



# FreeZone®

## Freeze Dry Systems and Accessories



*Protecting your  
laboratory environment*

**LABCONCO®**



**Fisher  
Scientific**



# FreeZone® Freeze Dry Systems

AN OVERVIEW

## Table of Contents:

Overview . . . . .	1
Selection Guide . . . . .	4
<b>FreeZone Freeze Dry Systems</b>	
1 Liter Benchtop . . . . .	6
2.5 Liter Benchtop . . . . .	8
2.5 Liter Cascade Benchtop . . . . .	10
2.5 Liter Cascade Console . . . . .	12
4.5 Liter Benchtop . . . . .	14
4.5 Liter Console . . . . .	16
4.5 Liter Cascade Benchtop . . . . .	18
4.5 Liter Cascade Console . . . . .	20
4.5 Liter -105° C Cascade Benchtop . . . . .	22
6 Liter Benchtop . . . . .	24
6, 12 & 18 Liter Console . . . . .	26
6 & 12 Liter Cascade Console . . . . .	30
Ordering Information . . . . .	33
Dry Ice Freeze Dry System . . . . .	41
FreeZone Triad Cascade Freeze Dry Systems . . . . .	42
FreeZone Stoppering Tray Dryers . . . . .	46
FreeZone Bulk Tray Dryers . . . . .	49
FreeZone Triad, Stoppering Tray Dryers & Bulk Tray Dryers Accessories . . . . .	51
Drying Accessories . . . . .	52
Secondary Traps . . . . .	55
PrimeMate™ Oil Change Systems . . . . .	56
Rotary Vane Vacuum Pumps & Accessories . . . . .	57
Fast-Freeze® Flasks . . . . .	60
Lyph-Lock® Flasks . . . . .	61
Serum Bottles . . . . .	62
Ampules & Miscellaneous Accessories . . . . .	63
FreeZone Benchtop Shell Freezers . . . . .	65

*LABCONCO has been designing and manufacturing laboratory freeze drying equipment since 1974. Since the beginning, Labconco has strived to incorporate features that enhance environmental safety, ease-of-use and durability.*

**ENVIRONMENTAL SAFETY.** All refrigeration systems found in FreeZone Freeze Dry Systems, FreeZone Plus Cascade Freeze Dry Systems and FreeZone Stoppering Tray Dryers use environmentally-friendly HCFC/CFC-free refrigerants.

**EASE OF USE.** FreeZone Freeze Dry Systems were designed to provide simplicity of use and convenience.

- With automatic start up, pressing one button initiates collector refrigeration and vacuum. Vacuum pull down is delayed to allow sufficient time for the collector to cool ensuring that moisture is trapped by the collector to protect the pump from contamination.
- Lighted “wave” graphs display amber then green to indicate when temperature and vacuum levels are right for adding samples.\*



FreeZone Freeze Dry Systems in console models are available in 2.5, 4.5, 6, 12 and 18 liter collector capacities.

\*Not included on FreeZone 1 Liter Systems



# FreeZone® Freeze Dry Systems

A N O V E R V I E W



*FreeZone 1 Liter Benchtop Freeze Dry Systems offer an economical solution for processing light sample loads or dedicated use by one researcher.*

- The LCD provides easy-to-read digital readouts of vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays service information such as total number of hours of refrigeration and vacuum pump operation and total number of hours since the refrigeration and vacuum pump were serviced.
- The vacuum control valve helps to speed evaporation of solvent samples by maintaining the vacuum level.\*
- The audible/visual alarm alerts the user to abnormal system events. Alarm messages are displayed on the LCD.\*
- The upright collector chamber makes defrosting easy. All models may be manually defrosted by pouring water into the upright chamber to melt the collected ice. Some models include a built-in hot gas defrost that melts the collected ice. When the defrost function is selected, hot gas from the compressor is circulated through the collector coil. The defrost feature automatically shuts off when the refrigerant leaving the collector coil reaches +65° C (+149° F). A collector drain hose allows convenient emptying of the melted ice.
- The rear-mounted RS-232 port simplifies connection to a personal computer for operation verification. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.\*

\*Not included on FreeZone 1 Liter Systems

\*\* Polytetrafluoroethylene

**DURABILITY.** FreeZone Systems have several features designed to protect the system and vacuum pump.

- The patented moisture sensor protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber.\*
- The vacuum break valve protects the system from oil back-streaming during power outages.\*
- Models are available that include a PTFE\*\* -coated collector chamber and coil for processes involving corrosive compounds.
- The purge valve, available on FreeZone 6, 12 and 18 Liter Console Systems, allows the vacuum pump to be run after freeze drying is complete so that contaminants may be purged from the oil.

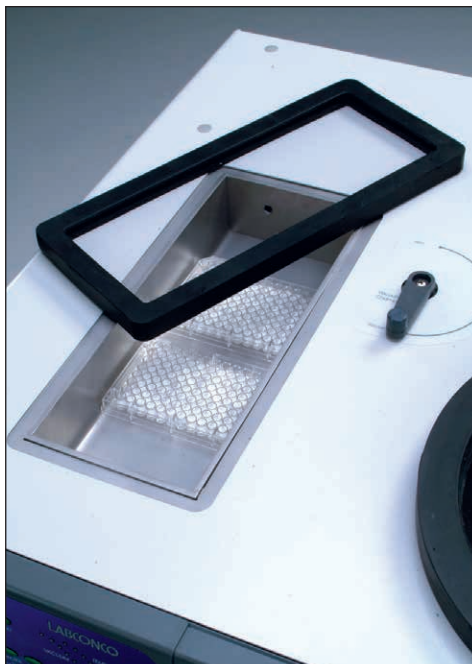


*FreeZone Plus 2.5 Liter Cascade Freeze Dry Systems reach -84° C for processing samples with low eutectic points. Dual refrigeration cascade models also come in 6 and 12 liter collector capacities.*



## FreeZone® Freeze Dry Systems

AN OVERVIEW



*Left: A built-in shell freezer may be ordered with selected models of FreeZone 6 Liter Freeze Dry Systems.*

*Right: A built-in mini vacuum drying chamber holds small samples and heats to +60° C (+140° F). The drying chamber may be ordered with selected models of FreeZone 6, 12 and 18 Liter Freeze Dry Systems.*

## Digital Control Panel Displays System Status

### FreeZone® 1 Liter Freeze Dry Systems

LABCONCO

VACUUM 0.070 mBar  
COLLECTOR -50C

MENU SELECT VACUUM  
MANUAL / ON  
OFF

**MENU** switch. Changes the display from operating system parameters to set-up parameters.

**SELECT** switch. Press to select between manual or automatic vacuum pump start-up, desired vacuum or temperature unit of measure.

**VACUUM MANUAL ON/OFF** switch. Press to start the vacuum pump manually or to stop the vacuum pump when operating in either the auto or manual start-up mode.

**LCD.** Displays system set-up and operating parameters. The user may configure the display to show vacuum in mBar, Pa or Torr and temperature in ° F or ° C. Other displays include: total duration of refrigeration operation, total duration since the refrigeration system was last serviced, total duration of vacuum operation and total duration since the vacuum pump was last serviced (in hours).



# FreeZone® Freeze Dry Systems

AN OVERVIEW

## FreeZone® 2.5–18 Liter Freeze Dry Systems

**DEFROST** switch with LED indicator light. Controls the hot gas chamber defrost function found on all FreeZone 6, 12 and 18 Liter Console Systems.

