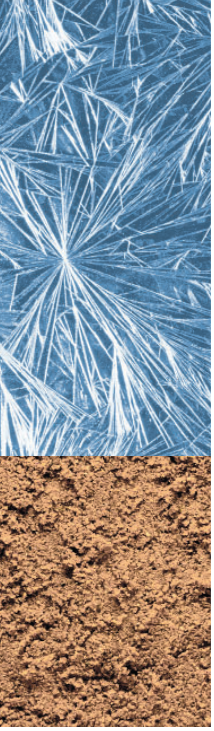
Heto PowerDry® LL1500 Freeze Dryer

Superior Throughput, Efficiency and Versatility for Ultra-Low Temperature Applications

Analyze • Detect • Measure • Control™

Thermo ELECTRON CORPORATION



A Powerful Tool for Your Freeze Drying Tasks

The Heto PowerDry LL1500 freeze dryer from Thermo Electron delivers 1,500 grams – or 1.5 kilograms – per 24 hours of ice trapping capacity – the highest capacity available for a condenser of its size. The unit employs PowerDry technology for fast, reliable and efficient drying using a condenser temperature as low as -110°C. This unique refrigeration system features a dual-capillary design for maximum cooling performance, providing the fastest possible drying time as well as evenly and fully distributed ice condensation.

The full condenser surface area is optimized to provide extraordinarily high throughput.

The Heto PowerDry LL1500 offers a user-friendly design that helps you perform your freeze drying applications in a safe, fast and reliable way. The system is built with a simple, standard controller that is ideal for most applications, allowing you to quickly and simply dry your samples with excellent results.

Top plate
AISI 316 corrosion resistant stainless steel plate

Refrigeration system
Cascade compressor system using non-HCFC refrigerants

Controller
Digital display of the condenser temperature in addition to process status indicator

Condenser
AISI 316 single piece construction condenser 160 mm diameter x 190 mm height (6.3" x 7.5")

Pump connections
A valve and vacuum hose connect to the vacuum pump

Drain
Chemical-resistant Teflon® valve for complete and easy drainage

Design
Compact horizontal layout with sloped front for easy reading

Heto PowerDry LL1500 Freeze Dryer

The Heto PowerDry LL1500 freeze dryer from Thermo Electron is a powerful tool for small-scale freeze drying tasks. As the only small-scale (1.5kg/24 hour) freeze dryer on the market to achieve an ultra-low temperature of -110°C, the Heto PowerDry LL1500 is ideal for applications where you need to retain the biological activity and structural integrity of your samples, and for situations using low freezing point organics.

The Heto PowerDry LL1500 offers a range of features that make it a *must have* resource in pharmaceutical and biotechnology companies as well as university and hospital research labs:

Ultra Low Temperature

- -110°C freeze drying temperature preserves sample activity and structural integrity.
- Allows you to use lower-temperature solvents such as methanol, ethyl ether, ethanol and others.

High Throughput

- Incorporates superior cooling capacity that enables the Heto PowerDry LL1500 to reach the set temperature quickly, so you can process more samples in less time.
- Unique PowerDry technology maintains temperature throughout the run for faster, more efficient drying.
- Offers the greatest total ice trapping capacity for its size–3 kg.

High Performance Freeze Dryers for Every Need

Whether you're seeking small-capacity units for research, or high-end, programmable systems for pilot applications, Thermo Electron offers a complete line of high performance freeze dryers to meet your needs. The Heto PowerDry LL1500 is part of the extensive family of Heto PowerDry freeze dryers, known for providing quality and innovation. Combined with Thermo Electron's global service and support network, the Heto PowerDry family of freeze dryers is designed to ensure years of reliable performance.

The Heto PowerDry LL1500 is part of the extensive Heto PowerDry family of freeze dryers from Thermo Electron. Shown above (left to right): PowerDry LL1500, PowerDry PL6000, PowerDry PL9000, and the PowerDry PL3000 (center).

