

• Compact • Versatile • Ultra Low Condenser Temperatures • Freeze/Freeze Dry

BenchTop "K" Series Freeze Dryers (Lyophilizers)



The BenchTop "K" Series Freeze Dryers

were developed in response to the industry demand for a research Freeze Dryer that would encompass a full range of laboratory processing requirements. The compact design and the wide range of options and accessories make our new freeze dryer the most versatile available.

The new "K" series freeze dryers are offered in a full range of condenser temperatures from -55°C to -105°C . Our new wide condenser temperature ranges can provide you with the drying power required to freeze dry all aqueous and most organic based samples. The condenser sizes range from 3 to 9 liters allowing for processing

of a few samples or multiple user applications.

The many available accessories allow for any shape or size sample to be freeze dried. The manifolds permit up to 18 flasks to be placed on the freeze dryer at once. The adjustable racks accommodate samples that are in dishes or Tyvek™ bags to be placed inside the manifold for drying. The stoppering assembly enables you to easily stopper vials under vacuum or atmosphere for long term storage requirements. Heated racks can be used to speed up the drying process and reduce processing time.

Our "K" series BenchTop line is delivered with your choice of two user-friendly control systems.

The new SLC, Standard Lyo Control, is provided as standard equipment on all BenchTop "K" series dryers. Our more sophisticated ALC, Automatic Lyo Control, adds more features and allows recipe driven heat drying rack control. All ALC and SLC controls include precise pressure (vacuum) control to shorten the drying cycles through improved heat transfer.

Powerful workstation software allows complete data collection and historical trending of your freeze drying cycles.

New automated hot gas routine allows defrosting in minutes and enables you to quickly get back to the task of drying your valuable samples.



BenchTop 2K Freeze Dryer

shown with vacuum pump, lab cart, 8 port acrylic manifold, 3-shelf bulk rack-unheated



BenchTop 4K Freeze Dryer

shown with vacuum pump, lab cart, 12 port acrylic manifold, 5-shelf bulk rack-unheated.



BenchTop 6K Freeze Dryer

shown with vacuum pump, lab cart, 12 port acrylic manifold, 3-shelf stoppering assembly rack-heated.

BenchTop Features: Standard for 2K, 4K and 6K

- **Auto Start-up** - One button start-up that activates all operating parameters in the correct sequence.
 - **Freeze/Freeze Dry** - Utilize the condenser shelf accessory to freeze and freeze dry non-transition temperature products inside the condenser, under sterile conditions.
 - **Pressure Control** - Allows you to precisely control the vacuum for faster freeze drying, and reproducible results.
 - **Hot Gas Defrost** - Defrost the condenser in ten minutes or less for fast turn around of freeze drying cycles.
- Compact benchtop footprint; designed to fit on a laboratory bench or small lab cart for more mobility.
 - Digital display of vacuum and temperature plus many innovations only available with a microprocessor system.
 - CFC-free refrigeration systems.
 - Ultra low condenser temperatures for processing a full range of samples (-55 to -105°C).
 - Large variety of manifolds and accessories available to accommodate any processing requirements.
 - All manifolds come with VirTis 3/4" (19 mm) patented Quickseal valves.
 - Condenser can be used alone for freezing and freeze drying of small samples (see below).
 - Two different microprocessor monitoring systems available for data acquisition and more control over the freeze drying process including RS232 data port.
 - Every freeze dryer comes with our complimentary gift package which includes: (1) 600 ml flask; (1) adapter for the flask; (1) package of filter paper (100 pcs); (3) tubes of vacuum grease, (1) bottle of vacuum pump oil and information on ordering accessories and glassware.
 - All units are supplied with appropriate vacuum tubing and clamps for installing a two-stage vacuum pump.

The Very Flexible Patented BenchTop Shelf System (2K and 4K models)



Shelf handle allows lowering the shelf for rapid vial freezing.

