN_2 Capacity w/o Inventory L est.	1540			1521			1736			1731		
LN_2 Capacity at Platform Vapor L est.	290			305			282			300		
Unit Dimensions												
Neck Opening in. (mm)	25.0 (635)			25.0 (635)			25.0 (635)			25.0 (635)		
Usable Internal Height in. (mm)	29.5 (749)			29.2 (742)			34.5 (876)			34.2 (868)		
Inner Diameter in. (mm)	56.0 (1422)			54.8 (1391)			54.8 (1391)			54.8 (1391)		
Overall Height w/AutoFill in. (mm)	68.2 (1732)			68.2 (1732)			73.2 (1860)			73.2 (1860)		
Door Width Requirement** in. (mm)	60.0 (1524)			60.0 (1524)			60.0 (1524)			60.0 (1524)		
Weight Empty* lb. (kg)	1721 (781)			1721 (781)			1721 (781)			1721 (781)		
Weight Liquid Full* lb. (kg) est.	4830 (2191)			4830 (2191)			4875 (2211)			4875 (2211)		
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
791 OS/U Medsep (25 ml)	5,866	7	838	5,628	7	804	6704	8	838	6,432	8	804
4R9951 (50 ml)	2,952	6	492	2,940	6	490	3,936	8	492	3,920	8	490
4R9953 (250 ml)	1,584	4	396	1,608	4	402	1,980	5	396	2,010	5	402
4R9955 (500 ml)	1,104	4	276	1,240	4	310	1,380	5	276	1,550	5	310
DF200 (200 ml)	960	4	240	984	4	246	1,200	5	240	1,230	5	246
DF700 (700 ml)	504	4	126	544	4	136	630	5	126	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.



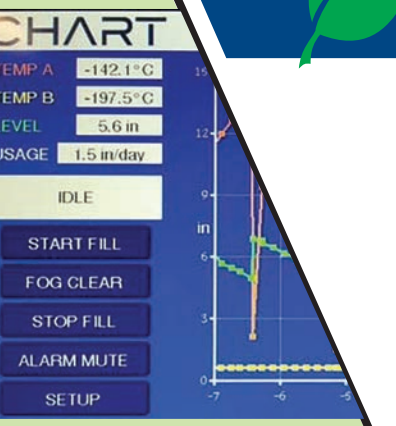
Temperature Test Graph

* Temp Test indicates typical performance of 1800 Series -190°C freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

CHART®

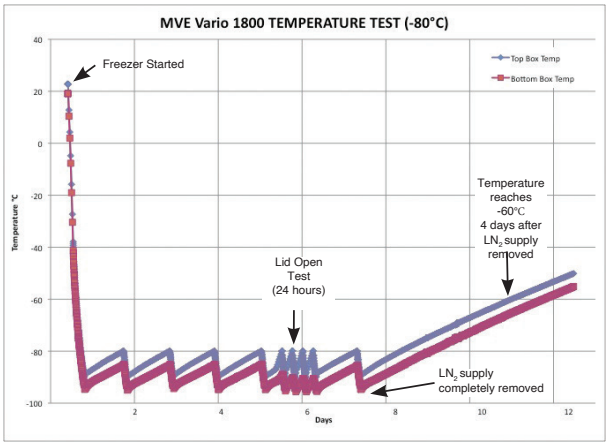
Visit www.chartbiomed.com for more information.

MVE Variō® Series Freezers



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
- New touch screen



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.

Featuring the New Chart MVE Touch Screen

The MVE Variō® Series Freezer is the 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 LN_2 while providing the safety margin and consistent temperature profile, even with the lid open, that is associated with LN_2-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.

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	MVE Variō 1536P			MVE Variō 1539R			MVE Variō 1879P			MVE Variō 1881R			MVE Variō 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		
LN_2 Usage at -80°C L/day estimated	9			9			15			15			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)			29.3 (745)			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
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

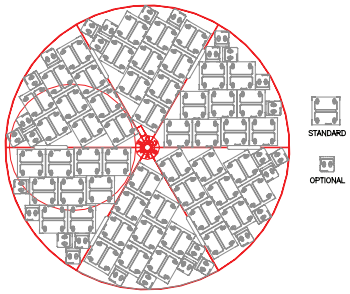
Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU. Freezer systems UL/C-UL Listed. (Only Freezers with the Variō Pro Controller)

* Without inventory

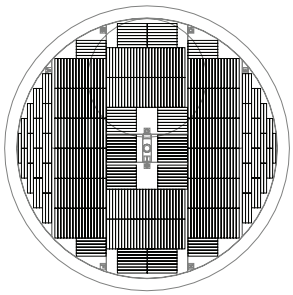
**Minimum width required for vessel to pass through opening. Footprint may vary. Contact Tech Service for detailed drawings.

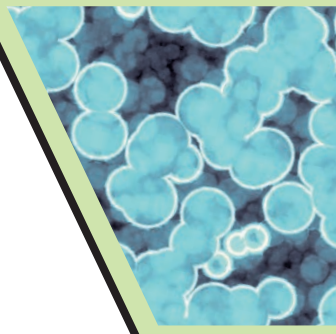
Rack Layout

Square Rack Layout (P)



4R9951 Layout (R)





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Visit www.chartbiomed.com for more information.

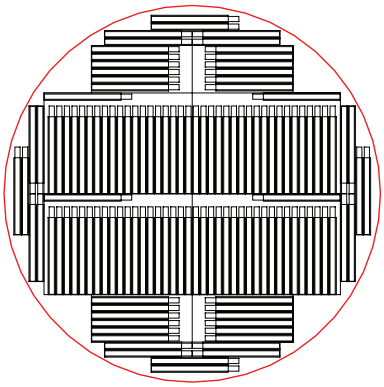
MVE Series

Features include

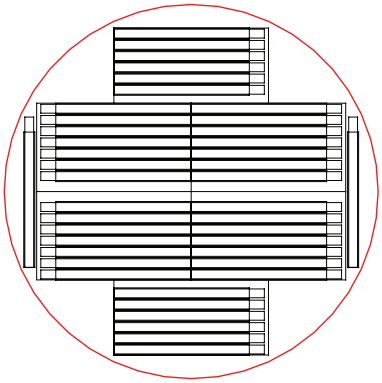
- Liquid sample storage
- Wide neck opening
- Lowest liftover height
- Largest LN_2 capacity
- Optional Battery Backup

Rack Layouts

4R9953 Layout



DF700 Layout



Featuring the TEC 3000

The MVE Series freezers provide stable cryogenic storage for up to 39,000 1.2 / 2.0 ml vials. These freezers provide maximum storage density and provide the industry's longest hold time. MVE Series are primarily designed for liquid storage.

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844-MVE-CRYO

SECURITY THROUGH MVE SYSTEMS®

	MVE 204†			MVE 205			MVE 510			MVE 616			MVE 1426			MVE 1839		
Maximum Storage Capacity																		
1.2 & 2 ml Vials (Internally Threaded)	3,200			5,200			10,400			16,900			26,650			39,000		
Number of Large Racks 100 cell boxes	4			4			7			12			18			28		
Number of Mini Racks 25 cell boxes	-			-			4			4			10			8		
Number of Shelves per Rack	8			13			13			13			13			13		
High Security Straw Capacity (0.5 ml)	11,592			19,320			32,760			50,400			79,800			151,200		
Number of Canisters (73 mm)	23			23			39			60			95			150		
Goblets/Canister : Straws/Goblet	3:168			5:168			5:168			5:168			5:168			6:168		
Performance																		
LN_2 Capacity w/o Inventory L	65			95			166			240			388			673		
Unit Dimensions																		
Neck Opening in. (mm)	16.00 (406)			16.00 (406)			20.70 (527)			25.10 (638)			31.75 (806)			39.40 (1002)		
Usable Internal Height in. (mm)	19.7 (502)			28.9 (735)			30.0 (762)			29.5 (749)			29.3 (745)			33.6 (854)		
Inner Diameter in. (mm)	16.00 (406)			16.00 (406)			20.70 (527)			25.1 (638)			31.75 (806)			39.40 (1002)		
Overall Height w/ AutoFill in. (mm)	30.8 (784)†			46.3 (1176)			46.7 (1185)			45.8 (1161)			46.8 (1188)			54.0 (1372)		
Door W x D Requirement** in. (mm)	18.0 (457)			23.6x22.7 (601x577)			30.6x29.7 (778x754)			33.5x34.6 (852x878)			40x41.6 (1017x1056)			46.8x48.9 (1187x1242)		
Weight Empty* lb. (kg)	79 (36)			195 (88)			281 (127)			320 (145)			490 (222)			750 (341)		
Weight Liquid Full* lb. (kg) est.	195 (88)			365 (166)			577 (262)			748 (339)			1181 (536)			1950 (885)		
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	Total Bags	Bags/ Frame	No. Frames
791 OS/U Medsep (25 ml)	-	-	-	539	7	77	882	7	126	1,372	7	196	2,226	7	318	3,968	8	496
4R9951 (50 ml)	-	-	-	228	6	38	420	6	70	612	6	102	924	6	154	1,856	8	232
4R9953 (250 ml)	-	-	-	128	4	32	224	4	56	336	4	84	512	4	128	1,010	5	202
4R9955 (500 ml)	-	-	-	96	4	24	160	4	40	248	4	62	424	4	106	770	5	154
DF200 (200 ml)	-	-	-	80	4	20	128	4	32	200	4	50	336	4	84	610	5	122
DF700 (700 ml)	-	-	-	40	4	10	68	4	17	116	4	29	168	4	42	380	5	76

TWO Year Parts Warranty • FIVE Year Vacuum Warranty

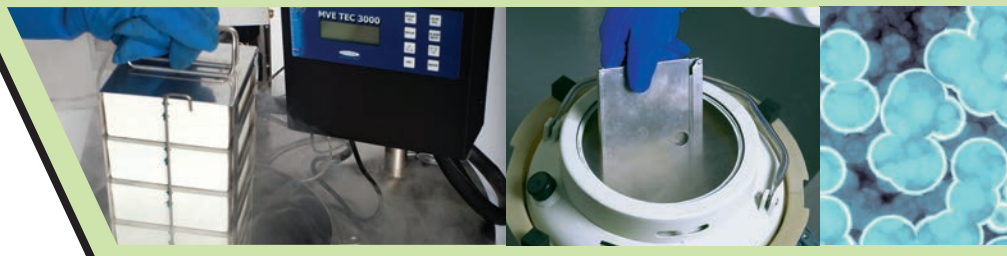
Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU. Freezer systems UL/C-UL Listed.

