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Forma® 8500 Series -86C ULT Freezers



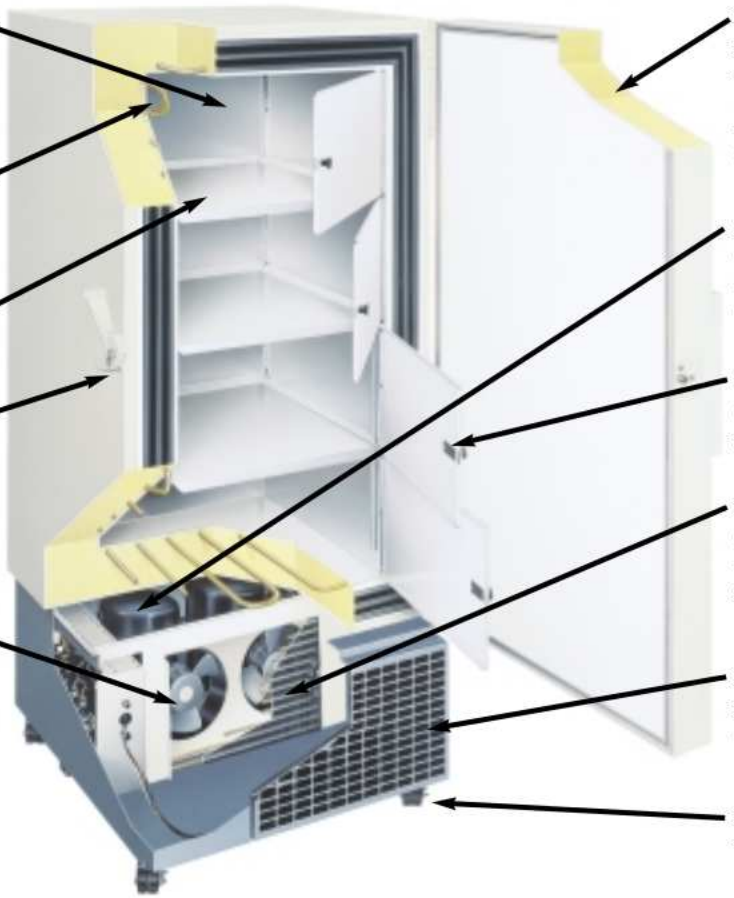
ThermoQuest

IN THE COMPANY OF SCIENTISTS™

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CONSTRUCTION FEATURES

Since 1950, the Forma name has been synonymous with high quality, reliable laboratory equipment. ThermoQuest continues that tradition by offering the Forma® 8500 Series -86C ULT Freezers—a premium line of quality ultra-low temperature freezers. We combined our design and engineering expertise with the latest, energy efficient refrigerants, world-class compressors tailored to meet our rigorous refrigeration requirements, and unique features, such as the Forma Enviro-Scan™ Microprocessor Monitoring System. Forma 8500 Series ULT Freezers are manufactured to meet a wide variety of pharmaceutical and biological product storage applications. The units are constructed and stress tested to operate efficiently at a temperature range of -50C to -86C (-58F to -123F) in a 32C (89.6F) ambient environment. Upright freezers are available in 13.0, 17.3, and 23.0 cu. ft. (368.1, 489.9, and 651.3 liters) capacities. Chest freezers are available in 12.7 and 20.0 cu. ft. (359.6 and 566.3 liters) capacities.



- Automatic voltage compensator responds to high and low voltage situations for safe, dependable operation.
- Battery back-up provides power to the Enviro-Scan™ Monitor in the event of a power failure.
- Available Double Door design (U.S. Patent #5,600,966 and #5,737,939) makes freezer sharing easier.
- Front-to-back, controlled airflow system results in cooler compressor temperatures and longer compressor life.
- Powder coat paint finish outlasts conventional zinc, chrome, and enamel finishes.
- Rotolock service valves allow easy servicing and refrigerant recovery.
- PEAK II Refrigeration System's "silent watch" automatically limits system temperatures to protect the compressors.
- High-performance cascade refrigeration system incorporates the latest, energy efficient refrigerants.

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RUGGED CABINET CONSTRUCTION



Stainless steel interior and adjustable shelf

- All Forma 8500 Series freezer cabinets are constructed of high quality, heavy gauge, cold-rolled steel.
- Powder coat paint finish provides a uniform exterior surface that resists chipping and rust. All cabinets meet ASTM Standard B117–85 for salt spray testing that exceeds 1,000 hours.
- Durable stainless steel interior simplifies cleaning.
- All upright models include three fully adjustable solid stainless steel shelves.
- Maximum product protection is provided by a minimum of 5.0" (12.7cm) of non-CFC, foamed-in-place polyurethane insulation with an R factor rating of 36.3 in the cabinet, 4.5" (11.4cm) in the upright door(s), and 2.0" (5.1cm) in the chest lid
- Upright model freezers feature four interior compartment doors with sliding latches that ensure door closure and reduce cold air loss. A five door option is available on all uprights.