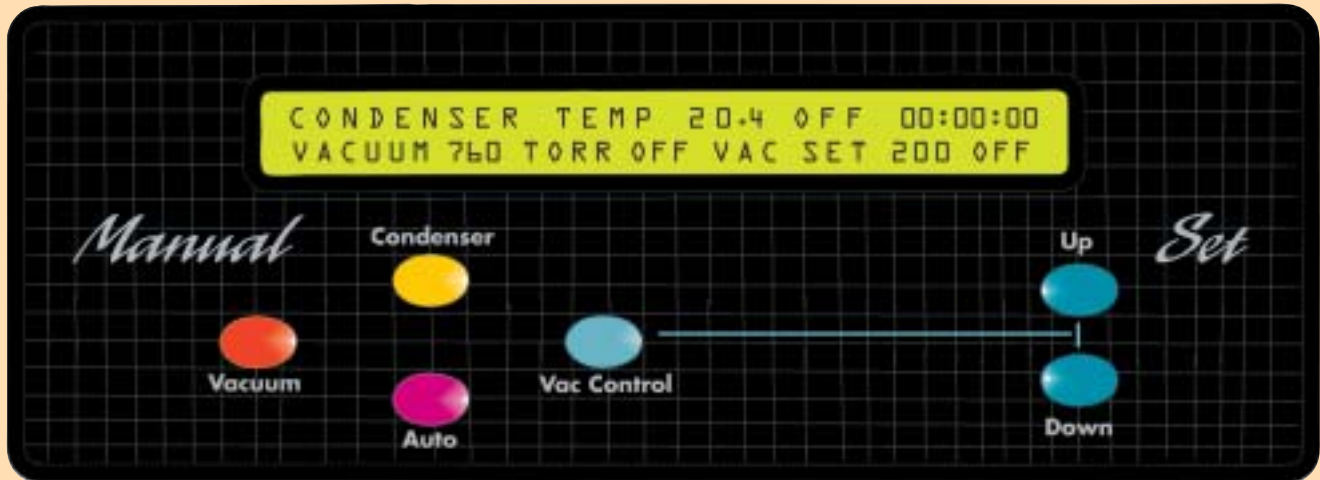


Handle is rotated to position the shelf in the drying position



Shelf also serves to rapidly remove the collected ice when manifold drying.

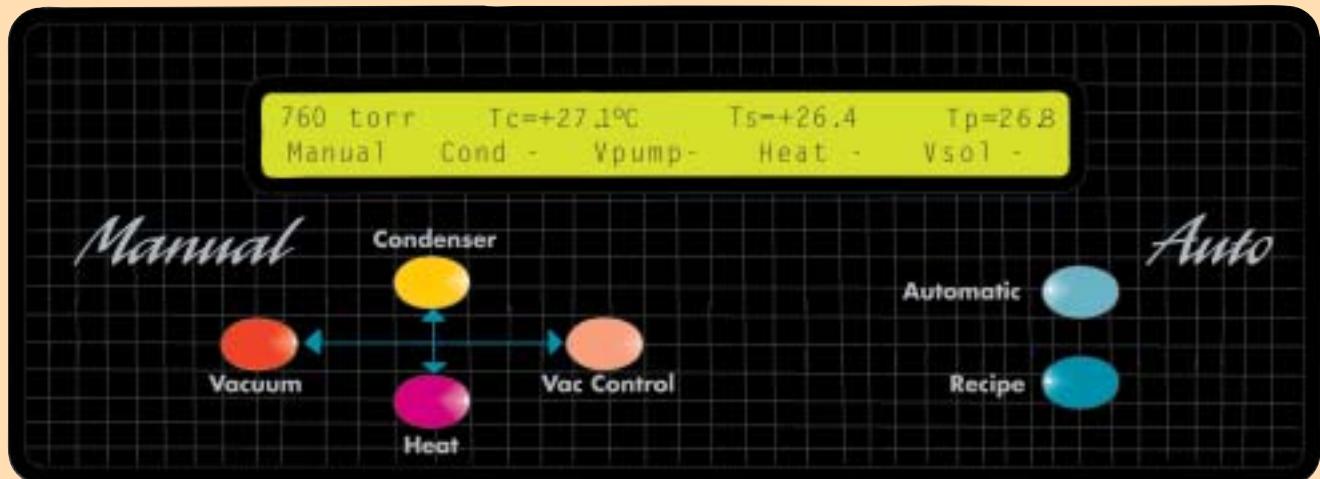
Standard Lyo Controls (SLC) Microprocessor Controller



This control package is available for BenchTop 2, 4 and 6K .

- Auto start-up: one button automatic operation to the drying mode.
- User-friendly interface to all new BenchTop Freeze Dryers.
- Full function control plus precise vacuum regulation.
- Power outage, condenser overload and vacuum safety alarms provided as standard.
- Easy data access provided by a rear panel mounted RS-232 interface.

Automatic Lyo Controls (ALC) Microprocessor Controller



This control package is only available for BenchTop 4 and 6K .

Includes all the features of the SLC control, plus...

- Automatic cycle advance including precise temperature control of optional product drying racks.
- Pressure control is selectable between two foreline control methods and an inert gas bleed system.
- Recipe driven cycles
- Expanded alarms
- Product temperature and shelf temperature indication.
- Complete trending is provided by optional synoptic software and the standard RS-232 data port.

BenchTop 2K Freeze Dryer - ES and XL Models

Condenser Blank-Off Temperature: ES -55°C/XL -75°C		System Refrigerant	CFC-Free
Condenser Capacity in 24 Hours: Liters	2	Condenser Type	Bottom external coil
Overall Condenser Capacity: Liters	3.0	Compressor Horsepower	ES, XL 1/3 HP
SLC CONTROL SYSTEM	LCD Display	Average Time to 100 mt: Minutes (0.13 mbar)	15
Condenser Temperature Scale	-150°C to +100°C	Ultimate System Vacuum: (6.6x10 ⁻³ mbar)	5mt
Vacuum Indication (Millitorr or Millibar - selectable)	760 Torr to 1 Millitorr	Base Cabinet Dimensions:	
Vacuum Regulation	Vacuum Bleed Type	in. 12.5W x 19D x 15.5H	
Temperature - Vapor		cm. 31.7W x 48.3D x 39.4H	
Pressure Conversion	Push Button	Weight: Lbs/Kg	ES, XL 59/26.5
System Maintenance	Oil Change	Standard Voltages	115V/60, 208V/60, 220V/50
PC Interface	RS - 232	(Specifications are subject to change without notice.)	
Defrost Method	Hot Gas		
Product Freezing in Condenser via 2 Position shelf	ES -50°C XL -65°C		

The BenchTop 2K Freeze Dryers offer the flexibility of larger floor models in a smaller footprint. Designed with the small laboratory in mind, they are cost efficient without compromising the need to do multiple variations of samples.