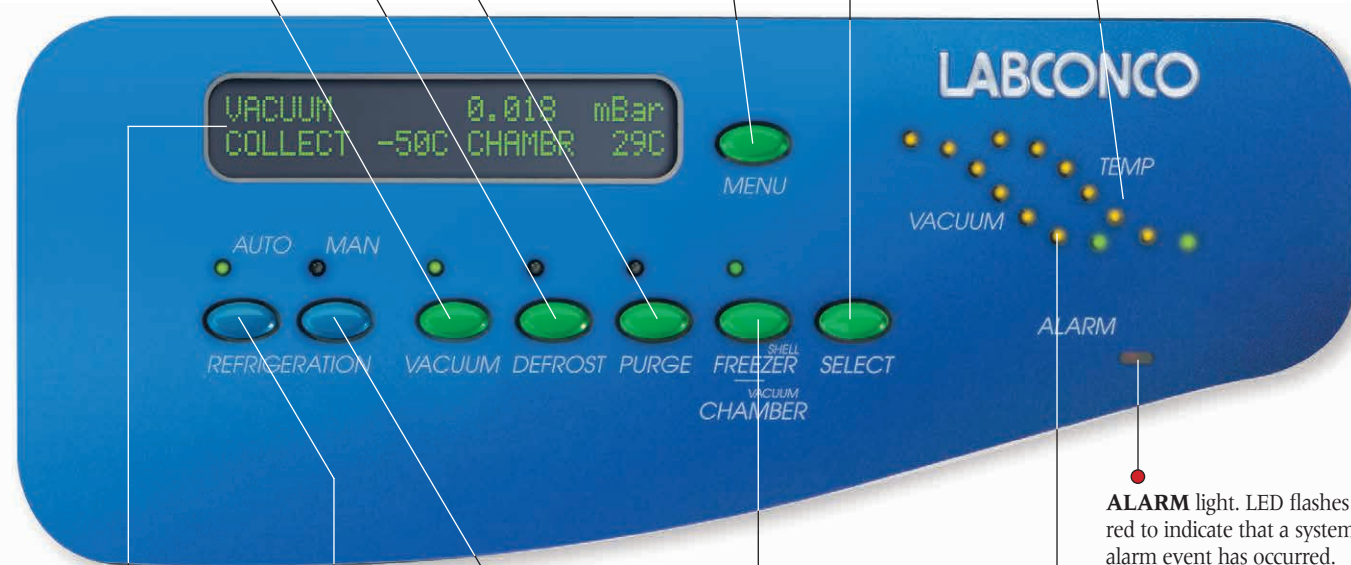
**VACUUM** switch with LED indicator light. Starts or stops the vacuum pump.

**PURGE** switch with LED indicator light. Controls the optional purge valve available on FreeZone 6, 12 and 18 Liter Console Systems. The green LED illuminates when the purge valve is closed, isolating the pump from the collector chamber.

**MENU** switch. Press to change screen display.

**SELECT** switch. Press to select desired vacuum or temperature unit of measure or set-up parameters.

**TEMPERATURE GRAPH DISPLAY.** Provides at-a-glance monitoring of the collector temperature. The highest LED illuminates amber to indicate that the temperature is warmer than +10° C. The indicators sequence down when the temperature reaches +10, 0, -10, -20, -30 and -40° C. When the collector temperature reaches -40° C, the lowest LED illuminates green, indicating temperature is right to add samples.



**LCD.** Displays system set-up and operating parameters and alarm messages. The user may configure the display to show vacuum in mBar, Pa or Torr and temperature in ° F or ° C. Other displays include: total duration of refrigeration operation and total duration since the refrigeration system was last serviced (in hours); total duration of vacuum operation and total duration since the vacuum pump was last serviced (in hours); time between RS-232 transmissions (10, 30, 60, 300 or 600 second intervals); and alarm messages: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use) and moisture in collector.

**MANUAL** refrigeration switch with LED indicator light. Press to start the refrigeration only.

**AUTO** mode switch with LED indicator light. Controls refrigeration and the automatic mode process. In the automatic mode, the system activates the vacuum pump when the collector temperature reaches -40° C.

**SHELL FREEZER** switch with LED indicator light. Controls the optional shell freezer rollers and refrigeration module available on FreeZone 6 Liter Console Freeze Dry Systems.


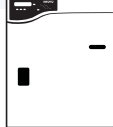
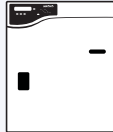
**VACUUM CHAMBER** switch with LED indicator light. Controls the optional mini vacuum drying chamber available on FreeZone 6, 12 and 18 Liter Console Freeze Dry Systems.

**ALARM** light. LED flashes red to indicate that a system alarm event has occurred. Events that trigger the audible/visual alarm are: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.

**VACUUM GRAPH DISPLAY** Provides at-a-glance monitoring of relative system vacuum level. The highest LED illuminates amber to indicate that the vacuum level is above 2.0 mBar. The indicators sequence down when the vacuum level reaches 2.0, 1.0, 0.8, 0.6, 0.45 and 0.12 mBar. When the vacuum level is between 0.45 and 0.12, the lowest LED flashes green. Below 0.12 mBar, the lowest LED illuminates green steadily, indicating samples may be attached to the freeze dry system.



# FreeZone® Freeze Dry Systems Selection Guide

	System Capacity	Style	Application Requirements and User Preferences	-50° C (-58° F) Collector/ Refrigeration <i>For aqueous samples Optional PTFE-coated collector available</i>	-84° C (-119° F) Cascade Collector/ Refrigeration <i>For samples with low eutectic points, including acetonitrile Optional PTFE-coated collector available on some models</i>
	<b>1 Liter</b> <i>See pages 6-7</i>	Benchtop	<ul style="list-style-type: none"> <li>• Light sample loads</li> <li>• Limited floor space</li> <li>• Economical</li> </ul>	<ul style="list-style-type: none"> <li>• 1/3 hp refrigeration system</li> <li>• Removes 1 liter of water in 24 hours*</li> </ul>	
	<b>2.5 Liters</b> <i>See pages 8-11</i>	Benchtop	<ul style="list-style-type: none"> <li>• Light sample loads</li> <li>• Limited floor space</li> </ul>	<ul style="list-style-type: none"> <li>• 1/3 hp refrigeration system</li> <li>• Removes 2 liters of water in 24 hours*</li> </ul>	<ul style="list-style-type: none"> <li>• Two 1/3 hp refrigeration systems</li> <li>• Removes 2.2 liters of water in 24 hours*</li> </ul>
	<b>2.5 Liters</b> <i>See pages 12-13</i>	Console	<ul style="list-style-type: none"> <li>• Light sample loads</li> <li>• Low eutectic point samples</li> </ul>		<ul style="list-style-type: none"> <li>• Two 1/3 hp refrigeration systems</li> <li>• Removes 2.2 liters of water in 24 hours*</li> </ul>
	<b>2.5 Liters</b> <i>See pages 42-45</i>	Benchtop Triad™	<ul style="list-style-type: none"> <li>• Light sample loads</li> <li>• Low eutectic point samples</li> <li>• Stoppers samples in bottles under vacuum</li> </ul>		<ul style="list-style-type: none"> <li>• Two 1/3 hp refrigeration systems</li> <li>• Removes 1.8 liters of water in 24 hours*</li> </ul>
	<b>4.5 Liters</b> <i>See pages 14-15, 18-19 and 22-23</i>	Benchtop	<ul style="list-style-type: none"> <li>• Light to moderate sample loads</li> <li>• Limited floor space</li> </ul>	<ul style="list-style-type: none"> <li>• 1/3 hp refrigeration system</li> <li>• Removes over 2 liters of water in 24 hours*</li> </ul>	<ul style="list-style-type: none"> <li>• Two 1/3 hp refrigeration systems</li> <li>• Removes 4 liters of water in 24 hours*</li> </ul>
	<b>4.5 Liters</b> <i>See pages 16-17 and 20-21</i>	Console	<ul style="list-style-type: none"> <li>• Light to moderate sample loads</li> </ul>	<ul style="list-style-type: none"> <li>• 1/3 hp refrigeration system</li> <li>• Removes over 2 liters of water in 24 hours*</li> </ul>	<ul style="list-style-type: none"> <li>• Two 1/3 hp refrigeration systems</li> <li>• Removes 4 liters of water in 24 hours*</li> </ul>
	<b>6 Liters</b> <i>See pages 24-25</i>	Benchtop	<ul style="list-style-type: none"> <li>• Moderate sample loads</li> <li>• Limited floor space</li> <li>• Available with Stoppering Tray Dryer</li> </ul>	<ul style="list-style-type: none"> <li>• 3/4 hp refrigeration system</li> <li>• Removes 4 liters of water in 24 hours*</li> </ul>	
	<b>6 Liters</b> <i>See pages 26-27 and 30-31</i>	Console	<ul style="list-style-type: none"> <li>• Moderate sample loads</li> <li>• Broadest range of options</li> <li>• Available with Stoppering Tray Dryer</li> </ul>	<ul style="list-style-type: none"> <li>• 3/4 hp refrigeration system</li> <li>• Removes 4 liters of water in 24 hours*</li> </ul>	<ul style="list-style-type: none"> <li>• Two 1/3 hp refrigeration systems</li> <li>• Removes 4 liters of water in 24 hours*</li> </ul>
	<b>12 Liters</b> <i>See pages 26, 28, 30 and 32</i>	Console	<ul style="list-style-type: none"> <li>• Sample loads of varying volumes</li> <li>• Available with Stoppering Tray Dryer</li> </ul>	<ul style="list-style-type: none"> <li>• 1 hp refrigeration system</li> <li>• Removes 8 liters of water in 24 hours*</li> </ul>	<ul style="list-style-type: none"> <li>• Two 3/4 hp refrigeration systems</li> <li>• Removes up to 4 liters of water in 24 hours*</li> </ul>
	<b>18 Liters</b> <i>See pages 26 and 29</i>	Console	<ul style="list-style-type: none"> <li>• Large volumes of material or numerous sample batches</li> </ul>	<ul style="list-style-type: none"> <li>• 1-1/2 hp refrigeration system</li> <li>• Removes 10 liters of water in 24 hours*</li> </ul>	