5.0" thick exterior walls



Chest freezer with sub-lids and optional inventory system

- Chest models feature a flexible gasket that tightly seals the counterbalanced lid against the cabinet. Assisted by an intrinsic cam-actuated door latch, upright doors seal against a triple-point silicone gasket.
- Vacuum relief port is built into all upright freezers to allow easy re-entry after door closings.
- All chest style freezers have sub-lids that are manufactured of extruded, non-CFC polystyrene, a material that resists cracking and chipping.
- Easy-to-grasp door and lid handles allow convenient access to the freezer chamber. Upright versions are hinged on the right and are assisted by an intrinsic cam-actuated, single draw door latch.
- Key locks to secure the freezer door or lid are standard on all models.
- Dual wheel, locking, swivel casters provide easy mobility.

UNIQUE DOUBLE DOOR DESIGN

- Patented Double Door design (U.S. Patent #5,600,966 and #5,737,939) on specific models allows frequently used specimens to be stored in the top chamber while long-term storage items remain undisturbed in the bottom.
- Because cold air "falls," this unique double door design helps stabilize the bottom chamber temperature and ensure product protection even during repeated upper door openings, and makes sharing the freezer more feasible.
- Each door has a single draw door latch with a standard key lock to ensure door closure and product security. Optional, unique key locks (Stock #195915) are available.



Double door freezer with optional inventory system and recorder

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FORMA ENVIRO-SCAN™ MICROPROCESSOR MONITORING SYSTEM*

Standard on all 8500 Series ULT Freezers, the Forma Enviro-Scan incorporates a sensi-touch keypad, a digital display, and audible and visual indicators to keep you informed of all freezer functions. The visual indicators include:

POWER – Green light is illuminated when power is connected to the freezer and the power switch is in the ON position.

POWER FAILURE – Red light is illuminated when electrical power to the freezer is interrupted. Light goes out when the power is restored.

OVER TEMP – Red light flashes when freezer temperature deviates above the high alarm setpoint. Pulsing audible alarm will sound.

UNDER TEMP – Red light flashes when freezer temperature deviates below the low alarm setpoint. Pulsing audible alarm will sound.

STANDBY – Red light is illuminated in this mode. Temporarily disables audible alarm.

LOW BATTERY – With normal power on, red light is illuminated to alert you that the battery charge is below 50%. When operating on battery power, the red light is illuminated to alert you that the charge is below 15%.

DOOR AJAR – Red light flashes when door/lid is open. If the door/lid is not closed within 30 seconds, a pulsing audible alarm will sound.

"CONDENSER HOT" – Illuminates to warn you that the condenser temperature has reached an unacceptable level. An intermittent audible alarm will sound until the condition is corrected.



Enviro-Scan Microprocessor

ENVIRO-SCAN FEATURES

- Module digitally displays the actual chamber temperature and control setpoint, readable to the nearest degree C. High and low alarm points can be programmed quickly and easily. With your personal four-digit code, only you can access the Enviro-Scan module.
- Control center indicates a power failure. Battery back-up supplies power to the monitor during a power failure (minimum 72 hour capacity based on a full charge).
- Audible and visual over and undertemperature alarms double the protection of stored products by warning you if the cabinet temperature extends beyond the setpoint limits. The liquid crystal display (LCD) indicates the high limit or low limit.
- Alarm can be silenced temporarily or placed in standby mode with the touchpad. The system rings back as a reminder to reset the standby mode when the cabinet temperature returns to normal.
- Exclusive alarm test system saves valuable time when checking alarm system readiness. Cabinet warm-up and cool-down can be simulated safely using the monitor's touchpad keys. The entire alarm circuit is tested. Both tests take only seconds and can be performed without opening the freezer. You can quickly and conveniently verify the high limit/low limit setpoint, assuring that the alarm system is ready if needed.
- Audible and visual door/lid ajar alarm is present. Light flashes when the door or lid is open. Alarm sounds after 30 seconds.
- Enviro-Scan monitors and displays the power line voltage. Audible and visual alarms alert you of a power failure.
- Remaining battery power capacity is reported. Low battery capacity alarm is provided.
- RS-232 port permits computer interface and monitoring of temperature and alarms. Remote alarm contacts and millivolt output signal are standard features.
- Refrigeration system is monitored for a clogged filter or high ambient conditions. An audible alarm alerts you for 12 seconds every 15 minutes until the condition is corrected.
- Remote contacts are located on the rear of the freezer base for easy connection to an in-house security system or one of our optional monitor/alarm systems. A separate cable is required (Stock #195482).