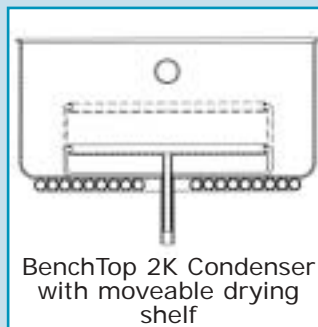
The following features are standard on this model:

- Ability to condense up to 2 liters of ice in 24 hours with an overall condenser capacity of 3 liters total.
- Standard Lyo-Control (SLC) microprocessor system for monitoring of critical freeze drying parameters such as condenser temperature and vacuum.
- Refrigeration system with CFC-Free refrigerants and two temperature options of -55°C or -75°C.
- Space saving footprint of 12.5"W x 19"D x 15.5"H (31.7 cm x 48.2 cm x 39.3 cm). (Manifold not included in height.)
- Ability to freeze and freeze dry in the condenser with a VirTis patented 2-position shelf.
- PC interface via RS232 port for use in collecting data with optional software.

BenchTop 2K Freeze Dryer

shown with

- 8 port acrylic manifold,
- 3-shelf bulk rack-unheated



- Hot gas defrost for fast turnaround. Will defrost the condenser in under 10 minutes.
- System maintenance alarm that tracks vacuum pump usage for notification to change the oil.

See Pages 8-11 for available manifolds, vacuum pumps and accessories. Vacuum pump, adapter and manifold needed for operation.

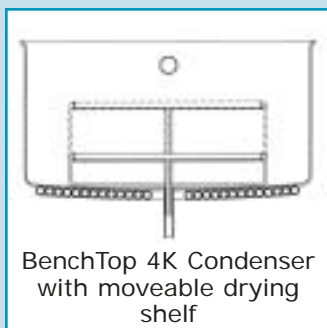
BenchTop 2K Freeze Dryer, ES Model	-55°C	115V/60Hz (CFC-Free)	Part #406383
BenchTop 2K Freeze Dryer, ES Model	-55°C	220V/50Hz (CFC-Free)	Part #405300
BenchTop 2K Freeze Dryer, XL Model	-75°C	115V/60Hz (CFC-Free)	Part #405065
BenchTop 2K Freeze Dryer, XL Model	-75°C	220V/50Hz (CFC-Free)	Part #419116

BenchTop 4K Freeze Dryer - XL and ZL Models

Condenser Blank-Off Temperature: XL -75°C/ZL -105°C		System Refrigerant	CFC-Free
Condenser Capacity in 24 Hours: Liters	3	Condenser Type	Bottom external coil
Overall Condenser Capacity: Liters	8	Compressor Horsepower	XL 1/2 HP ZL 2X 1/2 HP
SLC CONTROL SYSTEM	LCD Display	Average Time to 100 mt: Minutes (0.13 mbar)	15
Condenser Temperature Scale	-150°C to +100°C	Ultimate System Vacuum: (6.6x10 ⁻³ mbar)	5mt
Vacuum Indication (Millitorr or Millibar - selectable)	760 Torr to 1 Millitorr	Base Cabinet Dimensions:	
Vacuum Regulation	Vacuum Bleed Type	in. 15.5W x 19D x 15.5H	
Temperature - Vapor		cm. 39.4W x 48.3D x 39.4H	
Pressure Conversion	Push Button	Weight: Lbs/Kg	XL110/49.8 ZL 131/59.4
System Maintenance	Oil Change	Standard Voltages	115V/60, 208V/60, 220V/50
PC Interface	RS - 232	(Specifications are subject to change without notice.)	
Defrost Method	Hot Gas		
Product Freezing in Condenser via 2 Position shelf	XL -65°C ZL -90°C		

BenchTop 4K Freeze Dryer

shown with
12 port acrylic manifold,
5-shelf bulk rack-
unheated.



The BenchTop 4K Freeze Dryer was developed as a result of industry demand for a lower temperature condenser for freeze drying applications involving the use of organic solvents such as acetonitrile, TFA, DMSO and DMF. Technicians with a large range of applications will find this benchtop able to accommodate all their processing requirements.