* Without inventory

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

† Not available with Auto Fill. Does not conform to MDD, only CE Marked.

Note: The usable height is decreased when using a vapor platform, and storage capacity is reduced when using a sleeve.



CHART®

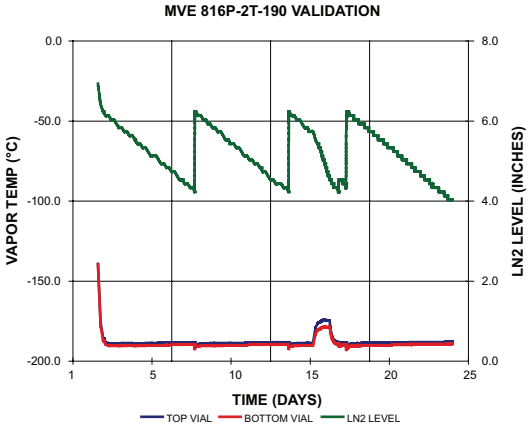
Visit www.chartbiomed.com for more information.

MVE 816P-2T-190

Innovative Inventory System
Two tier storage (with cutout in top tier) allows convenient access to bottom tier.

Features include

- Vapor phase storage temperature of -190°C*
- Two tier storage system maximizes capacity while minimizing floor space
- High efficiency design with offset neck for lowest possible LN_2 consumption
- Optional Battery Backup
- TEC 3000 control system with liquid level control and temperature alarms
- Optional one-or two-tier step



Temperature Test Graph

* Temp Test indicates typical performance of MVE 816P-2T-190 freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

Featuring the TEC 3000

The MVE 816P-2T-190 freezer is designed with the fertility market in mind. With its unique two-tier tray design, it can hold vials, straws and SUC-1 canisters which are used by leading fertility clinics worldwide. A constant temperature allows for vapor storage throughout the freezer at near liquid nitrogen temperatures. The innovative inventory system incorporates a two level storage arrangement that utilizes an access portal to allow removal of product stored on the lower level.

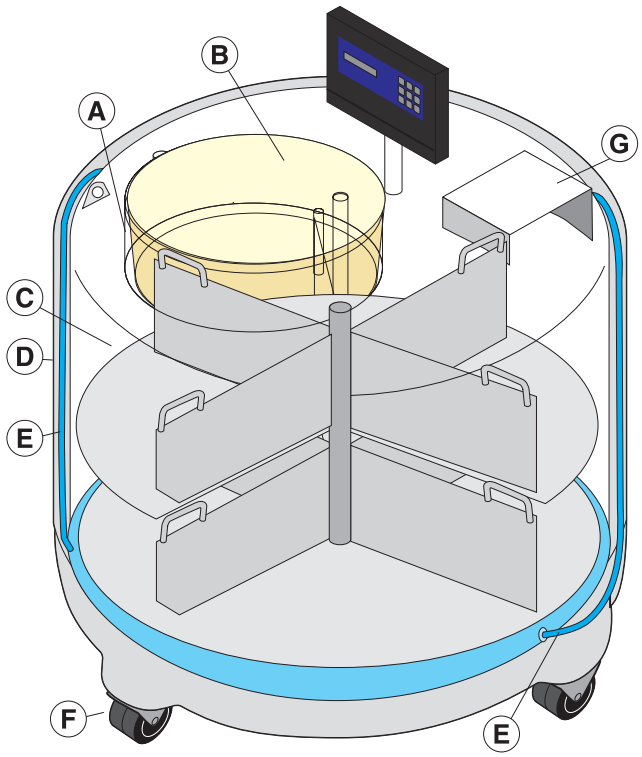
	MVE 816P-2T-190
Maximum Storage Capacity	
1.2 & 2 ml Vials (Internally Threaded)	10,500
Quantity of Large Racks 100 cell boxes	-
Quantity of Mini Racks 25 cell boxes	-
Number of Shelves per Rack	-
High Security Straw Capacity (0.5 ml)	31,584
Number of Canisters (73 mm)	94
Goblets/Canister : Straws/Goblet	2:168
Number of SUC-1 Canisters (2.5"x2.5"x11)	115
Number of 1.2 ml Vials on Canes	16,560
Number of 2.0 ml Vials on Canes	9,200
Number of 1/2 cc Straws 10/cane	35,650
Performance	
LN_2 Capacity w/o Inventory L est.	381
LN_2 Capacity at Platform Vapor L est.	56
Unit Dimensions	
Neck Opening in. (mm)	12.5 (317)
Usable Internal Height in. (mm)	13.0 (330) per level
Inner Diameter in. (mm)	28.70 (728) top tier 27.70 (702) bottom tier
Overall Height with Auto Fill in. (mm)	58.0 (1473)
Door Width Requirement** in. (mm)	32 (813)
Weight Empty* lb. (kg)	475 (215)
Weight Liquid Full* lb. (kg) est.	1155 (524)

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.



A Offset neck design minimizes liquid nitrogen consumption

B Lightweight composite lid is scratch and dent resistant

C Two level rotating tray provides easy access to samples

D Stainless steel construction reduces maintenance

E Annular (internal) filling lines minimizes frost build up and reduces maintenance requirements

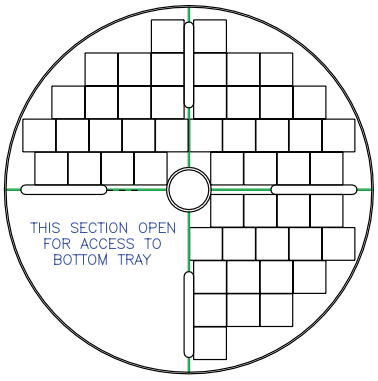
F Durable casters equipped with brakes

G Lid Stand

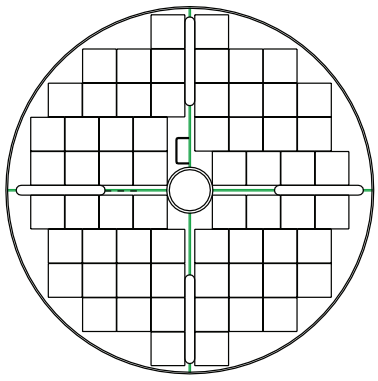
Rack Layout

115 SUC Boxes Total

Top Tray



Bottom Tray



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MVE Stock Series

Features include

- Wide neck opening
- Lowest liftover height
- Largest LN_2 Capacity
- Optional Battery Backup

Featuring the TEC 3000

The MVE Stock Series provides the ultimate in security for the breeding industry and are primarily used to store semen and embryos. The freezers are designed for pull and pack shipment, with a wide neck opening for easy access. Although engineered for liquid storage, most MVE Stock Series can be used to store in vapor.

	MVE 103***	MVE 808	MVE 816P-2T-190	MVE 1318	MVE 1842P-150	MVE 1877P-2T-150
Maximum Storage Capacity						
1.2 & 2 ml Vials (Internally Threaded)	-	11,700	10,500	20,800	-	-
Quantity of Large Racks 100 cell boxes	-	12	-	24	-	-
Quantity of Mini Racks 25 cell boxes	-	4	-	8	-	-
Number of Shelves per Rack	-	9	-	8	-	-
High Security Straw Capacity (0.5 ml)	7,728	37,296	31,584	76,104	-	347,424
Number of Canisters (73 mm)	23	74	94	151	-	517
Goblets/Canister : Straws/Goblet	2:168	3:168	2:168	3:168	2:168	4:168
Number of SUC-1 Canisters (2.5"x2.5"x11)	22	61	115	129	294	539
Number of 1.2 ml Vials on Canes	3,168	8,784	16,560	18,576	42,336	77,616
Number of 2.0 ml Vials on Canes	1,760	4,880	9,200	10,320	23,520	43,120
Number of 1/2 cc Straws 10/cane	6,820	18,910	35,650	39,990	91,140	167,090
Performance						
LN_2 Capacity w/o Inventory L est.	39	230	381	482	872	1456
LN_2 Capacity at Platform Vapor L est.	-	-	56	-	-	250
Unit Dimensions						
Neck Opening in. (mm)	16.0 (406)	25.0 (634)	12.5 (317)	35.5 (901)	25.0 (635)	25.0 (635)
Usable Internal Height in. (mm)	12.0 (305)	22.0 (558)	13.0 (330) per level	18.8 (479)	13.0 (330)	13.0 (330) per tray
Inner Diameter in. (mm)	16.00 (406)	28.30 (720)	28.70 (728) top tier 27.70 (702) bottom tier	39.60 (1007)	56.1 (1425)	56.25 (1429) top and bottom tiers
Overall Height with Auto Fill in. (mm)	16.4 (415)***	53.5 (1359)	58.0 (1473)	58.7 (1491)	51.1 (1296)	64.6 (1639)
Door Width Requirement** in. (mm)	18 (457)	31 (787)	32 (813)	42 (1067)	60 (1524)	60 (1524)
Weight Empty* lb. (kg)	48 (22)	250 (114)	475 (215)	469 (213)	1167 (530)	1721 (781)
Weight Liquid Full* lb. (kg) est.	117 (53)	660 (300)	1155 (524)	1328 (602)	2721 (1234)	4316 (1958)