**Year 2000 Compliant*

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BATTERY BACK-UP SYSTEM

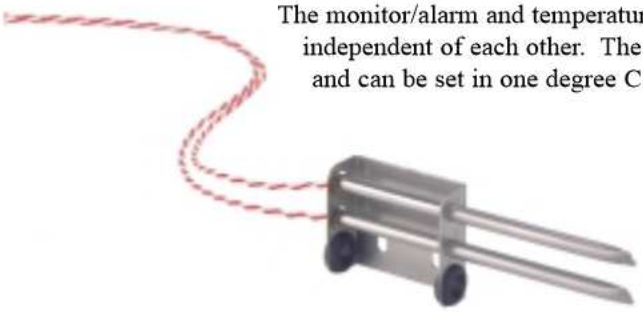


Battery back-up system

Every Forma 8500 Series ULT Freezer includes a battery back-up system that provides power to the Enviro-Scan Monitor in the event of a power failure. The charging system was designed to always have the battery back-up at a full charge, without requiring special programming.

- Exclusive battery back-up system provides power to the Enviro-Scan Monitor so that it can continuously monitor the freezer's contents, even during power outages.
- Enviro-Scan Monitor will operate on battery back-up for a minimum of 72 hours (based on a full charge).
- Heavy-duty back-up battery requires no maintenance and has a three year storage life.

INDEPENDENT TEMPERATURE CONTROL SYSTEM



Temperature probe

The monitor/alarm and temperature control systems on Forma 8500 Series ULT Freezers are totally independent of each other. The solid-state controller maintains a constant freezer temperature and can be set in one degree C increments.

- Probes for the Enviro-Scan and the temperature controller are located inside the freezer chamber to show the actual temperature where the product is stored. Probes are positioned in the lower left front corner of the chamber on upright freezers. Chest freezer temperature probes are located in the upper left front corner.
- Temperature is digitally displayed on an easy-to-read LCD.
- Tamper-resistant controller prohibits setpoint alteration, and limiting devices have been incorporated to prevent setpoints below the freezer's operating range.
- Should the temperature control probe fail (open), the refrigeration system locks on to ensure product protection.

AUTOMATIC VOLTAGE COMPENSATOR

- An Automatic Voltage Compensator is built into every Forma 8500 Series ULT Freezer to detect and respond to (i.e., buck or boost) high and low voltage fluctuations.
- Incoming voltage is monitored and adjusted on demand by the Automatic Voltage Compensator, ensuring compressor operation is within the design parameters.
- Green indicator light mounted on the front of the freezer indicates when incoming voltage is being corrected, providing peace-of-mind performance.



Voltage compensation light

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FORMA PEAK II REFRIGERATION SYSTEM

To achieve peak freezer performance and maximum reliability over a wider ambient temperature range, we designed the Forma PEAK II Refrigeration System. This system combines our engineering expertise; the latest energy efficient, non-CFC refrigerants; and a leading worldwide manufacturer's compressors. The compressors are designed uniquely for the **high and low stages** of our cascade refrigeration system. Look to our PEAK II Refrigeration System for:

Performance

Environmentally safe refrigerants

Assurance of quality and reliability

Kilowatt consumption minimized

- The Forma PEAK II Refrigeration System's "silent watch" automatically controls the system's internal pressure and temperature to assure peak performance through more efficient, quieter operation.
- Forma 8500 Series -86C ULT Freezers contain compressors designed specifically to meet our quality requirements and provide better product protection, better temperature recovery times, and increased heat removal per kilowatt of energy used.
- Designed and tailored for the high and the low stages of our cascade refrigeration system, two hermetic compressors provide maximum heat removal while requiring minimum current draw, thereby reducing operating costs.
- The latest refrigerant technology allows a more balanced, energy efficient refrigerant flow, which ensures that the compressors operate within designed compression ratios at a wider ambient temperature range.



Compressor label

FRONT-TO-BACK AIR CIRCULATION SYSTEM

- Front-to-back air circulation system results in cooler compressor temperatures, increased performance and reliability, and longer compressor life.
- To increase cooling, ambient air enters the front of the grille; passes through the filter, condenser, and compressor housing; and exits out the rear of the unit.
- Controlled airflow and a carefully designed cabinet with no side or bottom openings prevent warm air from recirculating through the compressor housing.