The following features are standard on this model:

- Offered in two ultra low condenser temperatures of -75°C and -105°C.
- Total condenser capacity of 8 liters.
- Hot gas defrost for fast turnaround, eliminating waiting time between freeze drying cycles.
- Standard Lyo-Control System (SLC) micro processor for monitoring of critical parameters with optional Auto Lyo-Control for product and drying rack temperature indication.
- Small footprint of 15.5"W x 19"D x 15.5"H (39.3 cm x 48.2 cm x 39.3 cm) on all models. (Note: Manifold adds to height.)
- Freezing and freeze drying of small samples can be accomplished easily in the condenser using the 2-position shelf.
- All refrigeration systems use CFC-Free refrigerant.
- PC interface via RS232 port can be used to collect critical data via the optional Lyo-Control Software.

See Pages 8-11 for available manifolds, vacuum pumps and accessories. Vacuum pump, adapter and manifold needed for operation.

BenchTop 4K Freeze Dryer, XL Model	-75°C	115V/60Hz (CFC-Free)	Part #408189
BenchTop 4K Freeze Dryer, XL Model	-75°C	220V/50Hz (CFC-Free)	Part #419123
BenchTop 4K Freeze Dryer, ZL Model	-105°C	208V/60Hz (CFC-Free)	Part #408226
BenchTop 4K Freeze Dryer, ZL Model	-105°C	220V/50Hz (CFC-Free)	Part #417563

BenchTop 6K Freeze Dryer - ES and EL Models

Condenser Blank-Off Temperature: ES-55°C/EL-85°C		System Refrigerant	CFC-Free
Condenser Capacity in 24 Hours: Liters	5	Condenser Type	Internal coil
Overall Condenser Capacity: Liters	9	Compressor Horsepower	ES 1/2 HP EL 2X 1/2 HP
SLC CONTROL SYSTEM	LCD Display	Average Time to 100 mt: Minutes (0.13 mbar)	18
Condenser Temperature Scale	-150°C to +100°C	Ultimate System Vacuum: (6.6x10 ⁻³ mbar)	5mt
Vacuum Indication (Millitorr or Millibar - selectable)	760 Torr to 1 Millitorr	Base Cabinet Dimensions:	
Vacuum Regulation	Vacuum Bleed Type	in. 15.5W x 19D x 15.5H	
Temperature - Vapor		cm. 39.4W x 48.3D x 39.4H	
Pressure Conversion	Push Button	Weight: Lbs/Kg	ES 101/45.8 EL 131/59.4
System Maintenance	Oil Change	Standard Voltages	115V/60, 208V/60, 220V/50
PC Interface	RS - 232	(Specifications are subject to change without notice.)	
Defrost Method	Hot Gas		
Product Freezing in Condenser via 2 Position shelf	ES -25°C EL -40°C		

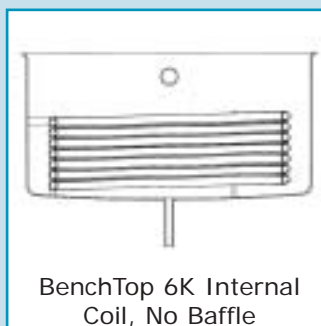
The BenchTop 6K Freeze Dryer has much more capacity than its name would imply. Designed for small labs needing a large capacity condenser that doesn't take up premium space in the lab, this equipment is the answer.

The following features are standard on these models:

- Will handle 5 liters of condensate in 24 hours.
- Total condenser capacity of 9 liters.
- Offered in two refrigeration systems standard -55°C for mostly aqueous-based samples and -85°C low temperature cascade for samples containing percentages of high vapor pressure solvents.
- Hot gas defrost for fast turnaround time, will defrost condenser in under 10 minutes.
- Convenient access drain hose located on the front of the cabinet for easy clean-up.
- Small footprint of 15.5"W x 19"D x 15.5"H (39.3 cm x 48.2 cm x 39.3 cm). (Note: Manifold adds to the height.)
- Standard Lyo-Control (SLC) microprocessor

BenchTop 6K Freeze Dryer

shown with
12 port acrylic manifold,
3-shelf stoppering
assembly rack-unheated.



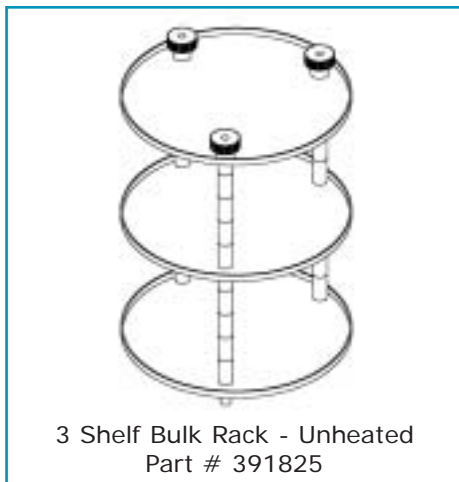
for monitoring of critical parameters and vacuum level control to assist in speeding up the drying process.

- Excellent as a solvent trap.
- High deposition rate loading with robust stainless steel condenser design.

See Pages 8-11 for available manifolds, vacuum pumps and accessories. Vacuum pump, adapter and manifold needed for operation.

