

## FrostLess

**MDF-DU500ZHA-PA ENERGY STAR® Certified -86°C Upright Ultra Low Temperature Freezer with Frost Mitigation Technology**



General Specifications		
Volume	cu.ft.   liters	18.5   525
Temperature Control Range	°C	-40 to -86
External Dimensions (W x D x H)	inches   mm	31.1 x 34.7 x 78.5   790 x 882 x 1993
Internal Dimensions (W x D x H)	inches   mm	24.8 x 23.9 x 55.1   630 x 607 x 1400
Footprint	ft²   m²	7.49   0.70
Stainless Steel Shelf (adjustable)	qty	(2 adjustable, 1 dedicated center)
Power Supply		115V, 60Hz, NEMA 5-15P, 8 ft cord length
Factory Certification		ISO9001, ISO13485, ISO14001
NRTL Testing Lab Mark		QPS Listed
Net Weight	lbs   kg	547   248
Noise Level <sup>1)</sup>	dB(A)	52

Storage Specifications		
Racks per Freezer	qty	16 (mix: 6 high x 5 high)
Racks per Shelf	qty	4
2" Boxes per Freezer	qty	352
3" Boxes per Freezer	qty	224

<sup>1)</sup> Actual value, background noise 20 dB(A).

Multiple options are available for racking including side opening and front loading trays. The information provided is for the most common racks. We also offer double height racks and other configurations, as well as customized racking for cryoboxes and other containers. Please speak to your local representative for more information.

Refrigeration	
Refrigeration System	Synchronized variable differential cascade system
Compressors	(2) 920 watt – Variable speed compressors (completely enclosed reciprocating type)
Condenser	<b>High-Stage:</b> fin and tube type <b>Low-Stage:</b> flate plate (brazed plate)
Evaporator	<b>High-Stage:</b> patented reverse flow heat exchanger <b>Low-Stage:</b> tube on sheet type (cold wall)
Refrigerant	<b>High-Stage:</b> R-290 natural refrigerant 135 grams   4.76 oz <b>Low-Stage:</b> R-170 natural refrigerant 80 grams   2.82 oz

Cabinet Construction	
Insulation	Rigid polyurethane foamed-in-place + VIP Plus® vacuum insulated panels: 3.1" (80 mm) thick
Exterior Material	Painted electrogalvanized steel
Interior Material	Powder coated electrogalvanized steel
Outer Door	Painted electrogalvanized steel exterior, Rigid polyurethane foamed-in-place with EZlatch, key lock, will accommodate padlock
Vacuum Relief	One on side of chamber (manual)
Inner Doors	2 (VIP Plus® vacuum insulated panels, ABS, stainless steel frames, positive latches)



Model MDF-DU500ZHA-PA showing VIP Plus® vacuum insulated inner doors and EZlatch access.

# FrostLess -86°C Upright Ultra-Low Temperature Freezer

## ENERGY STAR – Certification Number 4791176682

MDF-DU500ZHA-PA

Performance Characteristics	
24°C Ambient, empty chamber, measured at center of chamber	
Energy Consumption <sup>1)</sup>	
<b>Daily Consumption (6× door openings) <sup>2)</sup></b>	
Setpoint -70°C   Setpoint -80°C	5.44 kWh/day   6.84 kWh/day
<b>Steady State (no door openings)</b>	
Setpoint -70°C   Setpoint -80°C	5.21 kWh/day   6.57 kWh/day
<b>MDEC (max. daily energy consumption)</b>	6.2 kWh/day/18.5 cu.ft. = 0.33 kWh/day/cu.ft.
Performance	
<b>Interior Uniformity</b>	
Setpoint -70°C   Setpoint -80°C	±3°C   ±3°C
<b>Average Steady State Temperature <sup>4)</sup></b>	
Setpoint -70°C   Setpoint -80°C	-69.68°C   -79.4°C
<b>Temperature Recovery <sup>2) 5)</sup></b>	
Setpoint -70°C   Setpoint -80°C	10 minutes   10 minutes
<b>Refrigeration System Heat Rejection <sup>6)</sup></b>	
Setpoint -70°C   Setpoint -80°C	862 BTU/Hr   1118 BTU/Hr
<b>Pull-Down Time from 23°C Ambient</b>	
Setpoint -70°C   Setpoint -80°C	4.5 hours   5.2 hours

<sup>1)</sup> Energy consumption per day, EPA Test, Version 1.1, Section 7, Reporting, G2c.

<sup>2)</sup> Based on inner door opening time of 15 seconds per ENERGY STAR testing protocol with all mapped temperature points to within ±5°C of setpoint.