\*Freeze drying rate will be lower for samples other than shell-frozen plain water.



# FreeZone® Freeze Dry Systems

## BUILT-IN OPTIONS

<p><b>-105° C (-157° F)**</b>  <b>Cascade Collector/            Refrigeration</b></p> <p><i>For samples with very low eutectic points including acetonitrile and dilute methanol and ethanol</i></p>	<p><b>Purge Valve,            Mini Vacuum Drying Chamber &amp;            Shell Freezer</b></p> <p><i>Available on some models</i></p>	<p><b>Drying            Accessory</b></p> <p><i>Tray Dryers, Drying Chambers and Manifolds that accommodate samples in containers or in bulk</i></p>	<p><b>Vacuum            Pump</b></p> <p><i>See pages 57-59</i></p>	<p><b>Glassware</b></p> <p><i>See pages 60-63</i></p>
		<ul style="list-style-type: none"> <li>• REQUIRED— See drying accessories on pages 52-54.</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 86 liters/minute or larger displacement</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
		<ul style="list-style-type: none"> <li>• REQUIRED— See drying accessories on pages 52-54.</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 86 liters/minute or larger displacement</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
		<ul style="list-style-type: none"> <li>• REQUIRED— See drying accessories on pages 52-54.</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 86 liters/minute or larger displacement</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
		<ul style="list-style-type: none"> <li>• Permanently installed</li> <li>• One stoppering shelf</li> <li>• 4 ports</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 98 liters/minute or larger displacement†</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
<ul style="list-style-type: none"> <li>• Two 1/3 hp refrigeration systems</li> <li>• Removes 2.5 liters of water in 24 hours*</li> </ul>		<ul style="list-style-type: none"> <li>• Permanently installed or included†</li> <li>• 10 ports or 12 ports†</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 86 liters/minute or larger displacement</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
		<ul style="list-style-type: none"> <li>• Permanently installed or included†</li> <li>• 10 ports or 12 ports†</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 86 liters/minute or larger displacement</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
		<ul style="list-style-type: none"> <li>• REQUIRED— See drying accessories on pages 46-54.</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 98 liters/minute or larger displacement††</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
	<ul style="list-style-type: none"> <li>• Purge Valve available</li> <li>• Mini Vacuum Drying Chamber available</li> <li>• Shell Freezer available with -50° C models</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— See drying accessories on pages 46-54.</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 98 liters/minute or larger displacement††</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
	<ul style="list-style-type: none"> <li>• Purge Valve available</li> <li>• Mini Vacuum Drying Chamber available</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— See drying accessories on pages 46-54.</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 98 liters/minute or larger displacement††</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>
	<ul style="list-style-type: none"> <li>• Purge Valve available</li> <li>• Mini Vacuum Drying Chamber available</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— See drying accessories on pages 46-54.</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— 98 liters/minute or larger displacement††</li> </ul>	<ul style="list-style-type: none"> <li>• REQUIRED— unless bulk drying</li> </ul>

\* Freeze drying rate will be lower for samples other than shell-frozen plain water.

\*\* -105° C (-157° F) at 60 Hz, -102° C (-152° F) at 50 Hz

† FreeZone 4.5 Liter Freeze Dry Systems include a permanently-installed 10-port drying chamber. FreeZone Plus 4.5 Liter Cascade Freeze Dry Systems and FreeZone -105° C 4.5 Liter Freeze Dry Systems include a 12-Port Drying Chamber 10-273-19, which requires attachment.

†† 144 liters/minute displacement is recommended.



# FreeZone® 1 Liter Benchtop Freeze Dry Systems

## FEATURES & BENEFITS

*Rear-mounted 3/4" vacuum connection extends vertically, requiring less space.*

*HCFC/CFC-free refrigeration system* ensures rapid, environmentally-safe cooling. The condensing module cools the collector coil to **-50° C (-58° F)**, ideal for freeze drying aqueous samples. The system uses a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

❖ *Benchtop cabinet* has small footprint. Compact cabinet of durable powder-coated steel with brushed stainless steel front panel and four rubber feet fits easily atop a countertop or laboratory cart.

*Attachment lid* makes connection of accessories easy. Select from accessory drying chambers and manifolds (sold separately).

*Upright, stainless steel collector chamber* speeds and simplifies defrost. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector coil and chamber for additional corrosion resistance.

*Factory wired.* All models include a 3-wire cord with 20 amp NEMA plug.

*Automatic start-up* is quick and easy to use. Turning on the main power switch, located on the right-hand side, initiates the collector cool-down and vacuum pull-down sequence if automatic mode is selected. If manual mode is selected, turning on the main power switch initiates collector cool-down, but the vacuum pump must be turned on by pressing the vacuum switch.

*Rear-mounted electrical receptacle* allows connection of the vacuum pump (sold separately).



❖ *LCD* displays system set-up and operating parameters.

*Easy-to-follow operating instructions* are printed on the right-hand side.

*Collector drain hose* is accessible from the left-hand side for convenient disposal of defrosted material. It extends about 9 inches and retracts within the cabinet when not in use.



*ETL listed.* Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



*CE marking.* All 230 volt, 50 Hz models conform to the CE (European Community) directives.