BenchTop 6K Freeze Dryer, ES Model	-55°C	115V/60Hz (CFC-Free)	Part #405072
BenchTop 6K Freeze Dryer, ES Model	-55°C	220V/50Hz (CFC-Free)	Part #417211
BenchTop 6K Freeze Dryer, EL Model	-85°C	208V/60Hz (CFC-Free)	Part #406369
BenchTop 6K Freeze Dryer, EL Model	-85°C	220V/50Hz (CFC-Free)	Part #419130

Accessories for the BenchTop 2K



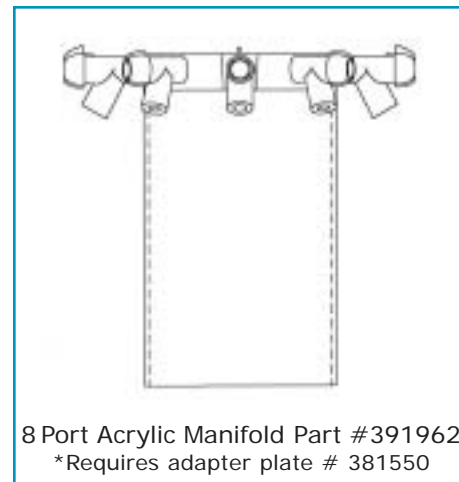
3 Shelf Bulk Rack - Unheated
Part # 391825

Three Shelf Rack has three shelves each with an eight-inch diameter (200 mm) and a clearance of 3.5 inches (8.9 cm). This accessory is adjustable and can be quickly and easily turned into a one or two shelf rack for a variety of processing requirements. It can hold up to 270-2 ml vials, or 150-5 ml vials, or 135-10 ml vials, or 80-20 ml vials.



2 Shelf Stopping Assembly Rack - Unheated
Part # 388726

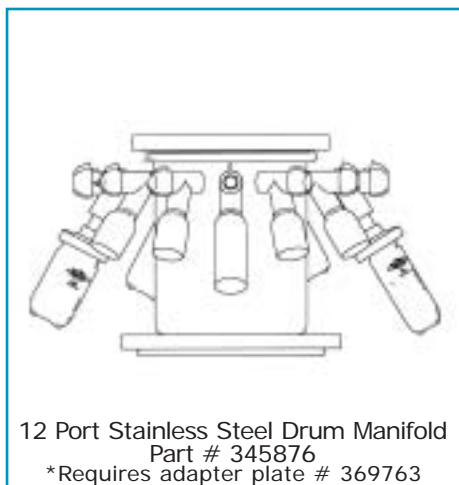
Stoppering Accessory has two shelves each with a diameter of 8 inches (200 mm). This assembly can be used to freeze dry samples in vials and stopper the vials at the end of the freeze drying process for long term storage. The shelves are adjustable for processing of larger vials. Unit fits easily inside the eight port acrylic manifold. Shelf clearance is 2.8 inches (7.1 cm).



8 Port Acrylic Manifold Part #391962
*Requires adapter plate # 381550

8 Port Acrylic Manifold with eight ports comes with eight VirTis 3/4" (19 mm) Quickseal valves for attaching a variety of flasks, ampoules or vials. Top plug is removable to allow for the two shelf stoppering assembly to be configured at a later date. Clear acrylic allows easy viewing of samples on stoppering assembly or bulk racks. 17.9"H x 9.5 "W (455 mm x 241 mm)

Stainless Steel Manifolds



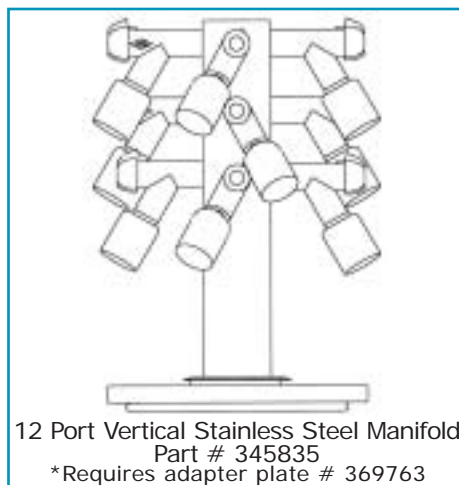
12 Port Stainless Steel Drum Manifold
Part # 345876
*Requires adapter plate # 369763

Stainless Steel Drum Manifold provided with 12 each 3/4" (19 mm) VirTis patented Quickseal valves. Stainless steel manifolds are recommended for applications involving high percentages of organic solvents and acids. Three tiered adjustable rack can be placed inside for drying of vials or small trays.