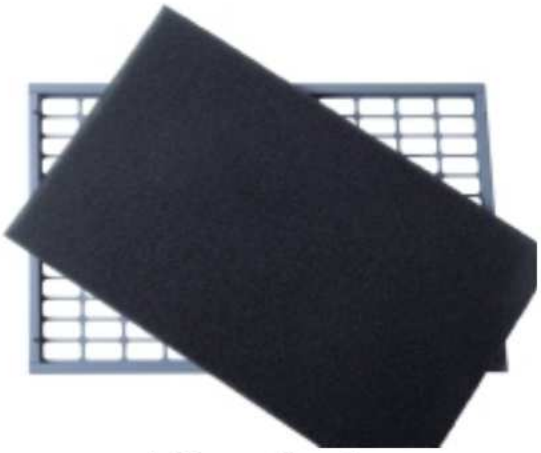


Front-to-back airflow system

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REMOVABLE, CLEANABLE AIR FILTER

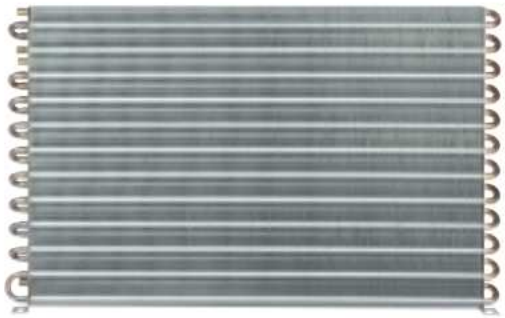
- Unique filtering system safeguards against dust and dirt being drawn into the condenser.
- Highly durable polyester foam filter is 0.5" (1.3cm) thick and has a surface area measuring two square feet.
- Front location allows quick visual inspection of the filter's condition.
- Filter is designed to be washable and reusable and can be removed without tools for easy cleaning or replacement. Air Filter Replacement Kits consisting of five new filters are available (Stock #195517 for uprights, Stock #195520 for chests).



Washable, reusable air filter

EXTRA LARGE CONDENSER

- Enlarged condenser complements the front-to-back airflow design by providing increased heat removal. Water-cooled condenser option is available.
- Condenser measures 12.0" x 18.0" (30.5cm x 45.7cm) and is constructed of aluminum fins and copper tubing.
- Increased condenser depth allows the freezer to perform better in a wider ambient temperature range.



Extra large condenser

CONDENSER FANS

For **increased heat removal** and **maximum compressor protection**, the Forma 8500 Series ULT Freezers incorporate two fans in the compressor housing. When both compressors are running, both fans operate to pull ambient air through the extra large condenser and across the compressors. Air is drawn into the compressor housing with a minimum of 455 CFM to maximize cooling. The condenser fans cycle on and off with the compressors.

- "Feathered" impeller blade edges reduce the operating noise level.
- Each 10.0" (25.4cm) diameter fan is surrounded by a durable, aluminum die cast venturi housing.



Condenser fans for compressor protection

REFRIGERANTS, INSULATION, AND PACKAGING

The Forma name has represented high quality, reliable laboratory equipment for a wide variety of applications since 1950. As the leader in life science equipment manufacturing and a global, environmentally conscious company, **we ceased using ozone depleting CFCs (Chlorofluorocarbons) and HCFCs (Hydrochlorofluorocarbons) in 1994**. Refrigerants used in all Forma Ultra-Low Temperature Freezers are non-CFC, non-HCFC, non-flammable, and commercially available. We also use non-CFC polyurethane insulation to provide product protection, and our product packaging consists of non-CFC materials.

non CFC REFRIGERANTS

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SINGLE DOOR ULTRA-LOW TEMPERATURE FREEZER SPECIFICATIONS



13.0, 23.0, and 17.3 cu. ft. (368.1, 651.3, and 489.9 liters) capacity upright freezers shown with optional recorders