❖ *Exclusive feature*





# FreeZone® 1 Liter Benchtop Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 1 liter of water in 24 hours and holding 1 liter of ice before defrosting.\*
- 1/3 hp HCFC/CFC-free refrigeration system to cool collector to **-50° C (-58° F)**. For aqueous samples. Not for use with samples containing acetonitrile, methanol or ethanol.
- ❖ Compact benchtop design with a small footprint.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD for display of set-up and operating parameters. It may be user-configured to select either automatic or manual mode operation and to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total duration of refrigeration system operation and time since the refrigeration system was serviced, and the duration of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- Automatic start-up for collector cool-down and vacuum pull-down when programmed for automatic mode.
- Side-mounted, retractable, 9" collector drain hose.
- Clear acrylic lid, 3/4" thick, with 3" diameter attachment port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3/4" OD vacuum connector, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 12.6" w x 17.9" d x 16.9" h (32.0 cm x 45.4 cm x 42.9 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory. See pages 52-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

\* Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



FreeZone 1 Liter Benchtop Freeze Dry System 10-030-126, 12-Port Drying Chamber 10-273-19, Portable Table 11-925-108 and miscellaneous glassware.

See ordering information on page 33.



# FreeZone® 2.5 Liter Benchtop Freeze Dry Systems

## FEATURES & BENEFITS

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. The condensing module cools the collector coil to **-50° C (-58° F)**, ideal for freeze drying aqueous samples. The system uses a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**Rear-mounted 3/4" vacuum connection extends vertically**, requiring less space.

**Attachment lid** makes connection of accessories easy. Select from accessory drying chambers and manifolds (sold separately).

**Upright, stainless steel collector chamber** speeds and simplifies defrost. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector coil and chamber for additional corrosion resistance.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Easy-to-follow operating instructions** are printed on the right-hand side.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**Collector drain hose** is accessible from the left-hand side for convenient defrost. It extends about 9 inches and retracts within the cabinet when not in use.

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.

❖ **Vacuum break valve** protects the system from oil backstreaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

❖ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze dry process.

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

❖ **Benchtop cabinet** has small footprint. Compact cabinet of durable powder-coated steel with brushed stainless steel front panel and four rubber feet fits easily atop a countertop or laboratory cart.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.

❖ *Exclusive feature*



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.



# FreeZone® 2.5 Liter Benchtop Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 2 liters of water in 24 hours and holding 2.5 liters of ice before defrosting.\*
- 1/3 hp HCFC/CFC-free refrigeration system to cool collector to **-50° C (-58° F)**. For aqueous samples. Not for use with samples containing acetonitrile, methanol or ethanol.
- ❖ Compact benchtop design with a small footprint.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- ❖ Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- Clear acrylic lid, 3/4" thick, with 3" diameter port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 12.6" w x 17.9" d x 16.9" h (32.0 cm x 45.4 cm x 42.9 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.



FreeZone 2.5 Liter Benchtop Freeze Dry System 10-030-132, Clear Chamber with Valves 10-030-155, Portable Table 11-925-108 and miscellaneous glassware.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory. See pages 52-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on page 33.

\* Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® Plus™ 2.5 Liter Cascade Benchtop Freeze Dry Systems

## FEATURES & BENEFITS

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. Two condensing modules, used in series, cool the collector coil to **-84° C (-119° F)**, ideal for freeze drying samples with low eutectic points including acetonitrile. The systems use a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**Rear-mounted 3/4" vacuum connection extends vertically**, requiring less space.

**Attachment lid** makes connection of accessories easy. Select from accessory drying chambers and manifolds (sold separately).

**Upright, stainless steel collector chamber** speeds and simplifies defrost. A baffle maximizes ice loading capabilities by evenly distributing collected ice over the entire collector coil. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector coil and chamber for additional corrosion resistance.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Easy-to-follow operating instructions** are printed on the right-hand side.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**Collector drain hose** is accessible from the left-hand side for convenient disposal of defrosted material. It extends about 9 inches and retracts within the cabinet when not in use.

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

❖ **Vacuum break valve** protects the system from oil backstreaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

❖ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze dry process.

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

❖ **Benchtop cabinet** has small footprint. Compact cabinet of durable powder-coated steel with brushed stainless steel front panel and four rubber feet fits easily atop a countertop or laboratory cart.

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.

❖ *Exclusive feature*



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.



# FreeZone® Plus™ 2.5 Liter Cascade Benchtop Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 2.2 liters of water in 24 hours and holding 2.5 liters of ice before defrosting.\*
- Dual 1/3 HCFC/CFC-free refrigeration systems to cool collector to **-84° C (-119° F)**. For samples containing water or acetonitrile. Not for use with samples containing methanol or ethanol.
- ❖ Compact benchtop cabinet with small footprint.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced, and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- ❖ Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- Clear acrylic lid, 3/4" thick, with 3" diameter port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3/4" OD vacuum connector, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 15.1" w x 23.2" d x 16.9" h (38.3 cm x 59.0 cm x 42.9 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.



FreeZone Plus 2.5 Liter Cascade Benchtop Freeze Dry System 10-030-138, 20-Port Manifold 10-273-14, Rotary Vane Vacuum Pump 01-096-21, Variable Height Bench 11-926-110 and miscellaneous glassware.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory. See pages 52-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on page 34.

\*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® Plus™ 2.5 Liter Cascade Freeze Dry Systems

## FEATURES & BENEFITS

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

**Rear-mounted 3/4" vacuum connection extends vertically**, requiring less space.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Collector drain hose** is accessible from the left-hand side for convenient disposal of defrosted material. It extends about 9 inches and retracts within the cabinet when not in use.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

❖ **Compact console cabinet.** Cabinet, mounted on 3" diameter casters, is powder-coated steel with removable brushed stainless steel front panel. The interior accommodates a vacuum pump (sold separately.)

**Easy-to-follow operating instructions** are printed on the right-hand side.

❖ **Vacuum break valve** protects the system from oil back-streaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**Attachment lid** makes connection of accessories easy. Select from accessory drying chambers and manifolds (sold separately).

**Upright, stainless steel collector chamber** speeds and simplifies defrost. A baffle maximizes ice loading capabilities by evenly distributing collected ice over the entire collector coil. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector chamber and coils for additional corrosion resistance.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

❖ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. Two condensing modules, used in series, cool the collector coil to **-84° C (-119° F)**, ideal for freeze drying samples with low eutectic points including acetonitrile. The systems use a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze dry process.

❖ *Exclusive feature*



# FreeZone® Plus™ 2.5 Liter Cascade Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 2.2 liters of water in 24 hours and holding 2.5 liters of ice before defrosting.\*
- Dual 1/3 hp HCFC/CFC-free refrigeration systems to cool collector to **-84° C (-119° F)**. For samples containing water or acetonitrile. Not for use with samples containing methanol or ethanol.
- ✳ Compact console cabinet with 3" diameter casters.
- ✳ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ✳ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced, and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- ✳ Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature "waves" for at-a-glance display of relative system vacuum and collector temperature.
- ✳ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ✳ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- Clear acrylic lid, 3/4" thick, with 3" diameter port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3/4" OD vacuum connector, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 18.6" w x 23.2" d x 37.4" h (47.2 cm x 59.0 cm x 95.0 cm).
- Usable interior space: 14.0" w x 18.5" d x 16.0" h (35.6 cm x 47.0 cm x 40.6 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.



FreeZone Plus 2.5 Liter Cascade Freeze Dry System 10-030-144, Clear Chamber with Valves 10-030-155, Product Shelves 10-030-152 and miscellaneous glassware.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory. See pages 52-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

See ordering information on page 34.

\*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

✳ Exclusive feature



# FreeZone® 4.5 Liter Benchtop Freeze Dry Systems

## FEATURES & BENEFITS

**Permanently-installed drying chamber facilitates sample connection.** The stainless steel chamber includes ten valves to allow connection of serum bottles, ampules or freeze dry flasks with 1/2" or 3/4" adaptors. Each valve has a beveled edge to provide at-a-glance indication of whether the valve is open or closed. The clear acrylic lid permits easy monitoring of ice build-up on the collector.

**Rear-mounted 3/4" vacuum connection extends vertically,** requiring less space.

**Upright, stainless steel collector chamber speeds and simplifies defrost.** Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector coil and chamber for additional corrosion resistance.