Acrylic Cold Trap Plate
2K/Part # 369770
4K,6K/Part# 405485

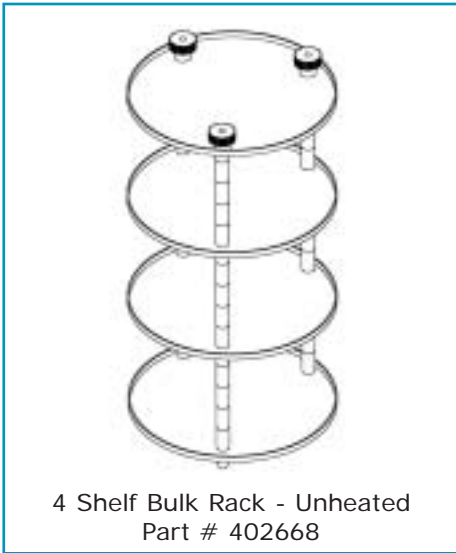
Acrylic Plate for use with BT2, 4 or 6K to utilize freeze dryer as a cold trap for other equipment such as vacuum concentrator or gel dryer.



12 Port Vertical Stainless Steel Manifold
Part # 345835
*Requires adapter plate # 369763

Vertical Stainless Steel Manifold for use with multiple small samples and/or large flasks. Comes complete with 12 each 3/4" (19 mm) VirTis patented Quickseal valves. When using large flasks support/condensate tray is recommended.

Accessories for the BenchTop 4K and 6K

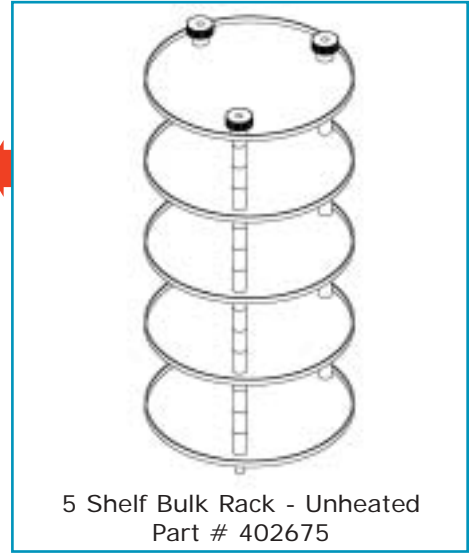


4 Shelf Bulk Rack - Unheated
Part # 402668

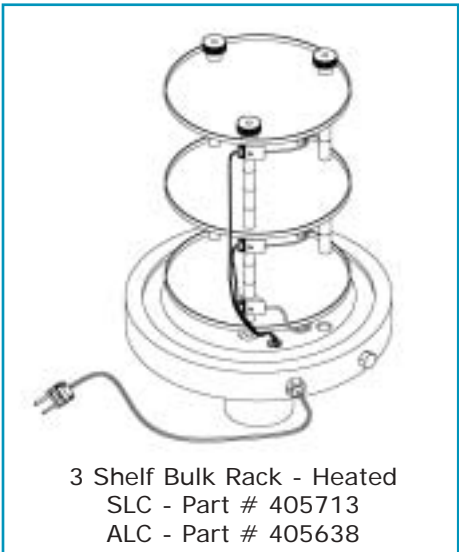
Four Shelf Bulk Rack has four each 10.5-inch (266 mm) diameter shelves with a clearance of 3.5 inches (8.9 cm).

Five Shelf Bulk Rack has five each 10.5-inch (266 mm) diameter shelves with a clearance of 2.8 inches (7.1 cm).

Both were designed for use with the 12 port acrylic manifold. Shelves will hold a variety of vials, serum bottles, small dishes and microtitre plates. Shelves are easily removed, adjusted or added for accommodating a variety of sample sizes. Additional shelves and spacers may be purchased separately.

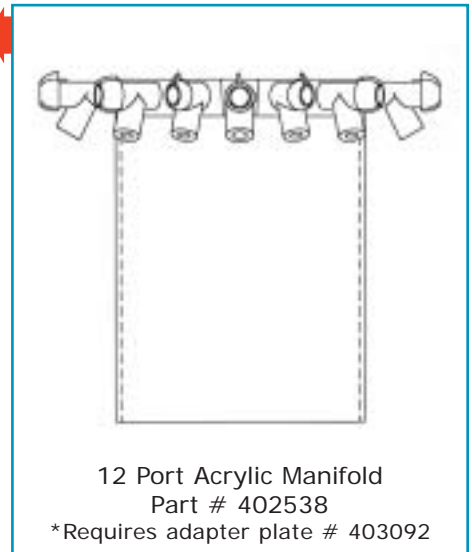


5 Shelf Bulk Rack - Unheated
Part # 402675



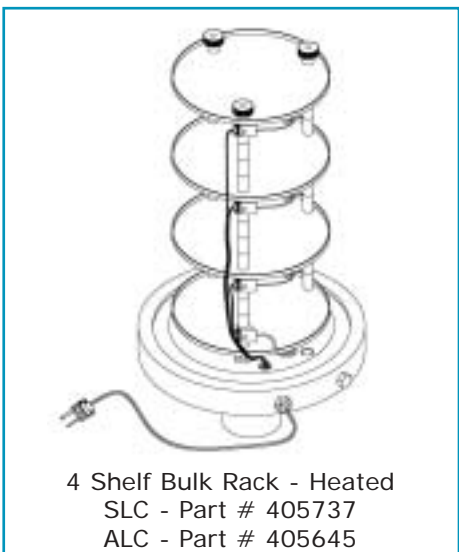
3 Shelf Bulk Rack - Heated
SLC - Part # 405713
ALC - Part # 405638

