



Freeze-Drying Solutions





ABOUT DYNAVAC

Since our inception, the mission of the DYNAPUMPS GROUP has been to supply high quality components and value added products to our clients' specifications and to provide excellent after sales service and spares.

DYNAVAC, our vacuum and air blower division, provides solutions for all vacuum and air movement applications. We specialise in engineering and building packages to suit the one-off needs of our customers, as well as the supply of individual components.

Once built, full functional testing is conducted to ensure our products live up to our customers' expectations.

Bench-top Laboratory Freeze Dryers

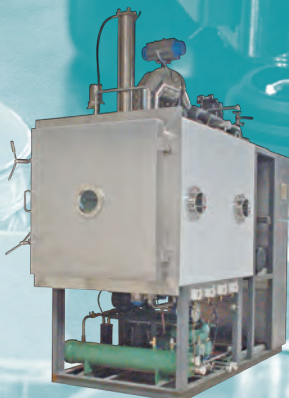


Free-standing Laboratory Freeze Dryers



Pilot freeze Driers for laboratory use

GMP Standard Pilot Freeze Dryers



Lyophilizers for Mass Production

FD-1 Series Freeze Dryer

Main Features:

- Integrated work chamber and cold trap construction, ensuring high strength and elimination of potential leaks.
- The cold trap includes a pre-freezing function.
- The draft tube conductance technique minimizes drying time.
- Includes European refrigeration compressor package.
- Low noise operation.
- Manually operated 'heat pump' type cold-trap defrost

Standard Versions:

FD-1 series is available in five standard versions:

- Bulk Chamber type: Suitable for loading of bulky material.
- Stoppering Type: Suitable for loading of closable bottles.
- External Adapter type: Suitable for loading of external flasks.
- Stopper & Adapter type: Suitable for loading of bulky material & external flasks.
- 'T' drying chamber type: Suitable for loading ampoule bottle.



Optional Equipment:

- Built-in gas purge valve allows easy backfilling with N2 or other gas in order to provide long-term specimen storage.
- Crystal Temperature Test Instrument
- Sample Temperature Monitor
- Six or Eight Shelf Drying Chamber
- Manifold Chamber
- Ampoule Bottle Sealing Torch
- Capping Device
- Backfill Filter
- Glass Flasks
- Serum Bottles
- Alternative Vacuum pump

FD-1 Series Freeze Dryers Technique Parameter

Model	FD-1A-50 FD-1A-80	FD-1B-50 FD-1B-80	FD-1C-50 FD-1C-80	FD-1D-50 FD-1D-80	FD-1E-50 FD-1E-80
Shelf Area	0.12	0.08	0.12	0.08	_____
Cold Trap temperature	-55/-85	-55/-85	-55/-85	-55/-85	-55/-85
Cold trap Capacity	3 litre / 4 litre per 24 hour run cycle				
Compressor	0.66 kW (danfoss brand) 2 x 0.51 kW (danfoss brand)				
Vacuum Pump	Dynavac WRD8, 8 m ³ /h (standard - options available)				
Dimension	W350*D600*H345 W540*D550*H900				

'Lab-1' Series Freeze Dryer

Main and optional features:

Dynavac LAB-1 Series Freeze Driers offer the standard features of 'FD-1' Freeze Driers with the following additional features:

- **Automatic Programmable Control System [PLC type]**

From drying to defrosting, our user-friendly programmable controls enable you to start runs quickly. The microprocessor controls selected ramping and holding segments to meet different temperature protocols.

- **Shelf Temperature Control System**

Accurate shelf temperature is automatically controlled, by circulation of the refrigerated and heated medium.

- **Compressor Delayed Protection**

Compressor delayed start function to minimize compressor wear.

Optional Equipment:

- **Vacuum control System**

During the freeze drying, the vacuum level is automatically control to improve the freeze drying efficiency by minimizing cycle time (optional)

- **Automatic cold-trap drainage system**

PLC controlled cold-trap drain valve (optional).

- **Automatic Purge System**

An automated purge system to protect samples by preventing the back-flow of vacuum pump lubrication oil.(optional)

- **1.5 km range remote control system**

Enabling the user can control the device by remote control system (optional).



'Lab-1' Series Freeze Dryers Technical data

Model	Lab-1A-50E Lab-1A-80E	Lab-1B-50E Lab-1B-80E	Lab-1C-50E Lab-1C-80E	Lab-1D-50E Lab-1D-80E	Lab-1E-50E Lab-1E-80E
Shelf Area	0.12	0.08	0.12	0.08	
Cold-Trap temperature	-55/-85	-55/-85	-55/-85	-55/-85	-55/-85
Cold Trap Capacity	3 litre/ 4 litre per 24 hour run cycle				
Refrigeration Capacity	0.66 kW [Danfoss brand] 2 x 0.51 kW [Danfoss brand]				
Vacuum Pump	Dynavac VRD8, 8 m ³ /h [standard – options available]				
Dimensions	W350*D600*H3/45 W540*D550*H900				