MODEL	8526 (8525)	8516 (8517)	8523
Temperature Range	-50C to -86C (-58F to -123F)		
Exterior Dimensions	33.3"W x 78.9"H x 31.0"F-B (84.6cm x 200.4cm x 78.7cm)	33.3"W x 78.9"H x 37.0"F-B (84.6cm x 200.4cm x 94.0cm)	40.8"W x 78.9"H x 37.0"F-B (103.6cm x 200.4cm x 94.0cm)
Clearance Requirements	Add 3.0" (7.6cm) to W for latch/hinge; add 7.1" (18.0cm) to F-B for control panel/wall spacer 23.0 cu. ft. freezer will pass through a 34.0" (86.4cm) wide doorway with door open and base front panel removed		
Interior Dimensions	23.0"W x 51.5"H x 19.3"F-B (58.4cm x 130.8cm x 49.0cm)	23.0"W x 51.5"H x 25.3"F-B (58.4cm x 130.8cm x 64.3cm)	30.6"W x 51.5"H x 25.3"F-B (77.7cm x 130.8cm x 64.3cm)
Capacity	13.0 cu. ft. (368.1 liters)	17.3 cu. ft. (489.9 liters)	23.0 cu. ft. (651.3 liters)
Certification	UL - Standard No. UL 471 and UL 3101-1 CSA - Standard C22.2 No. 120 and C22.2 No. 1010.1 CE - Low voltage and EMC Directives		
Refrigeration HP	Two 1 HP (2545 BTUH each)		
Insulation	Non-CFC, foamed-in-place polyurethane: 5.0" (12.7cm) cabinet; 4.5" (11.4cm) door		
Kilowatts per 24 Hours*	**8526:** 19 **8525:** 16	**8516:** 21 **8517:** 17	**8523:** 18
Electrical	**8526:** 120V, 60 Hz, 16.0 FLA (Operating range 108-130V) **8525:** 230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)	**8516:** 120V, 60 Hz, 16.0 FLA (Operating range 108-130V) **8517:** 230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)	**8523:** 230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)
Breaker Requirements	**8526:** 20 Amp **8525:** 15 Amp Dedicated Circuit, Time Delay Breaker	**8516:** 20 Amp **8517:** 15 Amp Dedicated Circuit, Time Delay Breaker	**8523:** 15 Amp Dedicated Circuit, Time Delay Breaker
Automatic Voltage Compensator	**LOW:** Cut In: 110V Cut Out: 115V Volts Boost: 10 Cut In: 210V Cut Out: 220V Volts Boost: 18 **HIGH:** Cut In: 125V Cut Out: 120V Volts Buck: 10 Cut In: 235V Cut Out: 225V Volts Buck: 18		
Shipping Weight			
Ocean:	945 lbs. (428.6 kg)	1,025 lbs. (464.9 kg)	1,140 lbs. (517.1 kg)
Air/Container:	705 lbs. (319.8 kg)	785 lbs. (356.1 kg)	880 lbs. (399.2 kg)
Motor:	705 lbs. (319.8 kg)	785 lbs. (356.1 kg)	880 lbs. (399.2 kg)

Continuing research and improvements may result in specification changes at any time.
Water-cooled condenser option is not UL Listed.
**At -80C (-112F), 23C (73.4F) ambient, 50 percent product load*

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DOUBLE DOOR ULTRA-LOW TEMPERATURE FREEZER SPECIFICATIONS



13.0 and 17.3 cu. ft. (368.1 and 489.9 liters) capacity upright double door freezers shown with optional recorders and inventory system

MODEL	8586 (8585)	8581 (8582)	8584
Temperature Range	-50C to -86C (-58F to -123F)		
Exterior Dimensions	33.3"W x 78.9"H x 31.0"F-B (84.6cm x 200.4cm x 78.7cm)	33.3"W x 78.9"H x 37.0"F-B (84.6cm x 200.4cm x 94.0cm)	40.8"W x 78.9"H x 37.0"F-B (103.6cm x 200.4cm x 94.0cm)
Clearance Requirements	Add 3.0" (7.6cm) to W for latch/hinge; add 7.1" (18.0cm) to F-B for control panel/wall spacer 23.0 cu. ft. freezer will pass through a 34.0" (86.4cm) wide doorway with door open and base front panel removed		
Interior Dimensions	23.0"W x 51.5"H x 19.3"F-B (58.4cm x 130.8cm x 49.0cm)	23.0"W x 51.5"H x 25.3"F-B (58.4cm x 130.8cm x 64.3cm)	30.6"W x 51.5"H x 25.3"F-B (77.7cm x 130.8cm x 64.3cm)
Capacity	13.0 cu. ft. (368.1 liters)	17.3 cu. ft. (489.9 liters)	23.0 cu. ft. (651.3 liters)
Certification	UL - Standard No. UL 471 and UL 3101-1 CSA - Standard C22.2 No. 120 and C22.2 No. 1010.1 CE - Low voltage and EMC Directives		
Refrigeration HP	Two 1 HP (2545 BTUH each)		
Insulation	Non-CFC, foamed-in-place polyurethane: 5.0" (12.7cm) cabinet; 4.5" (11.4cm) door		
Kilowatts per 24 Hours*	**8586:** 19 **8585:** 16	**8581:** 21 **8582:** 17	**8584:** 18
Electrical	**8586:** 120V, 60 Hz, 16.0 FLA (Operating range 108-130V) **8585:** 230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)	**8581:** 120V, 60 Hz, 16.0 FLA (Operating range 108-130V) **8582:** 230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)	**8584:** 230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)
Breaker Requirements	**8586:** 20 Amp **8585:** 15 Amp Dedicated Circuit, Time Delay Breaker	**8581:** 20 Amp **8582:** 15 Amp Dedicated Circuit, Time Delay Breaker	**8584:** 15 Amp Dedicated Circuit, Time Delay Breaker
Automatic Voltage Compensator	**LOW:** Cut In: 210V Cut Out: 220V Volts Boost: 18 **HIGH:** Cut In: 235V Cut Out: 225V Volts Buck: 18		
Shipping Weight			
Ocean:	945 lbs. (428.6 kg)	1,025 lbs. (464.9 kg)	1,140 lbs. (517.1 kg)
Air/Container:	705 lbs. (319.8 kg)	785 lbs. (356.1 kg)	880 lbs. (399.2 kg)
Motor:	705 lbs. (319.8 kg)	785 lbs. (356.1 kg)	880 lbs. (399.2 kg)