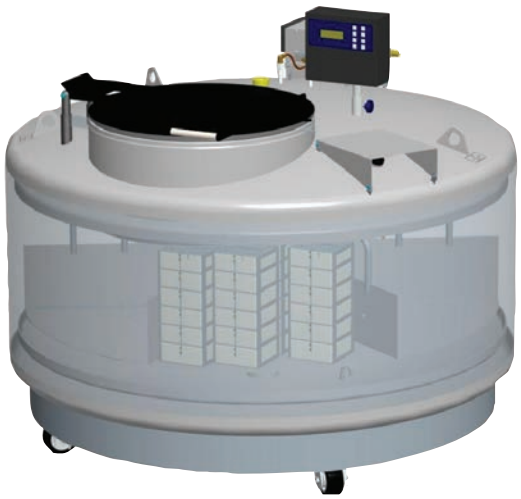
TWO Year Parts Warranty • FIVE Year Vacuum Warranty

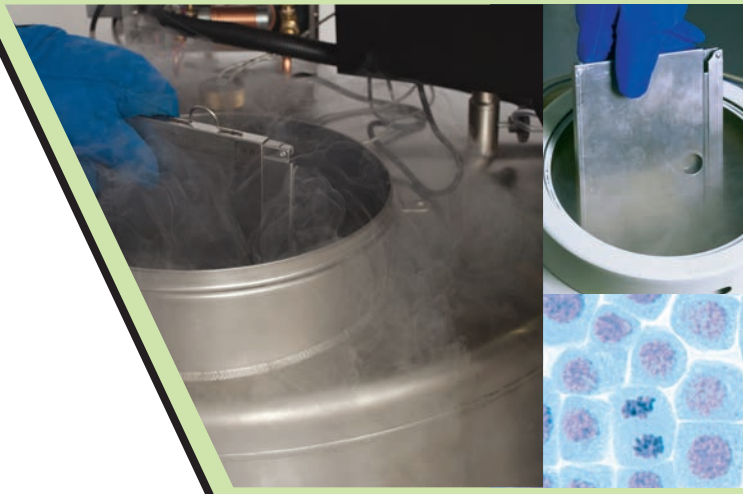
Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU. Freezer systems UL/C-UL Listed.

* Without inventory

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

***Not available with Auto Fill.





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MVE CryoCart

Features include

- Temperature monitor with type T Thermocouple
- Optional Temperature monitor and LN_2 transfer hose connection with plumbing system (manual lever)

MVE CryoCarts are designed for the loading of biological samples into canes, boxes, racks or frames. When used as a portable workbench, the unit will provide a safe and controlled environment for your samples for up to eight hours with the lid open. MVE CryoCart is ideal for transporting large quantities of samples from one tank to another within the same facility.

	MVE CryoCart
Performance	
LN_2 Capacity w/o Inventory To Top of Platform L est.	39.5
Unit Dimensions	
Overall Length in. (mm)	54.46 (1408)
Overall Width in. (mm)	20.16 (512)
Overall Height in. (mm)	39.5 (1003)
Lift Overall Height in. (mm)	37.2 (944)
Inside Length in. (mm)	41.0 (1041)
Inside Width in. (mm)	13.2 (335)
Inside Depth in. (mm)	15.4 (391)
Platform Height in. (mm)	4.5 (114)
Footprint in. (mm)	17.6x51.7 (447x1313)
Weight Empty lb. (kg) est.	195 (88)
Weight w/LN_2 Filled to Top of Platform lb. (kg) est.	266 (121)
Number of Racks (15-2)	2

90 Days Parts Warranty • One Year Vacuum Warranty
Not designed for long-term storage.

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SECURITY THROUGH MVE SYSTEMS®

MVE Research Dewars

The MVE Research Dewars are developed specifically for easy and safe handling of liquid nitrogen and samples within facilities. These units are vacuum insulated for superior thermal performance and long hold times.

Features include

- All stainless steel construction
- Optional insulated lid (cork & cover is not included)
- Wide mouth for easy access
- Convenient carrying handle (except .5L)
- Meets laboratory safety requirements that prohibit glass lined dewars

	RD-6	RD-3	RD-2	RD-1	RD-1W	RD-0.5
Performance						
LN_2 Capacity *L est.*	6	3	2	1	1	0.5
Handle	yes	yes	yes	yes	yes	no
Unit Dimensions						
Neck Opening in. (mm)	7.3 (185)	7.3 (185)	3.9 (99)	3.3 (84)	3.9 (99)	2.6 (66)
Inner Diameter in. (mm)	7.3 (185)	7.3 (185)	3.9 (99)	3.3 (84)	3.9 (99)	2.6 (66)
Outside Diameter in. (mm)	7.8 (198)	7.8 (198)	4.8 (122)	4.3 (109)	4.8 (122)	3.4 (86)
Usable Internal Height in. (mm)	10.6 (269)	6.3 (160)	7.1 (180)	6.2 (157)	6.1 (155)	7.1 (180)
Overall Height in. (mm)	11.8 (300)	7.5 (191)	12.3 (312)	9.1 (231)	7.0 (178)	8.0 (203)
Weight Empty* lb. (kg)	4.4 (2.0)	3.3 (1.5)	1.8 (0.8)	1.1 (0.5)	1.1 (0.5)	0.7 (0.3)
Weight Liquid Full* lb. (kg)	15.0 (6.8)	8.6 (3.9)	5.3 (2.4)	2.9 (1.3)	2.9 (1.3)	1.5 (0.7)
NER without Cover L/Hr	0.4	0.2	0.1	0.1	0.2	0.1

90-Day Warranty
*Estimated weights
Research dewars are not designed for short or long term sample storage.

CHART®

Visit www.chartbiomed.com for more information.

MVE CryoSystem 6000 Full Auto

Features include

- Fully automatic LN_2 level control and temperature monitoring
- Designed for liquid storage; can be used as vapor storage
- 17 user-defined audio / visual alarms
- Convenient placement of cork/cover for easy sample insertion and retrieval
- Controller post tilted for convenient LCD viewing
- Improved efficiency
- Transportable in case of emergencies or in the of event of natural disasters
- Includes six racks, transfer hose, and roller base

Featuring the TEC 3000

The MVE CryoSystem 6000 Full Auto combines the compact efficiency of aluminum dewars with the monitoring and auto fill features of the TEC3000 control system. The differential pressure-based level control allows this unit to easily be used for liquid or vapor storage. The TEC3000 continually monitors and records temperature and LN_2 levels, auto filling when needed, and providing audio/visual alarms with remote connectivity when necessary. The enhanced safety factor of not having to manually fill this unit also helps maintain a consistent temperature profile.

The CryoSystem 6000 Full Auto provides the convenience and security of high capacity stainless steel freezers for your average sized sample collection at a fraction of the price.

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SECURITY THROUGH MVE SYSTEMS®

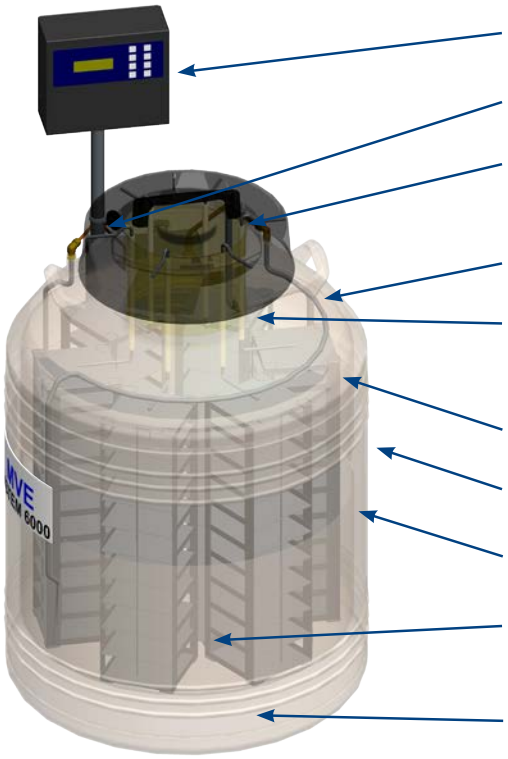
	CryoSystem 6000 FA		
Performance			
LN_2 Capacity w/o Inventory L est.	175.0		
Static Evaporation Rate* L/day	2.5		
Unit Dimensions			
Neck Opening in. (mm)	8.5 (216)		
Overall Height with Auto Fill in. (mm)	37.9 (963)		
Outer Diameter in. (mm)	26.5 (673)		
Weight Empty lb. (kg)	156 (70.7)		
Weight Full lb. (kg) est.	478 (216.8)		
Maximum Storage Capacity			
Box Size in.	2	3	3.75
Number of Racks	6	6	6
Number of vials 1.2 & 2 ml vials 100/box est.	6,000	4,200	3,000
Boxes per Rack	10	7	5

* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.

TWO Year Parts Warranty • THREE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.