FD-2 series freeze dryers Technical data

Model	FD-2	FD-2A	FD-2B	FD-2C	FD-2D
Shelf Area	0.27	0.18	0.12	0.18	0.12
Cold Trap Temperature	-85				
Cold Trap Capacity	6 litres per 24hr run cycle				
Refrigeration Capacity	2 x 0.51 kW [Danfoss brand]				
Vacuum Pump	Dynavac VRD12, 12 m ³ /h [standard – options available]				
Dimensions	W540*D720*H960				

FD-3/4/5/8 Series Freeze Dryer

Main Features:

- Integrated work chamber and cold trap construction, ensuring high strength and elimination of potential leaks.
- The cold trap includes a pre-freezing function.
- The draft tube conductance technique minimizes drying time.
- Built-in gas purge valve allows easy backfilling with N2 or other gas in order to provide long-term specimen storage.
- Includes European refrigeration compressor package.
- Low noise operation.
- Chamber lifting Hoist included
- PLC HMI controller
- Data recording system with 90 day continuous storage.
- Mass memory for safe storage of 500 programs or user- defined protocols.
- Display giving Vacuum level and temperature.
- Start-up delay function minimizes compressor wear
- Display history chart, giving vacuum level, cold trap temperature and sample temperature.



Standard Versions:

- FD-3 & FD-5 are stoppering versions.
- FD-4 & FD-8 are non-stoppering versions.

FD-3/4/5/8 series freeze dryers technical data

Model	FD-3	FD-4	FD-5	FD-8
Shelf Area	0.3	0.4	0.5	0.8
Cold Trap Temperature	-55			
Cold Trap Capacity	10L	10L	15L	15L
Shelf Number	5	5	7	7
Vacuum Pump	Dynavac VRD16	Dynavac VRD16	Dynavac VRD24	Dynavac VRD24
Power	3kW, 400VAC, 50HZ			



Accessories

FDC 20/06 Bulk Drying Chamber: 200mm Tray diameter, 6 x Shelves
FDC 20/08 Bulk Drying Chamber: 200mm Tray diameter, 8 x Shelves

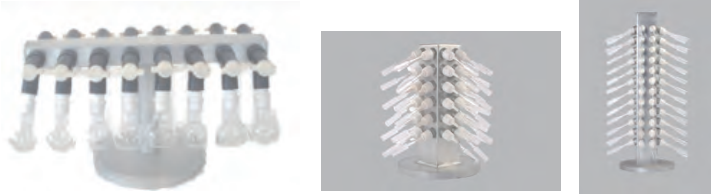
FDC 20/06/12 Bulk Drying Chamber + Valves : 200mm Tray diameter, 6 x Shelves, 12 valves
FDC 20/08/12 Bulk Drying Chamber + Valves : 200mm Tray diameter, 8 x Shelves, 12 valves

FDC18/03/12-S Stopping Chamber + Valves: 180mm Tray diameter, 3 x Shelves, 12 valves + stoppering function
FDC20/08/12-S Stopping Chamber + Valves: 200mm Tray diameter, 3 x Shelves, 12 valves + stoppering function



FDC/2 FDC/3 FDC/4 Built-in Chamber
Number of shelves is indicated by the product suffix.

T16 T24 T52 T104 Manifold Tree



Crystal Temperature Test Instrument



Ampoule Sealing Device



Ampoule Bottle Sealing Machine



Capping Device



Temperature Monitor



Pilot Series Freeze Dryer

Main Features:

- Integrated work chamber and cold trap construction, ensuring high strength and elimination of potential leaks.
- The cold trap includes a pre-freezing function.
- The draft tube conductance technique minimizes drying time.
- Includes European refrigeration compressor package.
- Low noise operation.
- Manually operated 'heat pump' type cold-trap defrost
- PLC HMI controller
- Data recording system with 90 day continuous storage.
- Mass memory for safe storage of 500 programs or user- defined protocols.
- Display giving Vacuum level and temperature.
- Start-up delay function minimizes compressor wear
- Display history chart, giving vacuum level, cold trap temperature and sample temperature
- Safety Stopping system.
- Vacuum control System. During the freeze drying, the vacuum level is automatically regulated to minimizing cycle time
- Automatic Purge System. Protects samples by preventing the back-flow of vacuum pump lubricant



Optional Features:

- Automatic cold-trap drainage system
- PLC controlled cold-trap drain valve (optional)
- 1.5 km range remote control system
- Enabling the user can control the device by remote control system (optional).