Twelve Port Acrylic Manifold comes complete with twelve 3/4" (19 mm) VirTis Quickseal valves. These valves can be used for attaching a variety of sample containers such as flasks, vials or ampoules. This manifold can be used with a variety of heated and unheated bulk rack assemblies along with the three shelf stoppering assembly. 17.9"H x 12"W (455 mm x 305 mm)



12 Port Acrylic Manifold
Part # 402538
*Requires adapter plate # 403092

Heated Bulk Racks Heated racks can be used in the 12 port acrylic manifold for processing of vials or small bulk samples. Heated bulk racks have a maximum temperature of up to +38°C with SLC control for processing of non-heat labile samples. If used with ALC control, temperature can be controlled at a range of +20°C to +80°C.



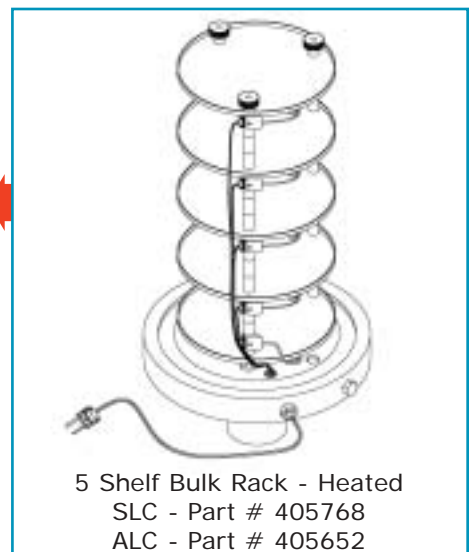
4 Shelf Bulk Rack - Heated
SLC - Part # 405737
ALC - Part # 405645

Offered in a three-, four- or five-shelf configuration, all shelves are 10.5-inch (266 mm) diameter. Shelves are adjustable and are easily configured for samples needing more shelf clearance.

Clearance between shelves for standard bulk racks that are heated are:

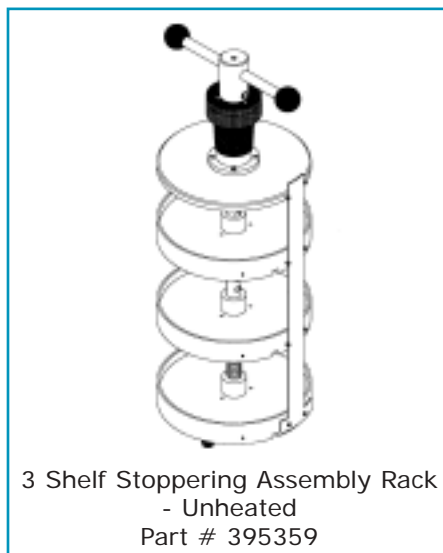
Clearance

- 3 Shelf Bulk - 3.5" (8.9 cm)
- 4 Shelf Bulk - 3.5" (8.9 cm)
- 5 Shelf Bulk - 2.7" (7.1 cm)



5 Shelf Bulk Rack - Heated
SLC - Part # 405768
ALC - Part # 405652

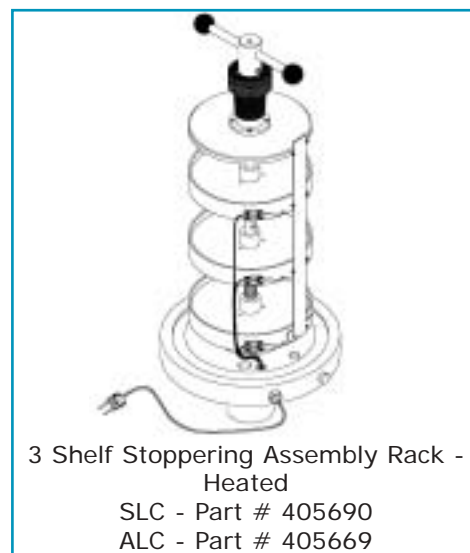
Stoppering Assembly Racks



3 Shelf Stoppering Assembly Rack
- Unheated
Part # 395359

Stoppering Assembly with three eight-inch (200 mm) diameter shelves is for stoppering of vials under vacuum or atmosphere. This assembly is available in a heated and an unheated version for use with the 12 port acrylic manifold. Shelves are adjustable for stoppering of a large variety of vial sizes. Shelf clearance is 2.8 inches (7.1 cm).

The heated rack has a temperature range of +38°C with the SLC control. If used with ALC control, temperature can be controlled at a range of +20°C to +80°C.



3 Shelf Stoppering Assembly Rack - Heated
SLC - Part # 405690
ALC - Part # 405669

Glassware



Flasks



Adapters

VirTis Wide Mouth Filter Seal Flasks are designed to make freeze drying simple. All VirTis flasks have flat bottoms for stability and wide mouths. They are available in 7 different sizes for a wide range of samples.