Tank Features



A TEC3000 Controller

B Plumbing assembly

C Durable, tamper-proof lid design

D Annular Lines

E High strength neck tube reduces liquid nitrogen loss

F Racks

G Strong, lightweight aluminum construction

H Advanced chemical vacuum retention system

I Spider design on platform for easy retrieval and insertion of product canisters

J Liquid Nitrogen Reservoir

CHART®

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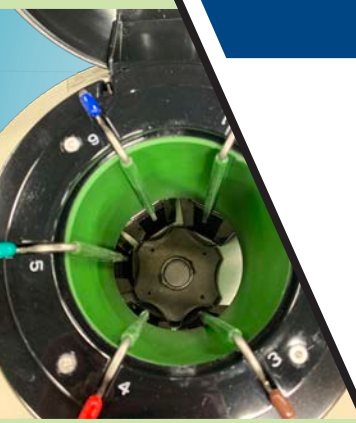
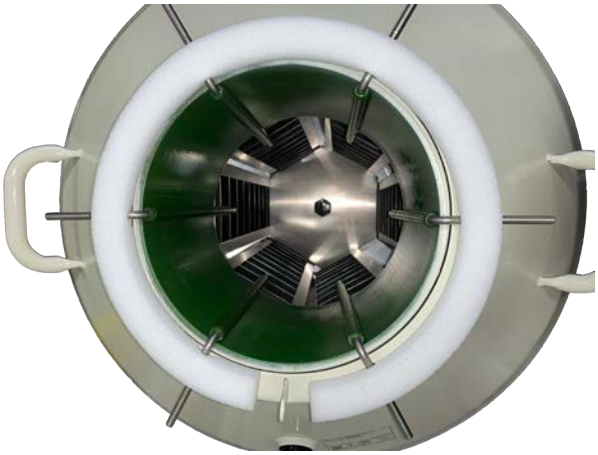
MVE CryoSystem Series

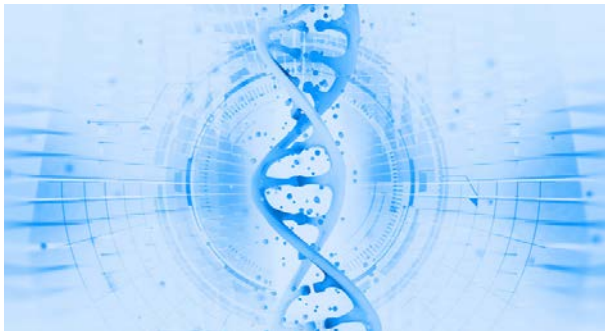


The MVE CryoSystem Series combines the benefits of low nitrogen consumption with mid-range vial capacity to meet the diverse needs of today's professionals worldwide. The lightweight and low-space demands of these containers make them the most economical units in their class.

Features include

- Designed for large capacity storage
- Low liquid nitrogen consumption
- Convenient lightweight package





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	CryoSystem 750	CryoSystem 2000	CryoSystem 4000	CryoSystem 6000
Maximum Storage Capacity				
Number of Racks	6	4	4	6
Number of 1.2 & 2.0 ml vials 100/box	-	2,000	4,000	6,000
Number of 1.2 & 2.0 ml vials 25/box	750	-	-	-
Boxes per Rack	5	5	10	10
Performance				
LN_2 Capacity w/o Inventory L est.	47.4	61.0	121.0	175.0
LN_2 Capacity w/Inv. L est.	45	51	111	150
Static Evaporation Rate* L/day	0.39	0.85	0.99	0.99
Working Duration** Full Days	76	38	70	104
Unit Dimensions				
Neck Opening in. (mm)	5.0 (127)	8.5 (216)	8.5 (216)	8.5 (216)
Overall Height in. (mm)	26.50 (673)	27.25 (692)	38.00 (965)	37.9 (963)
Outer Diameter in. (mm)	20 (508)	22 (559)	22 (559)	26.5 (673)
Weight Empty lb. (kg)	42 (19.0)	58 (26.3)	81 (36.7)	103 (46.7)
Weight Full lb. (kg)	126 (57)	182 (82.5)	300 (136)	425 (193)

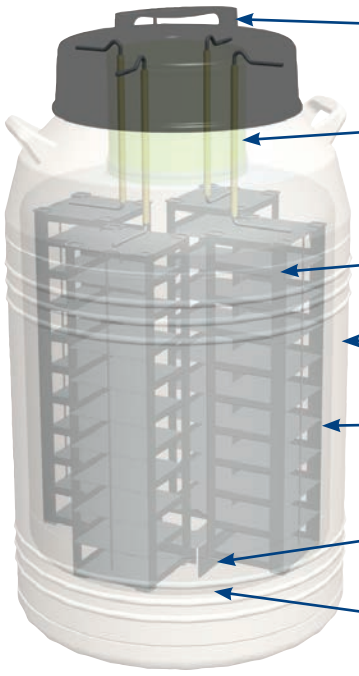
* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.

** Working Duration is an arbitrary reference, to estimate container performance under normal operating conditions in liquid storage. Actual working time may vary due to current atmospheric conditions, container history, manufacturing tolerances and patterns of use.

TWO Year Parts Warranty • THREE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.

Tank Features



A Durable, tamper-proof lid design

B High strength neck tube reduces liquid nitrogen loss

C Racks

D Strong, lightweight aluminum construction

E Advanced chemical vacuum retention system

F Spider design on platform for easy retrieval and insertion of product canisters

G Liquid Nitrogen Reservoir

CHART®

Visit www.chartbiomed.com for more information.

MVE Lab Series

Features include

- Designed for efficient storage of liquid nitrogen
- Low liquid nitrogen consumption
- Convenient lightweight package

The Lab Series cryogenic liquid dewars are named for their acceptance in laboratories and medical facilities worldwide. These high-efficiency, super insulated dewars are the most convenient, economical way to store and dispense liquid nitrogen. Many lab units can be fitted with pouring spouts, pressurized dispensing devices or dippers to aid in the transfer of liquid nitrogen.

	LAB 4	LAB 5	LAB 10	LAB 20	LAB 30	LAB 47	LAB 50
Performance							
LN_2 Capacity L est.	4	5	10	20	32	47	50
Static Evaporation Rate* L/day	0.19	0.15	0.18	0.18	0.22	0.39	0.49
Unit Dimensions							
Neck Opening in. (mm)	1.4 (35)	2.18 (55.4)	2.18 (55.4)	2.18 (55.4)	2.5 (64)	5.0 (127)	2.5 (64)
Overall Height in. (mm)	16.8 (426)	18.2 (462)	21.5 (546)	24.5 (622)	24.0 (610)	26.5 (673)	30.5 (775)
Usable Height in. (mm)	7.8 (198)	10.5 (266)	13.5 (343)	13.7 (348)	14.9 (378)	16.8 (427)	22.0 (559)
Outer Diameter in. (mm)	7.3 (185)	8.8 (222)	10.3 (260)	14.5 (368)	17.0 (432)	20.0 (508)	17.0 (432)
Internal Diameter in. (mm)	5.5 (139)	6.5 (165)	8.3 (210)	11.4 (289)	14.0 (356)	16.5 (419)	14.0 (356)
Weight Empty lb. (kg)	6 (2.7)	8 (4)	12 (5.4)	19 (9)	25 (11.4)	42 (19)	31 (14)
Weight Full lb. (kg)	13 (6)	17 (8)	31 (14)	55 (25)	82 (37.2)	120.4 (54.6)	120 (54.4)

* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.

Note: The Lab Series is designed for liquid storage.

TWO Year Parts Warranty • FIVE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.

Tank Features

A Durable composite lid design

B High strength neck tube reduces liquid nitrogen loss

C Strong, lightweight aluminum construction

D Advanced chemical vacuum retention system

E Liquid Nitrogen Reservoir

CHART®

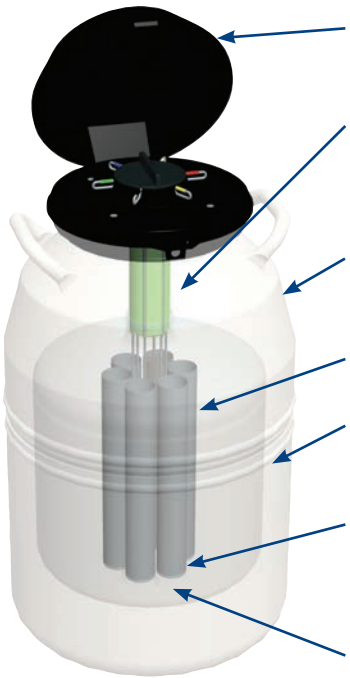
Visit www.chartbiomed.com for more information.

MVE SC Series

Features include

- Designed for small capacity storage needs
- Low liquid nitrogen consumption
- Convenient lightweight package
- SC 20/20 Signature includes Bend Don't Break™ durability feature

Tank Features



A Durable, tamper-proof lid design

B High strength neck tube reduces liquid nitrogen loss

C Strong, lightweight aluminum construction

D Canisters

E Advanced chemical vacuum retention system

F Spider design on platform for easy retrieval and insertion of product canisters

G Liquid Nitrogen Reservoir

MVE offers the widest range of compact aluminum storage tanks available on the market today. Over the past 50 years, our product designs have improved through end-user input and evolved into a unique selection of units. The SC Series is designed for the user who has small capacity needs, but requires long-term storage and low liquid nitrogen consumption in a convenient lightweight package.