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. The condensing module cools the collector coil to **-50° C (-58° F)**, ideal for freeze drying aqueous samples. The system uses a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze dry process.

**Easy-to-follow operating instructions** are printed on the right-hand side.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Vacuum and temperature graphs display relative system vacuum and collector temperature.** Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

**Automatic start-up is quick and easy to use.** Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**Collector drain hose** is accessible from the left-hand side for convenient defrost. It extends about nine inches and retracts within the cabinet when not in use.

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

❖ **Vacuum break valve** protects the system from oil backstreaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

❖ **Benchtop cabinet has small footprint.** Compact cabinet of durable powder-coated steel with brushed stainless steel front panel and four rubber feet fits easily atop a counter-top or laboratory cart.

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.

❖ *Exclusive feature*





# FreeZone® 4.5 Liter Benchtop Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 2 liters of water in 24 hours and holding 4.5 liters of ice before defrosting.\*
- 1/3 hp HCFC/CFC-free refrigeration system to cool collector to **-50° C (-58° F)**. For aqueous samples. Not for use with samples containing acetonitrile, methanol or ethanol.
- Permanently-installed 10-port stainless steel drying chamber with 1/2" thick, clear acrylic lid with neoprene gasket.
- Compact benchtop design with a small footprint.
- ✳️ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ✳️ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- ✳️ Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ✳️ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ✳️ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 18.6" w x 18.5" d x 22.5" h (47.2 cm x 47 cm x 57.2 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.



FreeZone 4.5 Liter Benchtop Freeze Dry System 10-271-10 and Utility Cart 16-317-73.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on page 34.

\*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

✳️ Exclusive feature



# FreeZone® 4.5 Liter Freeze Dry Systems

## FEATURES & BENEFITS

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

**Rear-mounted 3/4" vacuum connection** extends vertically, requiring less space.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Collector drain hose** is accessible from the left-hand side for convenient defrost. It extends about 9 inches and retracts within the cabinet when not in use.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

❖ **Compact console cabinet.** Cabinet, mounted on 3" diameter casters, is powder-coated steel with a removable brushed stainless steel front panel. The interior accommodates a vacuum pump (sold separately).

**Easy-to-follow operating instructions** are printed on the right-hand side.

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.

**Upright, stainless steel collector chamber** speeds and simplifies defrost. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector chamber and coils for additional corrosion resistance.

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. The condensing module cools the collector coil to **-50° C (-58° F)**, ideal for freeze drying aqueous samples. The system uses a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**Permanently-installed drying chamber** facilitates sample connection. The stainless steel chamber includes ten valves to allow connection of serum bottles, ampules or freeze dry flasks with 1/2" or 3/4" adapters. Each valve has a beveled edge to provide at-a-glance indication of whether the valve is open or closed. The clear acrylic lid permits easy monitoring of ice build-up on the collector.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

❖ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze dry process.

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

❖ **Vacuum break valve** protects the system from oil back-streaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.

❖ *Exclusive feature*



# FreeZone® 4.5 Liter Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 2 liters of water in 24 hours and holding 4.5 liters of ice before defrosting.\*
- 1/3 hp HCFC/CFC-free refrigeration system to cool collector to **-50° C (-58° F)**. For aqueous samples. Not for use with samples containing acetonitrile, methanol or ethanol.
- Permanently-installed 10-port stainless steel drying chamber with 1/2" thick, clear acrylic lid with neoprene gasket.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- ❖ Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature "waves" for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3" diameter casters.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 18.6" w x 24.0" d x 48.1" h (47.2 cm x 61.0 cm x 122.2 cm).
- Usable interior space: 14.0" w x 18.5" d x 21.0" h (35.6 cm x 47.0 cm x 53.3 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.



FreeZone 4.5 Liter Freeze Dry System 10-271-16.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on page 34.

\*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® Plus™ 4.5 Liter Cascade Benchtop Freeze Dry Systems

## FEATURES & BENEFITS

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

**Rear-mounted 3/4" vacuum connection extends vertically**, requiring less space.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Easy-to-follow operating instructions** are printed on the right-hand side.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Collector drain hose** is accessible from the right-hand side for convenient disposal of defrosted material. It extends about 9 inches and retracts within the cabinet when not in use.

**Benchtop cabinet has small footprint.** Compact cabinet of durable powder-coated steel with brushed stainless steel front panel and four rubber feet fits easily atop a counter-top or laboratory cart.

❖ **Vacuum break valve** protects the system from oil back-streaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**12-Port Drying Chamber 10-273-19 is included.** No additional drying accessory is required. Alternate drying accessories may be purchased separately.

**Upright, stainless steel collector chamber** speeds and simplifies defrost. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector chamber and coils for additional corrosion resistance.

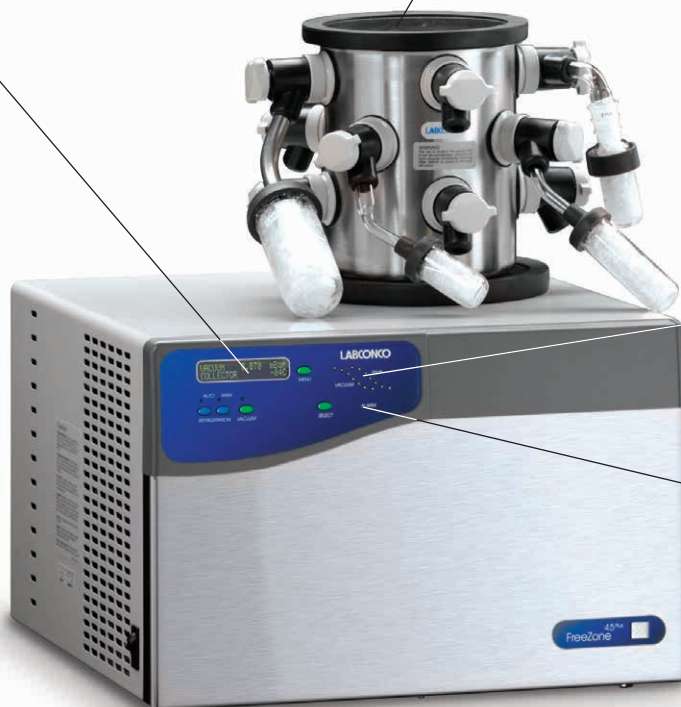
**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

❖ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. Two condensing modules, used in series, cool the collector coil to **-84° C (-119° F)**, ideal for freeze drying samples with low eutectic points including acetonitrile. The systems use a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbon (HCFCs) or chlorofluorocarbons (CFCs).

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze dry process.

❖ *Exclusive feature*



# FreeZone® Plus™ 4.5 Liter Cascade Benchtop Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 4 liters of water in 24 hours and holding 4.5 liters of ice before defrosting.\*
- Dual 1/3 hp HCFC/CFC-free refrigeration systems to cool collector to **-84° C (-119° F)**. For samples containing water or acetonitrile. Not for use with samples containing methanol or ethanol.
- 12-Port Drying Chamber 10-273-19 included (requires attachment).
- Compact benchtop design with a small footprint.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- ❖ Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- Clear acrylic lid, 3/4" thick, with 3" diameter port for connection of drying chamber (included).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 22.5" w x 24.2" d x 15.0" h (without drying chamber) (57.2 cm x 61.5 cm x 38.1 cm).
- Overall dimensions: 22.5" w x 24.2" d x 25.4" h (with drying chamber) (57.2 cm x 61.5 cm x 64.5 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.



FreeZone Plus 4.5 Liter Cascade Benchtop Freeze Dry System 16-108-500.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on page 35.

\*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® Plus™ 4.5 Liter Cascade Freeze Dry Systems

## FEATURES & BENEFITS

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

**Rear-mounted 3/4" vacuum connection extends vertically**, requiring less space.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Collector drain hose** is accessible from the right-hand side for convenient disposal of defrosted material. It extends about 9 inches and retracts within the cabinet when not in use.