Versatility

- Offers a wide variety of accessories that are interchangeable with our full range of Heto PowerDry freeze dryers.
- Makes an excellent cold trap when used in conjunction with vacuum concentrators.
- Serves as a secondary cold trap in conjunction with other freeze dryers.

Table of low freezing point solvents

Solvent / Freezing point at atmospheric pressure °C			
Water	0	1-Butanol	-89
Acetonitrile	-46	Formaldehyde	-92
Chloroform	-64	Acetone	-95
Acetic acid	-73	Methanol	-98
Ammonia	-78	Ethyl ether	-116
6 N HCL	-80	Ethanol	-117
Acetylene	-81	Acetaldehyde	-124
Isopropanol	-89	1-Propanol	-127

Figure 1

Figure 2

Figure 3

A Broad Range of Accessories to Meet Your Needs

The freeze dryer that you select must meet the needs of your specific applications. With the Heto PowerDry LL1500, you get a freeze dryer of the highest quality and design, with an ultra-low condenser temperature and access to a wide range of accessories covering all requirements, including:

- Bulk drying in flasks or trays
- Ampoule drying on manifolds
- Vial drying in chambers with stoppering arrangements

Our Heto PowerDry freeze dryers are unique in that any of the accessories can be freely interchanged among any of our other Heto PowerDry models. This provides you with added flexibility and reduced cost.

Chamber Configurations

The use of chambers is necessary when samples are on trays or in vials. The chambers can be mounted either directly on the condenser or via the lid, and are available with or without heated shelves. Most chambers are made of versatile 200 mm or 300 mm diameter clear acrylic cylinders for maximum safety and performance.

Bulk drying

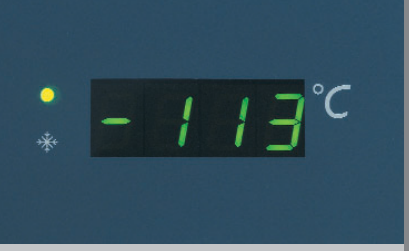
The AC300 chamber (Figure 1) is ideal for bulk drying. Each shelf is removable and can be used with other Heto trays. The AC300 chamber design allows heat radiation through the acrylic cylinder walls, thereby accelerating the freeze drying process. The optional HSC500 PLUS shelf controller can be connected on the AC300-H chamber for additional heat application and control.

Microplate drying

The AC300 chamber, outfitted with the MP3 rack (Figure 2), will accommodate 42 standard microplates or 21 deepwell plates, and can be easily loaded, unloaded and cleaned. The chamber design allows heat radiation through the acrylic cylinder walls, thereby accelerating the freeze drying process.

Vial drying

The AC300-S/H configuration (Figure 3) is ideal when multiple samples are distributed in vials. The manual stoppering system makes closing vials easy and convenient. The number of samples that can be processed in a single run depends on the diameter and height of the vials; please ask for details. We recommend that you use this configuration with an HSC500 PLUS shelf controller.



HSC500 PLUS Controller
The application of heat is essential to any freeze drying process. This is typically done by utilizing the ambient heat radiation or by electrically heating the shelves. The HSC500 PLUS controller is compatible with any of our Heto PowerDry freeze dryers, and provides optimal temperature regulation, thus ensuring the safest and most effective freeze drying cycle.

The shelf controller is very simple and logical to use. To keep track of various applications, the Heto PowerDry LL1500 – with the additional HSC500 PLUS controller – offers independent temperature control on up to five shelves, a product sensor connection, and an RS232-C interface for connecting to a printer or computer.


Figure 4


Figure 5


Figure 6

Manifold Configurations
The use of manifolds is particularly well suited for bulk drying samples in multiple roundbottomed flasks that are heated by ambient radiation. All manifolds are placed directly on top of the condenser lid using an NW40 flange.