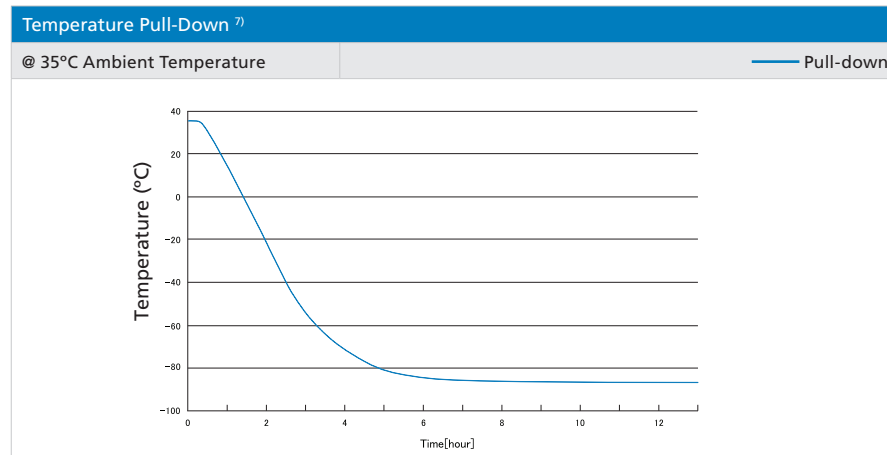
<sup>3)</sup> Calculation of ENERGY STAR based on performance of setpoints -70°C or -80°C.

<sup>4)</sup> Overall average for all recorded interior temperature measurements at setpoints of -70°C or -80°C.

<sup>5)</sup> Temperature recovery to ±5°C of setpoint.

<sup>6)</sup> Based on standard calculations.

Based on independent, third-party testing at time of publication. ENERGY STAR test results for submitted products can be compared for performance across the competitive market. Results are published on the ENERGY STAR website at [www.energystar.gov](http://www.energystar.gov). See Certification Number 4791176682. Detailed test results are available, including additional tests at ambient temperature of 20°C and 30°C.



<sup>1)</sup> The data reflects performance metrics rather than official product specifications. Results from technical data sheet tests should not be used to establish regulatory parameters for specific customer applications.

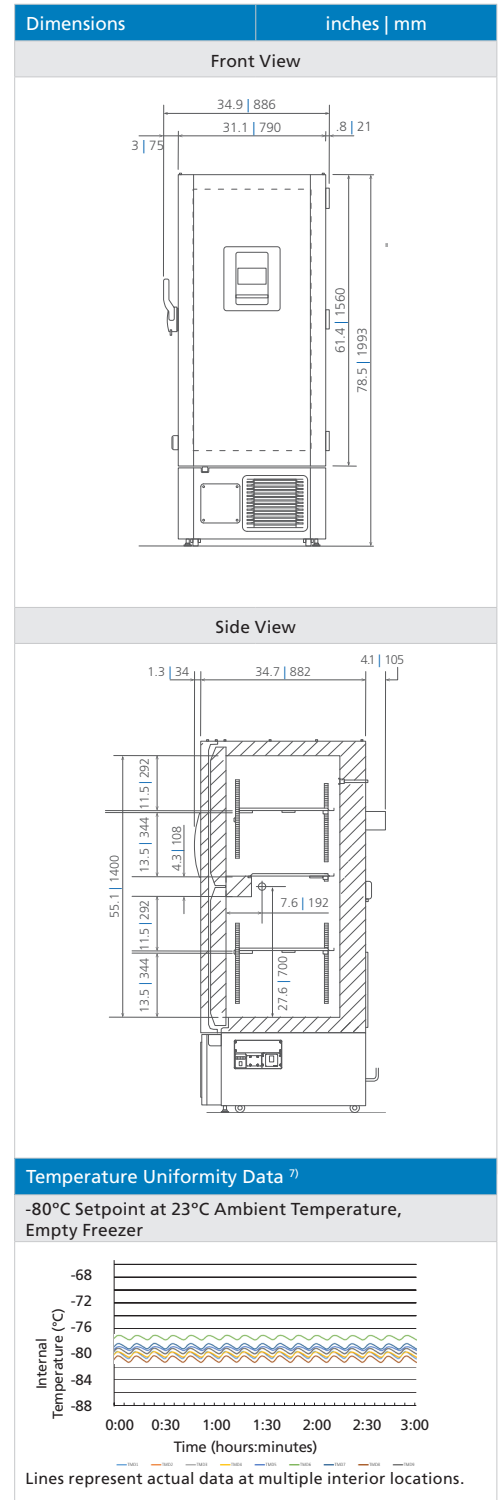
<sup>2)</sup> The performance of the freezer will depend on factors such as the volume of customer products, storage configuration, selected options, operating conditions, test methods, and adherence to recommended maintenance practices.

<sup>3)</sup> Ongoing product improvements may lead to changes or omissions in this technical data sheet without prior notice. PHC Corporation of North America disclaims responsibility for any damage, injury, loss, or expenses arising from the misuse of the information provided.



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<sup>7)</sup> Data points available upon request.

**Specifications are subject to change without notice.**  
For latest specification information contact PHC Corporation of North America at [info@us.phchd.com](mailto:info@us.phchd.com).