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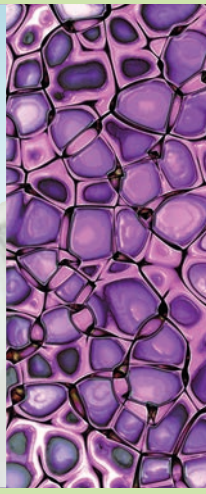
	SC 3/3	SC 8/5	SC 11/7	SC 20/20 Signature	SC 33/26	SC 36/32	Super 2
Maximum Storage Capacity							
Number of Canisters	6	6	6	6	6	6	6
Number of 1/2 cc Straws 10/cane	-	-	660	660	660	660	660
Number of 1/2 cc Straws 1 Level Bulk	440	440	879	879	879	879	879
Number of 1.2 & 2.0 ml vials 5/cane	-	-	210	210	150	150	210
Performance							
LN_2 Capacity w/o Inventory L est.	3.6	8.4	11.0	20.5	33.0	36.5	24.5
Static Evaporation Rate* L/day	0.13	0.15	0.16	0.085	0.13	0.10	0.085
Working Duration** Full Days	17	35	43	150	182	224	180
Unit Dimensions							
Neck Opening in. (mm)	2.18 (55.4)	2.18 (55.4)	2.18 (55.4)	2.18 (55.4)	2.18 (55.4)	2.18 (55.4)	2.18 (55.4)
Overall Height in. (mm)	16.0 (406)	18.5 (470)	21.6 (549)	26.0 (660)	25.9 (657)	27.2 (690)	28.2 (716)
Outer Diameter in. (mm)	8.7 (222)	10.2 (260)	10.2 (260)	14.5 (368)	18.2 (464)	18.2 (464)	14.5 (368)
Canister Height in. (mm)	5.0 (127)	5.0 (127)	11.0 (279)	11.0 (279)	11.0 (279)	11.0 (279)	11.0 (279)
Canister Diameter in. (mm)	1.65 (41.9)	1.65 (41.9)	1.65 (41.9)	1.65 (41.9)	1.65 (41.9)	1.65 (41.9)	1.65 (41.9)
Weight Empty lb. (kg)	8 (3.6)	12 (5.3)	17 (7.7)	22.5 (10.2)	34 (15.4)	34 (15.4)	26.5 (12)
Weight Full lb. (kg)	14.4 (6.5)	27.0 (12.1)	36.6 (16.6)	58.99 (26.7)	93.4 (42.4)	100.0 (44.8)	68.4 (31)

* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.

** Working Duration is an arbitrary reference, to estimate container performance under normal operating conditions in liquid storage. Actual working time may vary due to current atmospheric conditions, container history, manufacturing tolerances and patterns of use.

TWO Year Parts Warranty • FIVE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.



CHART®

Visit www.chartbiomed.com for more information.

MVE XC Series

Features include

- Designed for large capacity storage
- Low liquid nitrogen consumption
- Convenient lightweight package
- XC 20 Signature includes Bend Don't Break™ & Semen Safe™ durability features

MVE XC Series tanks have capacities ranging from 700–5000 straws, and 210 to over 1000 vials. Manufactured to a world class level of excellence and backed by an industry-leading 5-year vacuum warranty, these durable, lightweight units can be relied on to perform in the most demanding of environments.

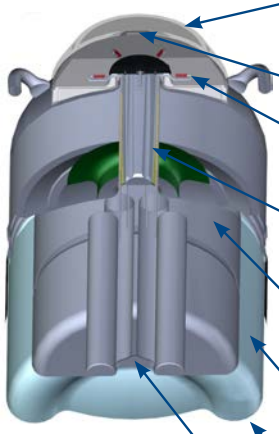
BEND DON'T BREAK™ (Patent Pending)

After 2 years in concept testing, the new XC 20 Signature includes a new top head shape which deforms in order to absorb G-force damage to the neck area. This increases the durability of the XC 20 Signature and will make the tank more robust to MINIMIZE the damage from mishandling and transport. Although the bend concept allows for visible outside evidence that has been tipped or dropped during transport, it will be more resilient and less likely to break, minimizing the chances of product loss.

SEMEN SAFE™

With extensive testing, the new XC 20 Signature will include a stronger composite neck that is 20% stronger than the old design. This feature will allow the neck to be less susceptible to G-force damage from mishandling and transport in order to increase the durability of the XC 20 Signature. When combined with BEND DON'T BREAK™, it should minimize semen losses, which are the result of transport damage. While we've maintained the "form, fit, and function" of the MVE 20 Millennium design, SEMEN SAFE™ increases the durability of our tanks.

Tank Features



A Tamper-proof, hinged lid

B Locking tab

C Color-coded canister/lid numbering system

D High strength neck tube reduces liquid nitrogen loss

E Advanced chemical vacuum retention system

F Insulation to provide maximum thermal performance

G Strong, lightweight aluminum construction

H Spider design for easy retrieval and insertion of product canisters

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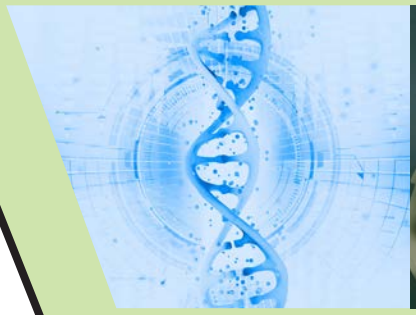
	XC 20 Signature	XC 21/6	XC 22/5	XC 32/8	XC 33/22	XC 34/18	XC 34/18 Plus	XC 43/28	XC 47/11-6SQ	XC 47/11-6	XC 47/11-10
Maximum Storage Capacity											
Number of Canisters	6	9	6	9	6	6	6	6	6 sq.	6	10
Number of 1/2 cc Straws 10/cane	660	-	2,400	2,520	1,260	2,100	2,100	1,260	-	3,900+	3200
Number of 1/2 cc Straws 1 Level Bulk	879	3,870	3,666	3,960	1,764	3,300	3,300	1,764	-	6,200	5,000
Number of 1/2 cc Straws 2 Level Bulk	1,680	-	-	-	-	-	-	-	-	-	-
Number of 1.2 & 2.0 ml vials 5/cane	210	-	810	855	360	630	630	360	-	1,320	1,050
Number of Racks 25 Vials	-	-	-	-	-	-	-	-	750	-	-
Performance											
LN_2 Capacity w/o Inventory L est.	20.5	21.0	22.4	32.0	33.4	34.8	67.5	42.2	47.4	47.4	47.4
LN_2 Capacity w/o Inventory Below Spider L est.	-	-	-	-	-	-	32.7	-	-	-	-
Static Evaporation Rate* L/day	0.090	0.35	0.35	0.35	0.14	0.18	0.40	0.14	0.39	0.39	0.39
Working Duration** Full Days	142	38	40	57	154	123	136	193	76	76	76
Unit Dimensions											
Neck Opening in. (mm)	2.18 (55.4)	3.50 (89)	3.81 (97)	3.81 (97)	2.75 (70)	3.50 (89)	3.50 (89)	2.75 (70)	5.00 (127)	5.00 (127)	5.00 (127)
Overall Height in. (mm)	26.0 (660)	17.2 (438)	22.0 (559)	21.5 (546)	26.0 (660)	26.6 (675)	37.5 (952)	26.4 (670)	26.5 (673)	26.5 (673)	26.5 (673)
Overall Inner Height in. (mm)	-	-	-	-	-	-	33.5 (850)	-	-	-	-
Outer Diameter in. (mm)	14.5 (368)	18.2 (464)	14.5 (368)	18.2 (464)	18.2 (464)	18.2 (464)	18.2 (464)	20.0 (508)	20.0 (508)	20.0 (508)	20.0 (508)
Canister Height in. (mm)	11/5 (279/127)	5 (127)	11 (279)	11 (279)	11 (279)	11 (279)	11 (279)	11 (279)	-	11 (279)	11 (279)
Canister Diameter in. (mm)	1.69/1.65 (42.9/41.9)	2.59 (68)	3.09 (79)	2.62 (67)	2.22 (56)	2.8 (71)	2.81 (71)	2.22 (56)	-	4.00 (102)	2.81 (71)
Distance: Platform to Top of Neck in. (mm)	-	-	-	-	-	-	21 (533)	-	-	-	-
Weight Empty lb. (kg)	22 (10)	24 (10.9)	26 (11.8)	30 (13.6)	34 (15.4)	34 (15.4)	45.9 (20.8)	36 (16.4)	42 (19.0)	42 (19.0)	42 (19.0)
Weight Full lb. (kg)	58.4 (26.5)	61.4 (27.9)	66.0 (30)	87.0 (39.5)	94.0 (42.5)	96.0 (43.5)	104.4 (47.3)	111.0 (50.5)	120.4 (54.6)	120.4 (54.6)	120.4 (54.6)

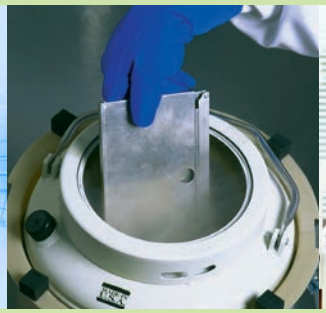
* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.

** Working Duration is an arbitrary reference, to estimate container performance under normal operating conditions in liquid storage. Actual working time may vary due to current atmospheric conditions, container history, manufacturing tolerances and patterns of use.

TWO Year Parts Warranty • FIVE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.