Flask drying using a 4-port flask manifold
The configuration shown in Figure 4 is ideal for bulk drying a few flasks. The BM-4 manifold is connected directly to the NW40 flange on the condenser lid, and will accommodate 4 flasks mounted with cones on individual rubber valves. The BM-4 manifold can be extended with the EM-4 manifold, thereby offering 4 additional connection valves.

High volume flask drying using a horizontal 14-port manifold
The horizontal manifold PM14 3⁄4 (Figure 5) is made of stainless steel and will accommodate 14 flasks mounted with cones on individual rubber valves. The manifold has an NW40 flange on top for connecting extra manifolds if required.

Multiple flask drying using a 12-port drum manifold
The DM12 3⁄4 stainless steel drum manifold (Figure 6) will accommodate up to 12 flasks mounted with cones on individual rubber valves. The manifold is connected directly to the condenser lid via an NW40 flange. The acrylic lid on top of the condenser has an NW40 flange connection for additional manifolds if required. Using this system, 200 mm diameter chambers can be accommodated as well.

Heto PowerDry LL1500 Freeze Dryer Specifications

Technical Specifications	Heto PowerDry LL1500 Freeze Dryer
Cat. no. 230V/115V	88001500/88001550
Required power supply	230V/50 Hz or 115V/60 Hz
Condenser capacity/ 24 hours	1.5 kg
Total ice capacity	2.6 kg
Condenser volume	3.8 L
Condenser diameter x height	Ø 160 x 190 mm (6.3 x 7.5")
Lowest condenser temperature	< -110°C
Refrigerants	R507/R1150
Status indicator (Alarm / Wait / Okay)	Yes
RS232-C interface	Yes (when used with HSC500 PLUS controller)
Digital temperature display	Ambient to <-120°C (-184°F)
Ambient temperature	+5 to +32°C (+41 to +89.6°F)
Noise level	<51 dBA
Ice condenser material	AISI 316 Stainless Steel
External dimensions DxWxH	480 x 800 x 335 mm (18.9 x 31.5 x 13.2")
Weight	53 kg (116.8 lbs)

Heto PowerDry LL1500 Freeze Dryer Accessories

PM 14 3/4
Cat. no. 88008104

DM 12 3/4
Cat. no. 88008164

FC-5F
Cat. no. 88003205

MP3
Cat. no. 88006111

MP1
Cat. no. 88006116

UR
Cat. no. 88006117

AM48/8
Cat. no. 88008108

BM-4
Cat. no. 88600011

EM-4
Cat. no. 88600012

Standard ø200mm Chambers

AC300
Cat. no. 88006120

Unheated Chambers

AC300-S/H
Cat. no. 88006112

AC300-H
Cat. no. 88006110

Heated Chambers

Manifolds

Pumps

RZ5 (93 L/min)
Cat. No. 88900067 (115V/60 Hz)
Cat. No. 88900066 (230V/50Hz)

RZ2 (37 L/Min)
Cat. No. 88900065 (115V/60 Hz)
Cat. No. 88900062 (230V/50Hz)

Oil mist filter

FORE2
Cat. no. 88900125

Connections

KIT 22
Cat. no. 88002922
KIT 23
Cat. no. 88002923

Cart (trolley)
Cat. no. 88006115

Shelf Controller

HSC500 PLUS
Shelf controller
(for heated chambers only)
Cat. no. 880003099

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ELECTRON CORPORATION

North America: USA +1-866-984-3766, Canada +1-905-332-2000
Europe: Belgium +32 2 482 30 30, Denmark +45 48 16 62 00, Finland +358 9 329 100, France +33 2 28 03 20 00, Germany/Austria/Switzerland +49 6103 4081012, Italy +39-02-2511141, Netherlands +31 76 571 4440, Russia/CIS +7 095 755 9045, Spain/Portugal +34 93 2233154, Sweden +46 8 742 03 90, UK/Ireland +44 870 609 9203
Asia: India +91 22 2778 1101, Japan +81 45 453 9220, China +86 21 5465 7588, Other Asian countries +852 2885 4613
Countries not listed: + 33 2 28 03 20 00

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