Continuing research and improvements may result in specification changes at any time.
Water-cooled condenser option is not UL Listed.
**At -80C (-112F), 23C (73.4F) ambient, 50 percent product load*

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CHEST STYLE ULTRA-LOW TEMPERATURE FREEZER SPECIFICATIONS



20.0 and 12.7 cu. ft. (566.3 and 359.6 liters) capacity chest freezers shown with optional recorders

MODEL	8539 (8538)	8559 (8558)
Temperature Range	-50C to -86C (-58F to -123F)	
Exterior Dimensions	71.0"W x 40.5"H x 28.8"F-B (180.3cm x 102.9cm x 73.2cm)	95.0"W x 40.5"H x 28.8"F-B (241.3cm x 102.9cm x 73.2cm)
Clearance Requirements	Add 7.5" (19.1cm) to F-B for wall spacer/handle	
Interior Dimensions	42.5"W x 28.0"H x 18.5"F-B (108.0cm x 71.1cm x 47.0cm)	66.5"W x 28.0"H x 18.5"F-B (168.9cm x 71.1cm x 47.0cm)
Capacity	12.7 cu. ft. (359.6 liters)	20.0 cu. ft. (566.3 liters)
Certification	UL - Standard No. UL 471 and UL 3101-1 CSA - Standard C22.2 No. 120 and C22.2 No. 1010.1 CE - Low voltage and EMC Directives	
Refrigeration HP	Two 1 HP (2545 BTUH each)	
Insulation	Non-CFC, foamed-in-place polyurethane: 5.0" (12.7cm) cabinet; 2.0" (5.1cm) lid; 1.0" (2.5cm) polystyrene sub-lid	
Kilowatts per 24 Hours*	**8539:** 15 **8538:** 12	**8559:** 19 **8558:** 15
Electrical	**8539/8559:** 120V, 60 Hz, 16.0 FLA (Operating range 108-130V) **8538/8558:** 230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)	
Breaker Requirements	**8539/8559:** 20 Amp **8538/8558:** 15 Amp Dedicated Circuit, Time Delay Breaker	
Automatic Voltage Compensator	**LOW:** Cut In: 110V Cut Out: 115V Volts Boost: 10 Cut In: 210V Cut Out: 220V Volts Boost: 18 **HIGH:** Cut In: 125V Cut Out: 120V Volts Buck: 10 Cut In: 235V Cut Out: 225V Volts Buck: 18	
Shipping Weight **Ocean:** **Air/Container:** **Motor:**	 845 lbs. (383.3 kg) 765 lbs. (347.0 kg) 683 lbs. (309.8 kg)	 1,000 lbs. (453.6 kg) 938 lbs. (425.5 kg) 852 lbs. (386.5 kg)

Continuing research and improvements may result in specification changes at any time.
3.0 and 6.7 cu. ft. ULT chest freezers are available as part of the Forma 700 Series. Contact your sales representative for complete details.
Water-cooled condenser option is not UL Listed.
**At -80C (-112F), 23C (73.4F) ambient, 50 percent product load*

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ACCESSORIES AND OTHER FORMA ULT FREEZERS

A full line of accessories and inventory systems is also available to accommodate all Forma ULT freezers. In addition to offering the Forma 8500 Series Ultra-Low Temperature Freezers, we offer the Forma 700 Series, Forma 900 Series, and Forma Power Plus Series of non-CFC ultra-low temperature freezers.

WORLD LEADER IN QUALITY AND SAFETY

For your personal safety and product protection, we manufacture Forma ULT Freezers to conform to the intense guidelines of third party testing facilities. Our commitment to you is reinforced by our adherence to world quality standards, such as those required to obtain UL Listing, achieve CSA Certification, earn the CE Mark, and maintain our ISO 9001-1994 registration.

UL LISTING, CSA CERTIFICATION, AND THE CE MARK

UL Listing (Standard UL 471), CSA Certification (Standard C22.2 No. 120 and C22.2 No. 1010.1), and the CE Mark (EN 61010/IEC 1010) attest to the electrical and mechanical safety of our freezers. Unit construction and electrical characteristics comply with Underwriters Laboratories, CSA International, and International Electrotechnical Commission requirements. Forma ULT Freezers undergo stringent testing before they carry the UL, CSA, and CE markings. Application of the CE Mark also means that the equipment has been tested for compliance with international requirements related to emission of, and susceptibility to, RF energy and electrostatic discharge. Copies of UL, CSA, and CE documentation are available for compliance verification.