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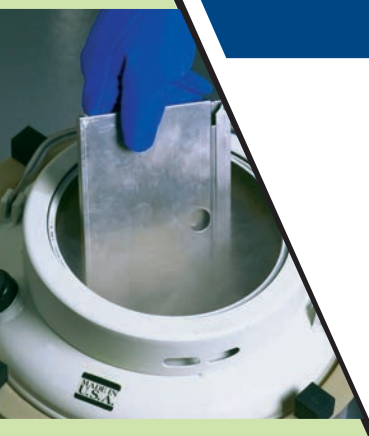
MVE Doble Series



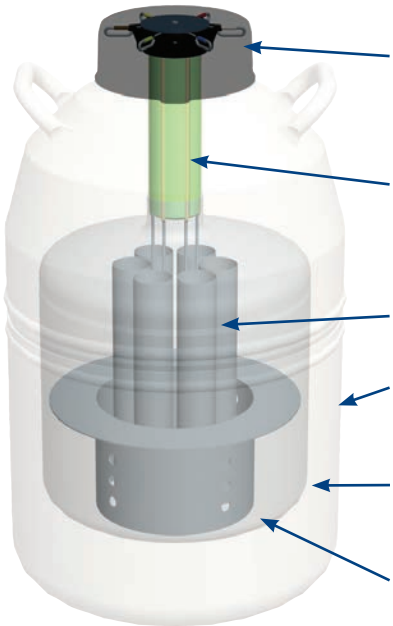
Features include

- MVE Protective Shipping Containers are recommended
- Protective shipping containers ensure upright shipping
- Liquid and vapor storage options
- Low liquid nitrogen consumption
- Convenient lightweight package
- **CHARGES IN TWO HOURS***

ADVANCED QWick Charge Technology — Charges in 2 hours

Ref 20888994 Rev C

Tank Features



A Durable composite lid design

B High strength neck tube reduces liquid nitrogen loss

C Canisters

D Strong, lightweight aluminum construction

E Advanced chemical vacuum retention system

F Hydrophobic liquid nitrogen absorbent system

Featuring Advanced QWick™ Charge Technology

The Doble Series cryogenic liquid dewars are the first units to be designed for both vapor shipment and liquid storage. The Doble QWick Series utilizes an absorbent wicking material that charges with liquid nitrogen in two hours. *New/warm tanks still need to be filled with LN_2 and allowed to sit 24 hours to achieve maximum hold time. When a tank is already cold, the Advanced QWick Charge technology will apply, providing the capacity for same-day vapor shipping. A unique absorbent layer in the base of the storage tanks enables them to be charged with nitrogen and employed as dry shippers with hold times of up to 21 days. Once at the final destination, the tanks can be filled with liquid and used for long term storage, therefore avoiding the need for return shipments.

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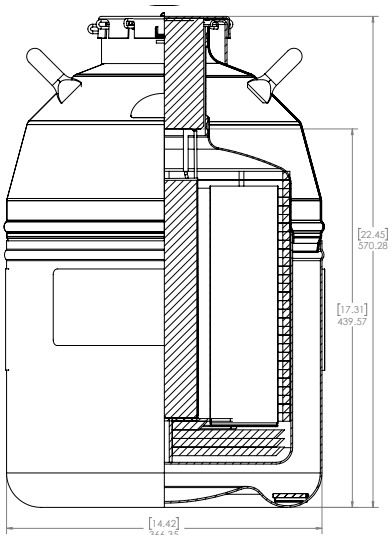
SECURITY THROUGH MVE SYSTEMS®

	Doble 11	Doble 20	Doble 22	Doble 28	Doble 34	Doble 47	Doble 47-10
Maximum Storage Capacity							
Number of Canisters	6	6	6	6	6	6	10
No. of 1/2 cc Straws 10/cane	660	660	2400	2,400	2,100	4,500	3,500
Vial Capacity	210	210	810	810	630	1,320	1,050
Performance (Hold Time overrides NER specifications)							
LN_2 Capacity w/o Inventory L est.	10.0	18.5	20.0	28.0	32.0	46.0	46.0
Vapor Capacity L	3.1	4.2	5.5	8.4	7.9	6.0	6.0
Static Evaporation Rate L/day	0.17	0.10	0.35	0.35	0.20	0.40	0.40
Working Duration days for liquid	37	116	40	50	110	74	72
Working Duration days for vapor	17	21	18	21	21	21	21
Unit Dimensions							
Neck Opening in (mm)	2.18 (55)	2.18 (55)	3.81 (97)	3.81 (97)	3.50 (89)	5.00 (127)	5.00 (127)
Overall Height in (mm)	21.6 (549)	25.5 (647)	22 (559)	22 (559)	26.6 (676)	26.5 (673)	26.5 (673)
Outside Diameter in (mm)	10.2 (260)	14.5 (368)	14.5 (368)	18.2 (462)	18.2 (462)	20.0 (508)	20.0 (508)
Canister Height in (mm)	11 (279)	11 (279)	11 (279)	11 (279)	11 (279)	11 (279)	11 (279)
Canister Diameter in (mm)	1.65 (42)	1.65 (42)	3.09 (79)	3.09 (79)	2.81 (72)	4.00 (101)	2.81 (72)
Weight Empty lb. (kg)	14.5 (6.6)	23 (10.4)	23.8 (10.7)	33 (15.0)	34.5 (15.6)	41 (18.5)	41 (18.5)
Weight Charged vapor lb. (kg)	19.5 (8.8)	30.3 (13.7)	35 (15.8)	47 (21.3)	47.9 (21.7)	54.6 (24.7)	54.6 (24.7)
Weight Full liquid lb. (kg)	32 (14.5)	56 (25.4)	68 (30.8)	89 (40.4)	92 (41.7)	117 (53.1)	117 (53.1)
Protective Shipping Container Part No.	20750519	11912460	11912460	11930861	20863878	14035731	14035731

TWO Year Parts Warranty • THREE Year Vacuum Warranty | Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.



FEATURES
LOCKABLE CORK AND COVER
CHARGES IN 2 HOURS*
OPTIONAL CENTER CANISTER AND INSERT TO EXTEND HOLD TIME

PERFORMANCE
ABSORBED LN2 CAPACITY ---------- 5.5 LITERS
STATIC EVAPORATION RATE (EXCLUDING INVENTORY) ---------- 0.35 L/DAY (HOLD TIME OVERRIDES NER SPECIFICATION)
STATIC HOLD TIME** (EXCLUDING INVENTORY) ---------- 18 DAYS

UNIT DIMENSIONS
NECK OPENING inch(mm) ---------- 3.8 (96.7)
OVERALL HEIGHT (TOP OF LID) inch(mm) ---------- 22.0 (559)
OUTSIDE DIAMETER inch(mm) ---------- 14.5 (368)
EMPTY WEIGHT LBS(kg) ---------- 23.3 (10.5) (+/- 5% TYPICAL)
CHARGED WEIGHT (EXCLUDING INVENTORY)*** LBS(kg) ---------- 33.0 (14.9) (+/- 5% TYPICAL)
FULL WEIGHT (EXCLUDING INVENTORY) LBS(kg) ---------- 68.0 (30.8) (+/- 5% TYPICAL)

CANISTERS
(QUANTITY) SIZE ---------- (6) 11"X3.2"OD (279mmX81mmOD)
(1) 11"X3.2"OD (279mmX81mmOD)

PLASTIC SHIPPING CONTAINER
PPSC---------- PN 11912460

MDD 93/42/EEC CERTIFIED

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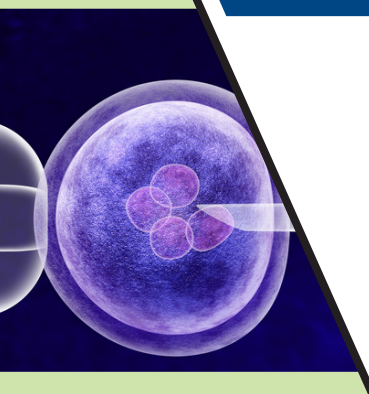
MVE Vapor Shipper Series



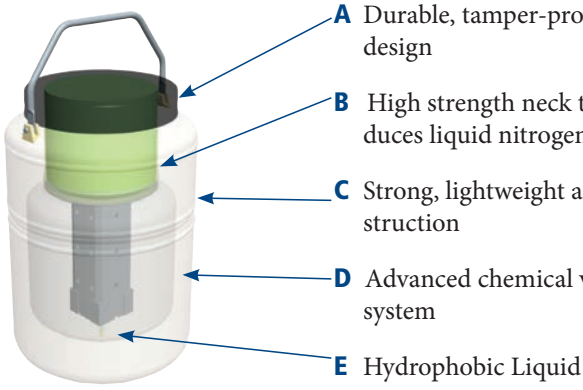
Features include

- MVE Protective Shipping Containers are recommended
- Protective shipping containers ensure upright shipping
- Low liquid nitrogen consumption
- Convenient lightweight package
- CHARGES IN TWO HOURS*

Featuring Advanced QWick™ Charge Technology

The MVE Vapor Shipper Series is designed for the safe transportation of biological samples at cryogenic (-150°C or colder) temperatures. MVE Vapor Shipper Series utilizes the Advanced QWick Charge Technology that will charge the vapor shipper in two hours. *New/warm tanks still need to be filled with LN_2 and allowed to sit for 24 hours to achieve maximum hold time. When a tank is already cold, the Advanced QWick Charge technology will apply, providing the benefit of same-day vapor shipping. Manufactured from durable, lightweight aluminum, the vapor shippers employ a hydrophobic compound which absorbs the liquid nitrogen to ensure dry, spill-free vapor-phase shipping.

MVE Protective Shipping Containers are recommended for usage. These containers may be used to ship your samples with a "non-hazardous" classification throughout the world, thus reducing costs and helping to assure sample viability.