❖ **Compact console cabinet.** Cabinet, mounted on 3" diameter casters, is powder-coated steel with removable brushed stainless steel front panel. The interior accommodates a vacuum pump (sold separately.)

**Easy-to-follow operating instructions** are printed on the right-hand side.

❖ **Vacuum break valve** protects the system from oil back-streaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**12-Port Drying Chamber 10-273-19 is included.** No additional drying accessory is required. Alternate drying accessories may be purchased separately.

**Upright, stainless steel collector chamber** speeds and simplifies defrost. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector chamber and coils for additional corrosion resistance.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

❖ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. Two condensing modules, used in series, cool the collector coil to **-84° C (-119° F)**, ideal for freeze drying samples with low eutectic points including acetonitrile. The systems use a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbon (HCFCs) or chlorofluorocarbons (CFCs).

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.

❖ *Exclusive feature*



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze dry process.



# FreeZone® Plus™ 4.5 Liter Cascade Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector capable of removing 4 liters of water in 24 hours and holding 4.5 liters of ice before defrosting.\*
- Dual 1/3 hp CFC-free refrigeration systems to cool collector to **-84° C (-119° F)**. For samples containing water or acetonitrile. Not for use with samples containing methanol or ethanol.
- 12-Port Drying Chamber 10-273-19 included (requires attachment).
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- ❖ Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- Clear acrylic lid, 3/4" thick, with 3" diameter port for connection of drying chamber (included).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3" diameter casters.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 22.5" w x 24.2" d x 36.5" h (without drying chamber) (57.2 cm x 61.5 cm x 92.7 cm).
- Overall dimensions: 22.5" w x 24.2" d x 46.9" h (with drying chamber) (57.2 cm x 61.5 cm x 119.1 cm).

### Models conform to the following standards:

- UL Standard 61010A-1 (60 Hz models).
- CAN/CSA C22.2 No. 1010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).



FreeZone Plus 4.5 Liter Cascade Freeze Dry System 16-108-506.

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

See ordering information on page 35.

\* Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® -105° C 4.5 Liter Benchtop Freeze Dry Systems

## FEATURES & BENEFITS

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

**Rear-mounted 3/4" vacuum connection extends vertically**, requiring less space.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Easy-to-follow operating instructions** are printed on the right-hand side.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Collector drain hose** is accessible from the right-hand side for convenient disposal of defrosted material. It extends about nine inches and retracts within the cabinet when not in use.

**Benchtop cabinet has small footprint.** Compact cabinet of durable powder-coated steel with brushed stainless steel front panel and four rubber feet fits easily atop a counter-top or laboratory cart.

❖ **Vacuum break valve** protects the system from oil back-streaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**12-Port Drying Chamber 10-273-19 is included.** No additional drying accessory is required. Alternate drying accessories may be purchased separately.

**Upright, stainless steel collector chamber** speeds and simplifies defrost. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector chamber and coils for additional corrosion resistance.

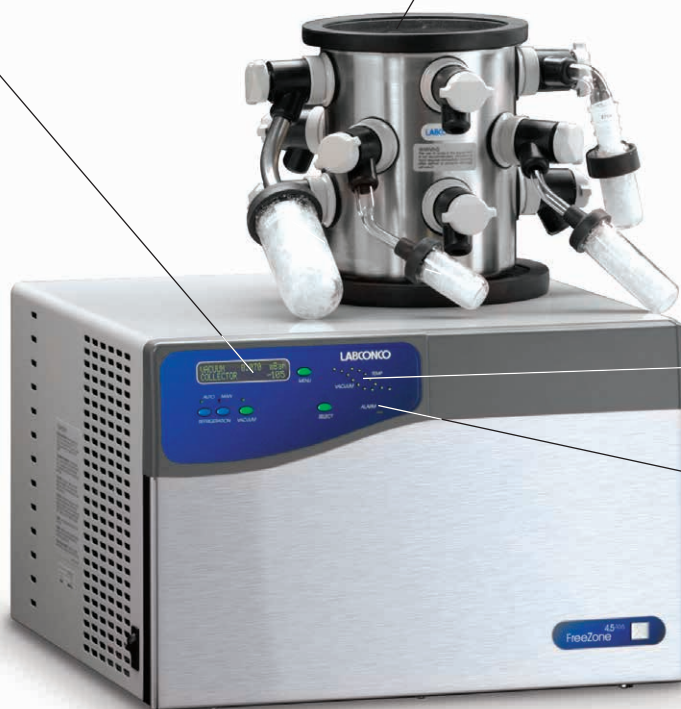
**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

❖ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. Two condensing modules, used in series, cool the collector coil to **-105° C (-157° F) at 60 Hz** or **-102° C (-152° F) at 50 Hz**, ideal for freeze drying samples with very low eutectic points, including ones containing dilute methanol or ethanol. The systems use a refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze dry process.

❖ *Exclusive feature*





# FreeZone® -105° C 4.5 Liter Cascade Benchtop Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 2.5 liters of water in 24 hours and holding 4.5 liters of ice before defrosting.\*
- Dual 1/3 hp HCFC/CFC-free refrigeration systems to cool collector to **-105° C (-157° F) at 60 Hz** or **-102° C (-152° F) at 50 Hz**. For samples containing water, acetonitrile or dilute methanol or ethanol.
- 12-Port Drying Chamber 10-273-19 included (requires attachment).
- Compact benchtop design with a small footprint.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- ❖ Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- Clear acrylic lid, 3/4" thick, with 3" diameter port for connection of drying chamber (included).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 23.2" w x 25.2" d x 16.0" h (without drying chamber) (58.7 cm x 64.0 cm x 40.6 cm).
- Overall dimensions: 23.2" w x 25.2" d x 26.4" h (with drying chamber) (58.7 cm x 64.0 cm x 67.1 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Domestic or international electrical configuration.



FreeZone -105° C 4.5 Liter Cascade Benchtop Freeze Dry System 16-080-200.

### All models require (not included):

- Vacuum pump with a displacement of at least 86 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63

See ordering information on page 35.

\*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® 6 Liter Benchtop Freeze Dry Systems

## FEATURES & BENEFITS

### ❖ **Durable benchtop cabinet.**

Cabinet is powder-coated steel with a brushed stainless steel front panel and four rubber feet and fits easily atop a countertop or laboratory cart.

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**Rear-mounted 3/4" vacuum connection** extends parallel to the back requiring less space.

**Attachment port** makes connection of accessories easy. Select from accessory drying chambers and manifolds (sold separately).

**Upright, stainless steel collector chamber** speeds and simplifies defrost. Hot water may be poured into the chamber, or collected ice may be allowed to melt overnight. Models are available with PTFE-coated collector coil and chamber for additional corrosion resistance.

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. The condensing module cools the collector coil to **-50° C (-58° F)**, ideal for freeze drying aqueous samples. The system uses a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbon (HCFCs) or chlorofluorocarbons (CFCs).

**Easy-to-follow operating instructions** are printed on the right-hand side.

❖ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

**Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Collector drain hose** is accessible from the right-hand side for convenient defrost. It extends about 9 inches and retracts within the cabinet when not in use.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze drying process.

❖ **LCD** displays system set-up and operating parameters and alarm messages.

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60 300 or 600 second intervals.

❖ **Vacuum break valve** protects the system from oil back-streaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.