ISO 9001: A COMMITMENT TO EXCELLENCE

As an innovative, global leader, we continue our pursuit of excellence by maintaining ISO 9001-1994 registration. This advanced quality system reinforces our commitment to provide the highest quality products available. The ISO 9000 series is a set of international requirements for establishing and maintaining quality management systems. It is based on the widely recognized quality assurance standards of the British Standards Institute (BSi). Continued compliance is assured by ongoing internal audits and periodic audits by the assessing agency. We are proud to be ISO 9001 registered. Of the three ISO 9000 Standards, ISO 9001 is the most comprehensive and the most difficult to obtain.

5 YEAR COMPRESSOR PROTECTION

All Forma 8500 Series ULT Freezers feature a one year parts and labor warranty, with four additional years on the compressors, parts only. Providing this coverage further demonstrates our commitment to quality and customer satisfaction.

DIRECT SERVICE SYSTEM: UNMATCHED SERVICE FOUR WAYS

- To save you both time and expense, our toll-free ThermoQuest Technical Service Department (1-888-213-1790) provides access to qualified telephone technicians who can help you troubleshoot and make minor adjustments to your Forma equipment. In an ongoing effort to better serve you, our Technical Service Department and our Sales Support Department (1-800-848-3080) are available from 8:00 a.m. to 7:00 p.m. (EST).
- For added coverage, we offer an Extended Warranty to repair or replace component parts proven to be defective once the original warranty period has ended. For additional convenience, we also provide Preventive Maintenance Agreements. Contact our Technical Service Department for details.
- A staff of direct factory-trained service technicians is maintained in major metropolitan areas of the United States. In all other areas, service needs are provided by factory-trained service organizations.
- Outside the U.S., service and warranty work are available through our distributors who are authorized to work on Forma products. Contact your local distributor for details.

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ThermoQuest offers the following Forma® products:

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- Biological Safety Cabinets
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FORMA® 8529 ULT UPRIGHT FREEZER



Model 8529 shown with optional recorder

The Forma 8529 ULT Freezer—the first 28.0 cu. ft. (792.8 liters) -86C ULT freezer on the market—was designed and manufactured to fulfill your high capacity pharmaceutical and biological product storage requirements. This freezer holds a maximum capacity of 60,000 vials, based on a 2.0ml vial size and the use of our optional, unique maximum capacity inventory racks. The Forma 8529 has been stress tested to operate efficiently at a temperature range of -50C to -86C (-58F to -123F) in a 32C (89.6F) ambient environment.

CABINET CONSTRUCTION

Our non-CFC, foamed-in-place polyurethane insulation, cabinet design, and **PEAK II** Refrigeration System allow maximum storage capacity and product protection.

Powder coat paint finish resists chipping and rust.

Durable stainless steel interior simplifies cleaning; inner doors reduce cold air loss; and three solid stainless steel shelves are adjustable.

Vacuum relief port allows easy re-entry after door closings.

Heavy-duty, locking, swivel dual wheel casters provide easy mobility.

FEATURES

Monitor/alarm and temperature control systems are independent of each other. Probes for the Forma Enviro-Scan™ Microprocessor Monitoring System and the temperature controller are located inside the freezer chamber to show the actual temperature where the product is stored. Battery back-up provides power to the Enviro-Scan in the event of a power failure. An RS-232 port, remote alarm contacts, and millivolt output signal are standard features.

Front-to-back, controlled airflow system results in cooler compressor temperatures and longer compressor life.

Extra large air-cooled condenser complements the front-to-back airflow by providing increased heat removal. Water-cooled condenser option is available.

Automatic Voltage Compensator detects and responds to (i.e., bucks or boosts) high and low voltage conditions to ensure that the compressors operate within their design parameters.

Two 10.0" (25.4cm) diameter fans in the compressor housing increase heat removal and maximize compressor protection.



Optional inventory rack systems with sliding drawers and cardboard boxes

OPTIONAL MAXIMUM CAPACITY INVENTORY RACK SYSTEMS

The 8529 ULT Freezer holds 24 maximum capacity racks (5.6"W x 11.8"H x 26.3"F-B (14.2cm x 30.0cm x 66.8cm)) for a total inventory of 60,000 vials, based on a 2.0ml vial size and the use of No. 820010 polycarbonate boxes and No. 920090 racks.