Tank Features

A Durable, tamper-proof lid design

B High strength neck tube reduces liquid nitrogen loss

C Strong, lightweight aluminum construction

D Advanced chemical vacuum retention system

E Hydrophobic Liquid Nitrogen absorbent system

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	SC 2/1V	SC 4/2V	SC 4/3V	SC 20/12V	XC 20/3V**	XC 30/12V	Mini-Moover	Cryo-Moover	Cryo-Shipper	CryoShipper XC	IATA
Maximum Storage Capacity											
No. of Canisters	1	1	1	6	4 + 1 Canister		1	7	1 Rack	-	Stainless Steel Secondary Container
No. of 1/2 cc Straws 10/cane	-	280	120	540	2500/2000**		60	3080		-	
No. of 1/2 cc Straws 1 Level Bulk	88	44	210	780	3750/3000**	1 (6)	88	4354		-	
No. of 1/4 cc Straws 1 Level Bulk	182	938	452	1630	7410/6000	Tier Rack	185	-		-	
No. of 1.2 & 2.0 ml Vials 5/cane	-	95	40	150	675/560**		20	945		-	Dimensions:
No. of 1.2 & 2.0 ml Vials 6/cane	-	102	48	180	840/672**		24	1134	500	966 (Bulk)	7-3/8" diameter
No. of blood bags stored 4R9953	-	-	-	-	-		-	-	10	10	8-3/4" deep
Performance (Hold Time overrides NER specifications)											
LN_2 Capacity L est.	1.5	3.6	4.3	20.5	6.2	32.0	2.9	4.2	8.5	10.0	10.0
Static Holding Time Days	8	13	21	60	16	82	14	12	10	14	14
Static Evaporation Rate* L/day	0.19	0.26	0.20	0.09	0.35	0.22	0.20	0.35	0.85	0.70	0.70
Unit Dimensions											
Neck Opening in (mm)	1.40 (35.0)	2.75 (70.0)	2.00 (51.0)	2.18 (55.0)	3.81 (96.7)	2.50 (64)	1.40 (35.0)	3.80 (97.0)	8.50 (216.0)	8.50 (216.0)	8.50 (216.0)
Overall Height in (mm)	13.5 (343)	18.4 (468)	19.4 (492)	25.7 (652)	22.0 (559)	24.3 (617)	19.5 (495)	22.0 (558)	21.5 (546)	23.0 (584)	23.0 (584)
Outside Diameter in (mm)	7.25 (184)	8.70 (222)	8.70 (222)	14.50 (368)	14.50 (368)	17.0 (432)	7.25 (184)	18.30 (464)	14.50 (369)	15.00 (381)	15.00 (381)
Canister Height in (mm)	5.0 (127)	11.0 (279)	11.0 (279)	11.0 (279)	11.0 (279)	10.27 (260.85)	11.0 (279)	11.0 (279)	11.0 (279)	12.5 (317.5)	8.75 (222.25)
Canister Diameter in (mm)	1.20 (31)	2.62 (67)	1.81 (46)	1.50 (38)	3.20 (80)	1.73 (43.9) x 1.64 (41.7)***	1.20 (31)	3.10 (79)	5.6 (142) x 6.6 (167)***	8.5 (216)	7.375 (187.325)
Weight Empty lb. (kg)	6.0 (2.7)	10.0 (4.5)	11.6 (5.3)	28.4 (12.8)	25.1 (11.3)	44 (20)	9.0 (4.1)	30.5 (13.8)	26.1 (11.8)	33.0 (15.0)	33.0 (15.0)
Weight Charged vapor lb. (kg)	8.0 (3.6)	17.1 (7.7)	19.1 (8.7)	44.5 (20.1)	36.0 (16.3)	76 (34)	13.7 (6.2)	40.9 (18.6)	39.0 (17.7)	49.0 (22.2)	49.0 (22.2)
Weight Full liquid lb. (kg)	9.0 (4.1)	20.0 (9.1)	21.0 (9.5)	64.7 (29.3)	60.2 (27.3)	82 (37.2)	15.5 (7.0)	87 (39.5)	54.5 (24.7)	73.0 (33.1)	73.0 (33.1)
Protective Shipping Container Part No.	20750408	20750409	20750409	11912460	11912460	21325842	20750408	11930861	20750520	10741726	10741726

* Without inventory

** Optional center absorbent added to center canister (increases static hold time from 16 days to 18 days).

*** CryoShipper has a rectangular assembly measuring 5.6" (142 mm) by 6.6" (167 mm) with a usable height of 11.0" (279 mm).

Hold time specs actual performance may vary with atmospheric conditions, sample temperature, and usage.

TWO Year Parts Warranty • THREE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.

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MVE CryoCube™ & BL-7

Above:
CryoCube insert

The MVE CryoCube and MVE BL-7 (Biologistic) are secure cryogenic shipping options for your biological samples. Both units incorporate creative engineering and simplistic design to allow shipping in any orientation without sacrificing temperature or hold time. Improved welded construction provides the MVE CryoCube and MVE BL-7 with consistent, high quality design with every unit. **The units allow for savings on dry ice, packaging, shipping cost, and disposal.**

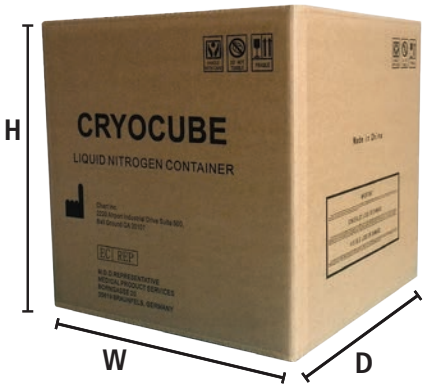
Features include

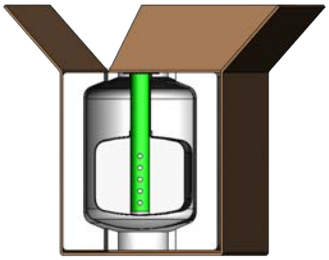
- Charges in 2 hours
- Operates as a dry shipper
- -150° C temperature
- 7-day (BL-7) or 5-day (CryoCube) holding time
- Safe shipping in any orientation
- Safe for international shipping
- Welded construction for added integrity

	MVE CryoCube	MVE BL-7
Maximum Storage Capacity		
Number of Blood Bags	NA	NA
Number of Canisters	1	1
Number of 1/2 cc Straws 10/cane	88	115
Number of 1/2 cc Straws 1 Level Bulk	182	270
Number of 1.2 & 2.0 ml vials 5/cane	6	15
Performance		
LN_2 Capacity w/o Inventory L est.	1.5	2.1
Static Evaporation Rate* L/day	--	--
Static Holding Time* days	5	7
Unit Dimensions		
Neck Opening in. (mm)	1.4 (35)	1.97 (50)
Overall Height in. (mm)	12.5 (317.5)	15.0 (381)
Overall Width in. (mm)	12 (305)	12.64 (321)
Overall Diameter in. (mm)	1.25 (32)	1.50 (38)
Weight Empty lb. (kg)	7.5 (3.41)	9.26 (4.2)
Weight Charged vapor lb. (kg)	10.2 (4.63)	13.01 (5.9)
Warranty	TWO Year Vacuum Warranty	TWO Year Vacuum Warranty

* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.





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SECURITY THROUGH MVE SYSTEMS

MVE CryoShipper CT-50 & CT-250

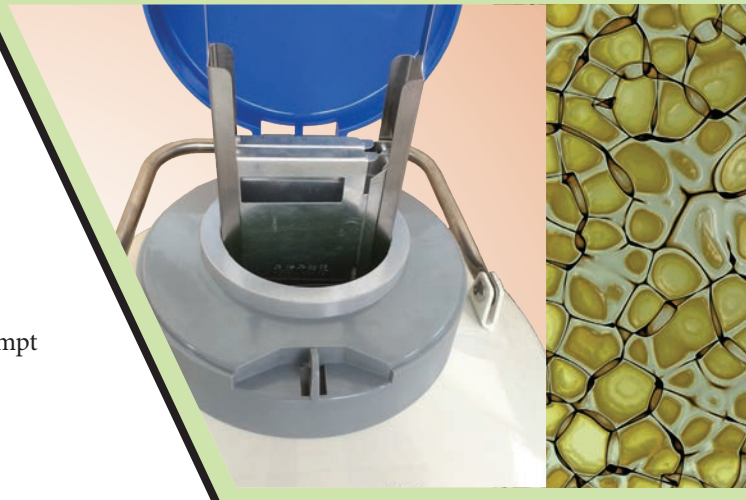
	CT-50**	CT-250**
Maximum Storage Capacity		
Number of Blood Bags	2 (25 mL)	2 (250 mL)
Performance		
LN_2 Capacity w/o Inventory L est.	5	8
Static Evaporation Rate* L/day	0.5	0.8
Static Holding Time* days	10	10
Unit Dimensions		
Neck Opening in. (mm)	3.82 (97)	6.5 (165)
Overall Height in. (mm)	15 (380)	19.8 (502)
Outer Diameter/Width in. (mm)	14.5 (368)	16.0 (406)
Weight Empty lb. (kg)	17.6 (8)	24.3 (11)
Weight Charged vapor lb. (kg)	26.45 (12)	38.6 (17.5)
Warranty	TWO Year Vacuum Warranty	TWO Year Vacuum Warranty

* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.
** CT = Cell Therapy
Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.

MVE's secure specialty shippers fill unique biological sample cryogenic shipping and storage needs. The MVE CryoShipper CT-50 and CT-250 are designed to ship specific blood bags sizes. Our unique rack designs hold one to two blood bags to help limit sample movement during transit. The new design can also store samples in liquid nitrogen after arrival at the destination.

Features include

- Safe for international shipping; IATA Dangerous Goods Regulations Exempt (Special Provision A152)
- CryoShipper CT-50 and CT-250 charge in 2 hours



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MVE CryoShipper 2000

The MVE CryoShipper 2000 is engineered specifically to ship large quantities of 1.2 and 2.0 mL vials. The new design can also store samples in liquid nitrogen after arrival at its destination.