❖ *Exclusive feature*



# FreeZone® 6 Liter Benchtop Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 4 liters of water in 24 hours and holding 6 liters of ice before defrosting.\*
- 3/4 hp HCFC/CFC-free refrigeration system to cool collector to **-50° C (-58° F)**. For aqueous samples. Not for use with samples containing acetonitrile, methanol or ethanol.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- ❖ Vacuum control valve that maintains setpoint vacuum level.
- Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Side-mounted, retractable, 9" collector drain hose.
- 3" diameter port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 31.8" w x 28.1" d x 14.5" h (80.8 cm x 71.4 cm x 36.8 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Stoppering Tray Dryer, 32.0" w x 24.6" d x 27.1" h (81.3 cm x 62.4 cm x 68.8 cm). Overall dimensions with Stoppering Tray Dryer: 32.0" w x 31.1" d x 40.6" h (81.3 cm x 79.0 cm x 103.1 cm). See specifications on pages 38-40.
- Domestic or international electrical configuration.



FreeZone 6 Liter Benchtop Freeze Dry System 10-271-22, Variable Height Bench 11-926-110, 20-Port Manifold with Support Shelves 10-273-16 and miscellaneous glassware.

### All models require (not included):

- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory (except models with Stoppering Tray Dryer). See pages 46-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on page 36.

\* Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® 6, 12 & 18 Liter Freeze Dry Systems

## FEATURES & BENEFITS

**Optional built-in mini vacuum drying chamber** holds small samples, either in bulk or in small containers such as serum bottles. It is used in conjunction with other drying accessories mounted on the attachment port. A separate drying accessory is required (sold separately). Its 50-watt heater is microprocessor-controlled from the front panel to +60° C (+140° F). (The chamber is not cooled. The only cooling is from the frozen sample.)

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Attachment port** makes connection of accessories easy. Select from accessory drying chambers and manifolds (sold separately).

**Upright, stainless steel collector chamber** speeds and simplifies defrost. Models are available with PTFE-coated collector coil and chamber for additional corrosion resistance.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED "waves" illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

✧ **LCD** displays system set-up and operating parameters and alarm messages.

**Easy-to-follow operating instructions** are printed on the left-hand side.

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**Collector drain hose** is accessible from the front for convenient defrost. It extends about 9 inches and retracts within the cabinet when not in use.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.

✧ *Exclusive feature*

**HCFC/CFC-free refrigeration system** ensures rapid, environmentally-safe cooling. The condensing module cools the collector coil to -50° C (-58° F), ideal for freeze drying aqueous samples. The system uses a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**Factory wired.** All models include a 3-wire cord with 20 amp NEMA plug.

**Optional purge valve** isolates the vacuum pump from the freeze dry system. The pump starts and warms the oil, while the collector cools, before pulling vacuum on the system. Pump life may be extended by purging small amounts of contaminants from the vacuum pump oil. Green indicator lights when the purge valve is closed.

**Optional built-in shell freezer** (6 liter models only) permits sample preparation while other samples lyophilize. The bath has two rollers to rotate flasks up to 1200 ml in size in heat transfer solution. The bath's separate CFC-free refrigeration system ensures rapid pre-freezing. A drain hose is accessible from the front for easy disposal of the heat transfer solution.

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

**Hot gas defrost.** Hot gas from the compressor is circulated through the collector coil and automatically shuts off when the refrigerant reaches +65° C (+149° F).

✧ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

✧ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

✧ **Durable console cabinet.** Cabinet, mounted on 3" diameter casters, is powder-coated steel with a removable brushed stainless steel front panel. The roomy interior accommodates a vacuum pump (sold separately).

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze drying process.

✧ **Vacuum break valve** protects the system from oil backstreaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.



# FreeZone® 6 Liter Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 4 liters of water in 24 hours and holding 6 liters of ice before defrosting.\*
- 3/4 hp HCFC/CFC-free refrigeration system to cool collector to **-50° C (-58° F)**. For aqueous samples. Not for use with samples containing acetonitrile, methanol or ethanol.
- Clear acrylic chamber lid, 3/4" thick, with neoprene gasket.
- ※ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ※ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature "waves" for at-a-glance display of relative system vacuum and collector temperature.
- ※ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ※ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Hot gas defrost and switch.
- Front-mounted, retractable, 9" collector drain hose.
- 3" diameter stainless steel port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3" diameter casters.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 32.2" w x 28.0" d x 36.3" h (81.8 cm x 71.1 cm x 92.1 cm).
- Usable interior space: 15.0" w x 24.5" d x 22.0" h (38.1 cm x 62.2 cm x 55.9 cm). Usable interior space on models with built-in shell freezer: 11.5" w x 24.5" d x 12.0" h (29.2 cm x 62.2 cm x 30.5 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

※ Exclusive feature



FreeZone 6 Liter Freeze Dry System with built-in shell freezer 16-208-504, 16-Port Drying Chamber 10-273-20 and miscellaneous glassware.

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Purge valve with switch for isolating the vacuum pump from the freeze dry system.
- Built-in stainless steel mini vacuum drying chamber, 5.1" w x 13.0" d x 2.5" h (12.9 cm x 33.0 cm x 6.4 cm), that includes 50-watt heater with microprocessor control to +60° C (+140° F), 3/4" thick clear acrylic lid and neoprene gasket. (Chamber is not cooled. The only cooling is from the frozen sample.)
- Built-in shell freezer with stainless steel bath, 5.5" w x 12.5" d x 7.5" h (30.5 cm x 14.0 cm x 19.0 cm), that includes 1/3 hp CFC-free refrigeration system with microprocessor control to -40° C (-40° F), 3/4" thick high-density polyethylene lid, neoprene gasket and drain hose.
- Stoppering Tray Dryer, 32.0" w x 24.6" d x 27.1" h (81.3 cm x 62.4 cm x 68.8 cm). Overall dimensions with Stoppering Tray Dryer: 32.0" w x 31.0" d x 63.4" h (81.3 cm x 78.7 cm x 160.9 cm). See specifications on pages 46-48.
- Domestic or international electrical configuration.

### All models require (not included):

- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory (except for models with Stoppering Tray Dryer). See pages 46-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on pages 37-38.

\* Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.



# FreeZone® 12 Liter Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 8 liters of water in 24 hours and holding 12 liters of ice before defrosting.\*
- 1 hp HCFC/CFC-free refrigeration system to cool collector to **-50° C (-58° F)**. For aqueous samples. Not for use with samples containing acetonitrile, methanol or ethanol.
- Clear acrylic chamber lid, 3/4" thick, with neoprene gasket.
- ❖ Brushed stainless steel and glacier white powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature "waves" for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Hot gas defrost and switch.
- Front-mounted, retractable, 9" collector drain hose.
- 3" diameter stainless steel port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3" diameter casters.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 32.2" w x 28.0" d x 36.3" h (84.8 cm x 71.1 cm x 92.1 cm).
- Usable interior space: 14.0" w x 24.5" d x 22.0" h (35.6 cm x 62.2 cm x 55.9 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (230 volts, 60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (230 volts, 60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

❖ Exclusive feature



FreeZone 12 Liter Freeze Dry System with Stoppering Tray Dryer 16-208-5016 and Serum Bottles (contact Fisher Scientific for ordering information).

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Purge valve with switch for isolating the vacuum pump from the freeze dry system.
- Built-in stainless steel mini vacuum drying chamber, 5.1" w x 13.0" d x 2.5" h (12.9 cm x 33.0 cm x 6.4 cm), that includes 50-watt heater with microprocessor control to +60° C (+140° F), 3/4" thick clear acrylic lid and neoprene gasket. (Chamber is not cooled. The only cooling is from the frozen sample.)
- Stoppering Tray Dryer, 32.0" w x 24.6" d x 27.1" h (81.3 cm x 62.4 cm x 68.8 cm). Overall dimensions with Stoppering Tray Dryer: 32.0" w x 31.0" d x 63.4" h (81.3 cm x 78.7 cm x 160.9 cm). See specifications on pages 46-48.
- Domestic or international electrical configuration.

### All models require (not included):

- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure, reverse IEC plug and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory (except models with Stoppering Tray Dryer). See pages 46-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on pages 39-40.

\* Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.