NUMBER	DESCRIPTION
820090	Rack with Sliding Drawers, 25 2.0" (5.1cm) cardboard boxes, and 81-cell dividers
920090	Same as 820090 without boxes and dividers
820091	Rack with Sliding Drawers, 20 3.0" (7.6cm) cardboard boxes, and 81-cell dividers
920091	Same as 820091 without boxes and dividers
820010	100-Cell Polycarbonate Box (25 boxes are required to fill each rack)

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SPECIFICATIONS

MODEL	8529
Temperature Range	-50C to -86C (-58F to -123F)
Exterior Dimensions	46.8"W x 77.9"H x 37.0"F-B (118.9cm x 197.9cm x 94.0cm)
Clearance Requirements	Add 3.0" (7.6cm) to W for latch/hinge; add 7.1" (18.0cm) to F-B for control panel/wall spacer. 28.0 cu. ft. freezer will pass through a 34.0" (86.4cm) wide doorway with door open and base front panel removed.
Interior Dimensions	36.6"W x 51.5"H x 27.0"F-B (93.0cm x 130.8cm x 68.6cm)
Capacity	28.0 cu. ft. (792.8 liters)
Max. Inventory Capacity	24 maximum capacity racks, 600 boxes, 60,000 vials (2.0ml)
Certification	UL - Standard No. UL 471 and UL 3101-1 CSA - Standard C22.2 No. 120 and C22.2 No. 1010.1 CE - Low voltage and EMC Directives
Refrigeration HP	Two 1 HP (2545 BTUH each)
Insulation	Non-CFC, foamed-in-place polyurethane: 4.5" (11.4cm) in the door, and top and bottom of the cabinet; 4.3" (10.9cm) in the cabinet's rear wall; and 5.0" (12.7cm) in the cabinet's side walls
Kilowatts per 24 Hours*	208V, 60 Hz = 18 230V, 50 Hz = 19
Electrical	230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)
Breaker Requirements	15 Amp Dedicated Circuit, Time Delay Breaker
Automatic Voltage Compensator	**LOW:** Cut In: 200V Cut Out: 210V Volts Boost: 18 **HIGH:** Cut In: 225V Cut Out: 215V Volts Buck: 18
Shipping Weight **Ocean:** **Air/Container:** **Motor:**	 1,120 lbs. (508.0 kg) 880 lbs. (399.2 kg) 880 lbs. (399.2 kg)

Continuing research and improvements may result in specification changes at any time.
The 8529 with the water-cooled condenser option is CSA Certified and bears the CE Mark.
**At -80C (-112F), 23C (73.4F) ambient, 50 percent product load*

Forma Scientific, Inc.

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FORMA 8513 (8514) CHEST STYLE ULT FREEZER

This premium 17.0 cu. ft. (481.4 liters) ultra-low temperature (ULT) chest freezer was designed for your biological, pharmaceutical, clinical, and industrial product storage requirements. It can hold 29 standard chest racks (No. 820012) for a total capacity of 348 boxes, or 28,188 vials, based on a 2.0ml vial size. Special features include the unique Forma PEAK II Refrigeration System, Enviro-Scan™ Microprocessor Monitoring System, and an automatic voltage compensator. The Lifetime Cabinet Warranty on all Forma 8500 Series ULT Freezers includes the cabinet, evaporator, and door.

SPECIFICATIONS

MODEL	8513 (8514)
Temperature Range	-50C to -86C (-58F to -123F)
Exterior Dimensions	86.6"W x 40.5"H x 28.8"F-B (220.0cm x 102.9cm x 73.2cm)
Clearance Requirements	Add 7.5" (16.5cm) to F-B for wall spacer/handle
Interior Dimensions	58.5"W x 28.0"H x 18.5"F-B (148.6cm x 71.1cm x 47.0cm)
Capacity	17.0 cu. ft. (481.4 liters)
Certification	UL - Standard No. UL 471 and UL 3101-1 CSA - Standard C22.2 No. 120 and C22.2 No. 1010.1 CE - Low voltage and EMC Directives
Refrigeration HP	Two 1 HP (2545 BTUH each)
Insulation	Non-CFC, foamed-in-place polyurethane: 5.0" (12.7cm) cabinet; 2.0" (5.1cm) lid; 1.0" (2.5cm) polystyrene sub-lid
Electrical	**8513:** 120V, 60 Hz, 16.0 FLA (Operating range 108-130V) **8514:** 230V, 50/60 Hz, 12.0 FLA (Operating range 208-240V)
Kilowatts per 24 Hours*	**8513:** 18 **8514:** 14
Breaker Requirements	**8513:** 20 Amp **8514:** 15 Amp Dedicated Circuit, Time Delay Breaker
Automatic Voltage Compensator	**LOW:** Cut In: 110V Cut Out: 115V Volts Boost: 10 Cut In: 210V Cut Out: 220V Volts Boost: 18 **HIGH:** Cut In: 125V Cut Out: 120V Volts Buck: 10 Cut In: 235V Cut Out: 225V Volts Buck: 18
Shipping Weight **Ocean:** **Air/Container:** **Motor:**	 955 lbs. (433.2 kg) 895 lbs. (406.0 kg) 845 lbs. (383.3 kg)

Continuing research and improvements may result in specification changes at any time.
Single and double door upright ULTs and additional chest sizes are available. Contact your sales representative for details.
**At -80C (-112F), 23C (73.4F) ambient, 50 percent product load*

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