The snap-on silicone rubber top provides a leak proof seal without vacuum grease for maintenance-free sample processing. A replaceable filter is secured with an O-ring to prevent cross-contamination and product dispersion.

These borosilicate flasks are completely autoclavable and are also offered with a safety coat-

ing. The nylon safety coating will contain glass in the case of breakage and will also protect the outer surface of the glass from scratching and chipping.

Flasks require an adapter to connect them to valves. Adapters are offered in plastic, glass or stainless steel for different applications and customer preference.

VirTis offers many other adapters for ampoules, vials and even round bottom flasks. Call VirTis customer service or e-mail us at customerservice@virtis.com regarding your specific requirements.

VirTis Wide Mouth Filter Seal Flasks

Catalog Number	Maximum Capacity	Working Capacity
235390	40 ml	20 ml
235382	75 ml	35 ml
118174	150 ml	75 ml
118208	300 ml	150 ml
118232	600 ml	300 ml
118273	1,200 ml	600 ml
118307	2,000 ml	1,000 ml

* Contact VirTis for part numbers of safety coated flasks.

Adapters to Connect Flasks to a Manifold

VirTis Part #	Material	Shape	Port Size	Compatible Flasks
367424	Plastic	Straight	3/4"	150 - 2,000 ml
179655	Glass	Straight	3/4"	150 - 2,000 ml
177923	Stainless Steel	Straight	3/4"	150 - 2,000 ml
177899	Glass	45 Degree	3/4"	150 - 2,000 ml
177931	Stainless Steel	45 Degree	3/4"	150 - 2,000 ml
179622	Glass	Straight	3/4"	40 & 75 ml
177873	Glass	45 Degree	3/4"	40 & 75 ml

Accessories for BenchTop 2,4 and 6K Freeze Dryers

Vacuum Pumps

All VirTis vacuum pumps are corrosion resistant and adapt easily to the BenchTop Freeze Dryers. They plug into the back of the freeze dryer via an I.E.C. line cord. Pumps are gas ballasted, two-stage with visible sight glass.



Sealing/Stoppering Accessory

Convenient sealing/stoppering device for BenchTop 2,4 and 6K freeze Dryers. Paired with an acrylic cover, accessory can be used to freeze vials in the condenser and stopper vials under vacuum and sterile conditions once freeze drying is complete. Easily accommodates a wide variety of vial sizes from 2 ml to 50 ml.

Lab Cart

18" x 24" (45.7 cm x 60.9cm) lab cart for BT2, 4 and 6K comes with two solid galvanized steel shelves, two chrome u-shaped handles and four each five-inch swivel casters. Cart can accommodate a total of 600 lbs. (272Kg) of weight. Part # 392174



Stoppers

Split stoppers are designed to sit on top of the vial or serum bottle and still allow vapor to pass from the sample to the condenser. Rubber stoppers are siliconized for ease of stoppering at the end of drying.

Windmill

End of drying indicator used inside the acrylic manifolds provides a quick visual indication of the end of the freeze drying process. Part # 353730

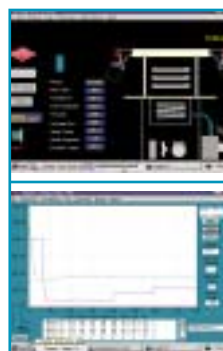


Ampoule Adapter

Fits into a standard VirTis 3/4" (19 mm) Quickseal valve on any manifold. This adapter can hold 19 ampoules at a time and is designed for fast freezing and freeze drying of small ampoules in multiple batches.

Support/Condensate Tray

Can be used with 2, 4 or 6K freeze dryer. When placed below the manifold will capture any moisture from glassware attached to manifold, also supplies support for larger vessels such as the 1200 or 2000 ml VirTis flasks. BT2K/Part # 391979; BT4K, 6K Part # 402682



Workstation Software

Interactive Windows-based software that allows complete trending of all process transducers. Provides plot and datalogging output formats.

Kwik-Dry

Accessory that attaches conveniently to the back of the 2, 4, or 6K freeze dryer and will help speed up drying of samples in flasks. Increases the available heat to the product by up to 15°C which will reduce drying time by up to 25%. BT2K/Part # 406550 BT4, 6K/ Part # 402682



Vacuum Brake Solenoid (VBS)

Vacuum brake solenoid located in-line between pump and condenser to prevent oil migration to condenser or samples in the event of a power failure. Can also be used for vacuum regulation with the ALC control system.



•Wide Range Of Condenser Capacities •Manifolds For Every Application •Pressure Control

VirTis offers a wide range of lab through industrial scale freeze dryers (lyophilizers). Contact VirTis for more information on:

Laboratory Freeze Dryers

- Freezemobiles
- AdVantage
- Unitop

Pilot/Production Freeze Dryers

- Genesis
- Ultra
- VirTual
- Benchmark

Other Lab Products

- Fermenters
- Ultrasonic Cell Disrupters
- Homogenizers

Warranty

All VirTis Freeze Dryers are covered by a one-year all parts and labor and two-year refrigeration warranty.

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