'Pilot' Series Freeze Dryer Specification [Laboratory Version]

Model	Pilot1-2LD	Pilot2-4LD	Pilot1-2MD	Pilot2-4MD	Pilot2-4L	Pilot2-4M	Pilot2-4H
Shelf Usable Area	0.1	0.2	0.1	0.2	0.2	0.2	0.2
Cold Trap (°C)	-55	-85	-55	-85	-55	-85	-85
Stopper	YES	NO	YES	NO	YES	YES	YES
Vacuum backing system	NO	NO	YES	YES	NO	NO	YES
Adjust vacuum system	NO	NO	YES	YES	NO	NO	YES
Automatic Purge system	NO	NO	YES	YES	NO	NO	YES
Automatic drainage system	NO	NO	NO	NO	NO	NO	YES
1.5 km far remote control system	NO	NO	NO	NO	NO	NO	NO
Vacuum	<8Pa	<8Pa	<6Pa	<6Pa	<6Pa	<6Pa	<6Pa
Condenser Capacity	3L	4L	3L	4L	4L	4L	4L
Compressor	0.5 kW	2 x 0.5 kW	0.5 kW	2 x 0.5 kW	0.75 kW	2 x 0.75 kW	2 x 0.75
Vacuum	2L/S						
Dimension (mm)	W750*D730*H600	W740*D800*H1330	W750*D730*H600	W740*D800*H1330	W660*D850*H1440	W660*D850*H1440	W660*D850*H1440

Freeze-drying Solutions

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'Pilot' Series Freeze Dryer Specification [Production Process Version]

Model	Pilot3-6H	Pilot5-8H	Pilot3-6T	Pilot5-8T	Pilot10-15T
Shelf Usable Area	0.3	0.5	0.3	0.5	1.0
Through wall	NO	NO	YES	YES	YES
Cold Trap (-°C)	-85				
Stopper	YES				
Vacuum Backfilling System	YES				
Adjust vacuum System	YES				
Automatic Purge System	YES				
Automatic drainage system	YES				
1.5 km far remote control system	YES				
Vacuum	<8Pa	<8Pa	<6Pa	<6Pa	<6Pa
Condenser Capacity	3L	4L	3L	4L	4L
Compressor	2 x 0.75 kW	2 x 0.75 kW	2 x 0.75 kW	2 x 0.75 kW	2 x 1.5 kW
Dimension (mm)	W1400*D760*H1800	W1400*D760*H1800	W760*D900*H1800	W860*D1400*H1800	W860*D2100*H1900

'LYO' Series Production Scale Freeze Dryer

Dynavac Engineers can design and custom-build Production Scale Freeze Drying systems to satisfy all customer requirements. We offer installation, on-site training and service of all brands of Freeze Dryers

Main Features:

Ice condenser capacities from 20 to > 800 kg

- Single or double chamber systems
- Freezing & drying in the drying chamber
- SIP/H₂O₂ disinfection, CIP, IQ/OQ,
- Process integration (loading systems, peripheral equipment)

Vacuum Chamber and Cold Trap:

Chamber and Cold Traps are designed and manufactured in accordance with GB150-2011/PED, ASME standards and comply with CGMP and FDA requirements.

The mirror polished internal surfaces are angled and more conducive to drainage when CIP and SIP is applied.



Refrigeration System:

Highest quality, European refrigeration compressors provide the operator with efficiency, reliability and security.

Vacuum Chamber and Cold Trap:

Precision fabricated and tested using mass spectrometer leak detector technology, ensuring the vacuum system reliability.

Freeze-drying Solutions

LYO Series Freeze Dryer Specification (Standard Models) :

Model	LYO-1E	LYO-1SE	LYO-2E	LYO-2SE	LYO-3E	LYO-3SE	LYO-5E	LYO-5SE
Shelf Usable Area	1	1	2	2	3	3	5	5
Cold Trap (°C)	<-70							
Stopper	NO	YES	NO	YES	NO	YES	NO	YES
Bottle Num. (22)	2100	2100	4200	4200	6300	6300	9450	9450
Liquid (L)	20	20	40	40	60	60	100	100
CIP	NO							
SIP	NO							
Shelf (mm)	100							
Shelf Temperature Range	-55-+80							
Condenser Capacity (Kg/24H)	20	20	40	40	60	60	100	100
Limiting Vacuum	<5Pa							

Model	LYO	LYO-2	LYO-3	LYO-5	LYO-7	LYO-10	LYO-20	LYO-40
Shelf Usable Area	1	2	3	5	7	10	20	40
Cold Trap (°C)	<-70							
Stopper	YES							
Bottle Num. (22)	2100	4200	6300	9450	15750	19950	42900	52500
Liquid (L)	20	40	60	100	150	200	400	800
Cooling Water Qty.	3.2	4.2	4.5	11	16	18	20	50
Cleaning Water (L/ min)	100	100	100	100	100	100	150	200
Pure Steam Consumption (Kg/H)	20	40	60	100	150	200	400	600
CIP	YES							
SIP	Optional							
Shelf (mm)	100							
Shelf Temperature Range	-55-+80							
Condenser Capacity (Kg/24H)	20	40	60	100	150	200	400	800
Limiting Vacuum	<3Pa							



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