Features include

- Large capacity vapor shipments
- Low liquid nitrogen consumption
- -150°C or colder
- Protective shipping container available
- Datalogger accessory is available
- Charges in under 2 hours
- Safe for international shipping; IATA Dangerous Goods Regulations Exempt (Special Provision A152)

	CryoShipper 2000
Maximum Storage Capacity	
Number of Square Racks	4
Number of Boxes per Rack	5
Number of 1.2 & 2.0 mL vials (100/box)	2000
Performance	
LN_2 Capacity w/o Inventory L est.	65.0
Static Evaporation Rate* L/day	0.79
Static Holding Time* days	15
Unit Dimensions	
Neck Opening in. (mm)	8.5 (216)
Overall Height in. (mm)	27.2 (692)
Outer Diameter in. (mm)	22.0 (559)
Weight Empty lb. (kg)	65 (29.5)
Weight Charged vapor lb. (kg)	95 (43.1)
Weight Full lb. (kg)	185 (83.9)
Protective Shipping Container Part No.	12875162

* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.

TWO Year Warranty • THREE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.

Data Logger

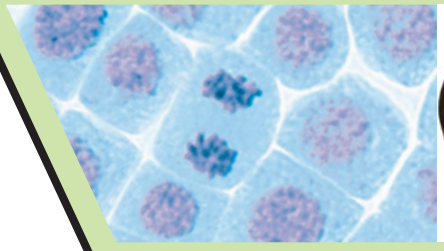
With the Data Logger, you require only one single device and no specific software or cables to monitor temperature during the global transfer of cryobiological goods. Chart also provides the option for the data logger to be preinstalled onto the lids of our MVE vapor shippers.
*Note that the Data Logger adds 0.16 L/day loss rate to any tank to which it is attached.

Features include

- Records and stores up to 75,500 data points
- High and Low Alarm Settings
- 15 month calibration certificate
- 3 year lifespan
- No additional software or cables needed!
- ISO 19005-1
- Conformity: CE, FCC, RoHS, Safe Transport of Chemical Goods, WEEE

	Data Logger
Specifications	
Dimensions L, W, H in (mm)	3.74 x 1.61 x 0.43 (95 x 41 x 11)
Weight lb (g)	0.1 (44)
Temperature Range	-200°C to +200°C
Accuracy	± 1.4°C [-200°C to -100°C]
Resolution	0.1°C
Display in (mm)	Multifunction LCD, 0.87 x 0.87 (22 x 22)
Case	ABS plastic
Battery	Non-replaceable
Battery Life	3 years
Sensor	Pt100 4-wire class A
Memory	75,500 data points
Interface	USB – PC Universal Serial Bus
Evaluation Report	Built-in PDF file generator automatically establishes an evaluation report with embedded data upon connection to a USB port. Complies with the ISO Standard 19005-1 Document Management for the long-term preservation of electronic documents (PDF/A) and FDA 21 CFR Part 11.

1 Year Warranty — No Returns



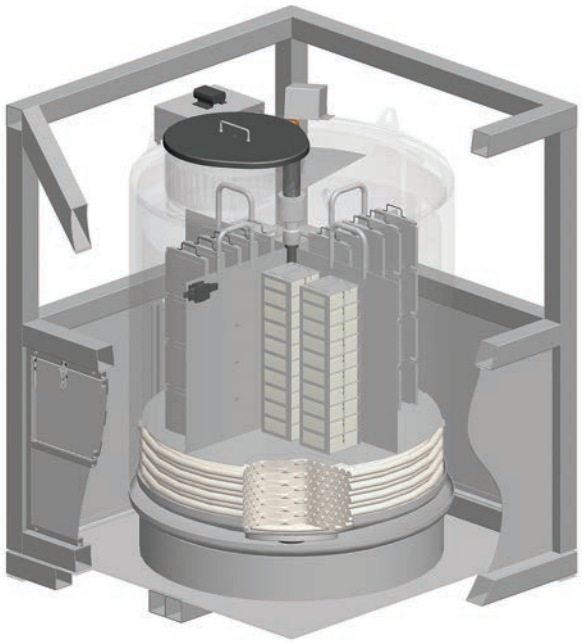
Visit www.chartbiomed.com for more information.

MVE 1536 Dry Shipper

The MVE 1536PD Dry Shipper is specifically designed to provide peace of mind when shipping and/or relocating samples.

Features include

- Liquid Nitrogen absorbent can be charged for dry shipment
- Hold time up to 20 days when properly charged
- Rigid steel frame can be moved with pallet jack/forklift
- Sized to fit in a wide-body aircraft
- Inventory tray locks to prevent rotation during transit
- Locking lid
- Includes data logger to monitor and record sample temperature during shipment or relocation
- Inner vessel must be decontaminated after use.



	MVE 1536PD
Maximum Storage Capacity	
1.2 & 2 ml Vials (Internally Threaded)	36400
Quantity of Large Racks 100 cell boxes	24
Quantity of Mini Racks 25 cell boxes	16
Number of Shelves per Rack	13
Performance	
Absorbed LN_2 Capacity L est.	320
Unit Dimensions	
Neck Opening in. (mm)	17.5 (444)
Usable Internal Height in. (mm)	30 (762)
Inner Diameter in. (mm)	38.5 (978)
Overall Height including Frame** in. (mm)	64 (1625)
Liftover Height in. (mm)	42.1 (1070)
Step Height in. (mm)	20.5 (521)
Depth of Fold Down Step in. (mm)	10.8 (274)
Footprint in. (mm)	52x52 (1321x1321)
Weight Empty* lb. (kg)	1600 (726)
Weight Liquid Full* lb. (kg) est.	2044 (927)

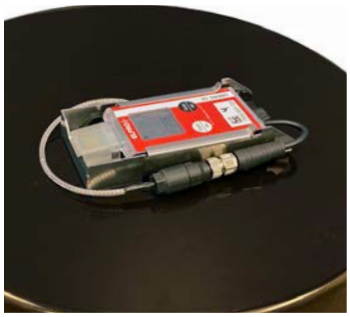
TWO Year Parts Warranty • THREE Year Vacuum Warranty

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

* Without inventory | **Contact Tech Service for detailed drawings.

Tank Features

Locking Cabinet

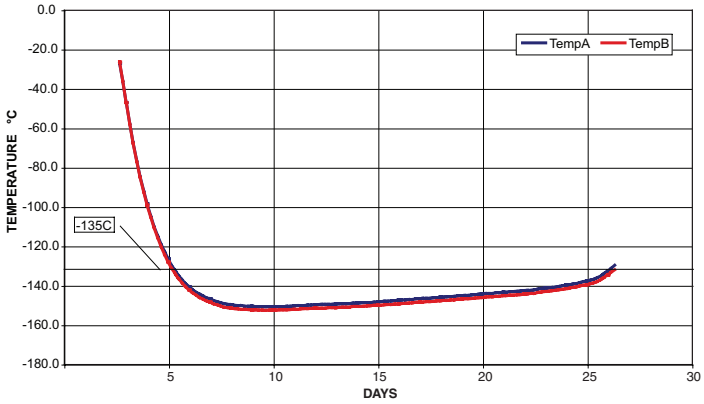


Data Logger

Top View

Tray

TEMPERATURE TEST*

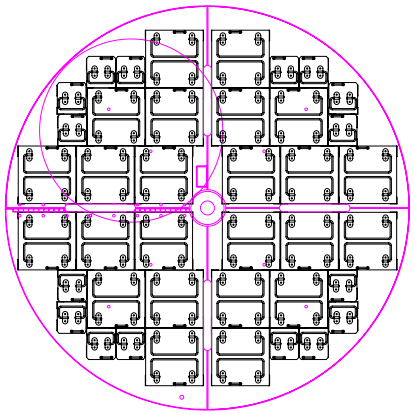


Temperature Test Graph

* Temp Test indicates typical performance of MVE 1536PD freezer with full inventory system and factory recommended level settings. Actual performance may vary with atmospheric conditions and usage.

Rack Layout

Square Rack Layout



Visit www.chartbiomed.com for more information.

Chart's Cryogenic Solutions

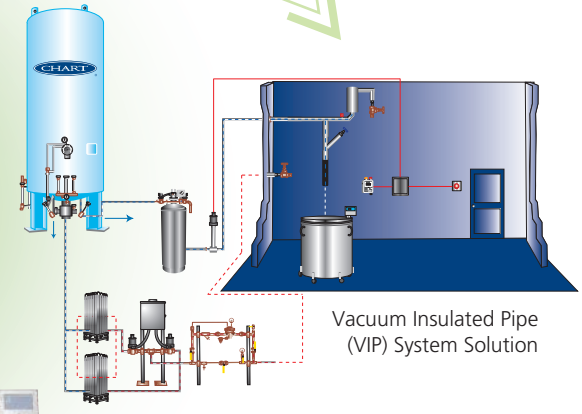
Air Separation

Distribution & Storage

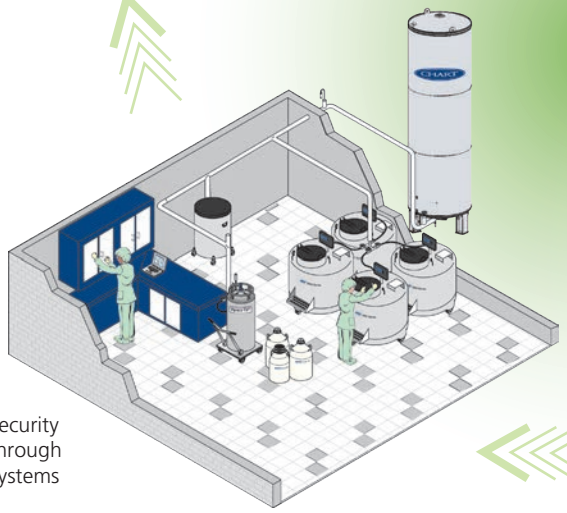
Bulk Storage Tanks

Liquid Cylinders

Dewars



Vacuum Insulated Pipe (VIP) System Solution



Security Through Systems

Freezers

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