# FreeZone® 18 Liter Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil capable of removing 10 liters of water in 24 hours and holding 18 liters of ice before defrosting.\*
- 1-1/2 hp HCFC/CFC-free refrigeration system to cool collector to **-50° C (-58° F)**. For aqueous samples. Not for use with samples containing acetonitrile, methanol or ethanol.
- Clear acrylic chamber lid, 3/4" thick, with neoprene gasket.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration system was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Hot gas defrost and switch.
- Front-mounted, retractable, 9" collector drain hose.
- 3" diameter stainless steel port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3" diameter casters.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 32.2" w x 28.0" d x 36.3" h (84.8 cm x 71.1 cm x 92.1 cm).
- Usable interior space: 14.0" w x 24.5" d x 22.0" h (35.6 cm x 62.2 cm x 55.9 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).



FreeZone 18 Liter Freeze Dry System 10-272-00, 48-Port Manifold 10-273-2 and miscellaneous glassware.

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Purge valve with switch for isolating the vacuum pump from the freeze dry system.
- Built-in stainless steel mini vacuum drying chamber, 5.1" w x 13.0" d x 2.5" h (12.9 cm x 33.0 cm x 6.4 cm), that includes 50-watt heater with microprocessor control to +60° C (+140° F), 3/4" thick clear acrylic lid and neoprene gasket. (Chamber is not cooled. The only cooling is from the frozen sample.)
- Domestic or international electrical configuration.

### All models require (not included):

- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory. See pages 46-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on page 41.

\*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® Plus™ 6 & 12 Liter Cascade Freeze Dry Systems

## FEATURES & BENEFITS

**Optional built-in mini vacuum drying chamber** holds small samples, either in bulk or in small containers such as serum bottles. It is used in conjunction with other drying accessories mounted on the attachment port. A separate drying accessory is required (sold separately). Its 50-watt heater is microprocessor-controlled from the front panel to +60° C (+140° F). (The chamber is not cooled. The only cooling is from the frozen sample.)

**Easy-to-follow operating instructions** are printed on the left-hand side.

**Automatic start-up** is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

**Collector drain hose** is accessible from the front for convenient defrost. It extends about 9 inches and retracts within the cabinet when not in use.

**Factory wired.** All models require a 3-wire cord with 20 amp NEMA plug.



**CE marking.** All 230 volt, 50 Hz models conform to the CE (European Community) directives.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.

✳ **LCD** displays system set-up and operating parameters and alarm messages.

**Attachment port** makes connection of accessories easy. Select from accessory drying chambers and manifolds (sold separately).

**Upright, stainless steel collector chamber** speeds and simplifies defrost. Models are available with PTFE-coated collector coil and chamber for additional corrosion resistance.

**Vacuum and temperature graphs** display relative system vacuum and collector temperature. Amber LED “waves” illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

✳ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

✳ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

**Vacuum control valve** maintains setpoint vacuum level to speed the freeze drying process.

**HCFC/CFC-free refrigeration systems** ensure rapid, environmentally-safe cooling. Two refrigeration systems, used in series, cool the stainless steel collector to **-84° C (-119° F)** making this system ideal for freeze drying samples with low eutectic points including acetonitrile. The systems use a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbon (HCFCs) or chlorofluorocarbons (CFCs).

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).

**Optional purge valve** isolates the vacuum pump from the freeze dry system. The pump starts and warms the oil, while the collector cools, before pulling vacuum on the system. Pump life may be extended by purging small amounts of contaminants from the vacuum pump oil. Green indicator lights when the purge valve is closed.

✳ **Durable console cabinet.** Cabinet, mounted on 3" diameter casters, is powder-coated steel with a removable brushed stainless steel front panel. The roomy interior accommodates a vacuum pump (sold separately).

**Hot gas defrost.** Hot gas from the compressor is circulated through the collector coil and automatically shuts off when the refrigerant reaches +65° C (+149° F).

✳ **Vacuum break valve** protects the system from oil backstreaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

**Stainless steel baffle** maximizes ice loading capabilities by evenly distributing collected ice over the entire collector coil.

✳ Exclusive feature





# FreeZone® Plus™ 6 Liter Cascade Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil and chamber with stainless steel baffle capable of removing 4 liters of water in 24 hours and holding 6 liters of ice before defrosting.\*
- Two 1/3 hp HCFC/CFC-free refrigeration systems, used in series, to cool collector to **-84° C (-119° F)**. For samples containing water or acetonitrile. Not for use with samples containing methanol or ethanol.
- Clear acrylic chamber lid, 3/4" thick, with neoprene gasket.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature "waves" for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Hot gas defrost and switch.
- Front-mounted, retractable, 9" collector drain hose.
- 3" diameter stainless steel port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with plug.
- 3" diameter casters.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 32.2" w x 28.0" d x 36.3" h (84.8 cm x 71.1 cm x 92.1 cm).
- Usable interior space: 14.0" w x 24.5" d x 22.0" h (35.6 cm x 62.2 cm x 55.9 cm)

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).



FreeZone Plus 6 Liter Cascade Freeze Dry System 10-271-52, FreeZone Stopping Tray Dryer 10-274-50, 6-Port Tray Dryer Manifold 10-273-33 and miscellaneous glassware.

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Purge valve with switch for isolating the vacuum pump from the freeze dry system.
- Built-in stainless steel mini vacuum drying chamber, 5.1" w x 13.0" d x 2.5" h (12.9 cm x 33.0 cm x 6.4 cm), that includes 50-watt heater with microprocessor control to +60° C (+140° F), 3/4" thick clear acrylic lid and neoprene gasket. (Chamber is not cooled. The only cooling is from the frozen sample.)
- Domestic or international electrical configuration.

### All models require (not included):

- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory. See pages 46-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

### See ordering information on page 39.

\*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® Plus™ 12 Liter Cascade Freeze Dry Systems

## SPECIFICATIONS

### All models feature:

- Upright stainless steel collector coil and chamber with stainless steel baffle capable of removing 4 liters of water in 24 hours and holding 12 liters of ice before defrosting.\*
- Two 3/4 hp HCFC/CFC-free refrigeration systems, used in series, to cool collector to **-84° C (-119° F)**. For samples containing water or acetonitrile. Not for use with samples containing methanol or ethanol.
- Clear acrylic chamber lid, 3/4" thick, with neoprene gasket.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature “waves” for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Hot gas defrost and switch.
- Front-mounted, retractable, 9" collector drain hose.
- 3" diameter stainless steel port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with 20 amp plug.
- 3" diameter casters.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 32.2" w x 28.0" d x 36.3" h (84.8 cm x 71.1 cm x 92.1 cm).
- Usable interior space: 11.5" w x 24.5" d x 16.5" h (29.2 cm x 62.2 cm x 41.9 cm)

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).



FreeZone Plus 12 Liter Cascade Freeze Dry System with built-in vacuum drying chamber 16-208-5021, 12-Port Drying Chamber 10-273-19 and miscellaneous glassware.

### Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Purge valve with switch for isolating the vacuum pump from the freeze dry system.
- Built-in stainless steel mini vacuum drying chamber, 5.1" w x 13.0" d x 2.5" h (12.9 cm x 33.0 cm x 6.4 cm), that includes 50-watt heater with microprocessor control to +60° C (+140° F), 3/4" thick clear acrylic lid and neoprene gasket. (Chamber is not cooled. The only cooling is from the frozen sample.)
- Domestic or international electrical configuration.

### All models require (not included):

- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory. See pages 46-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

See ordering information on page 40.

\* Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature



# FreeZone® Freeze Dry Systems

## ORDERING INFORMATION

*FreeZone® 1 Liter Benchtop Freeze Dry Systems. See specifications on page 7.*

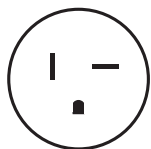
Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
10-030-126	115 volts, 60 Hz, 14.0 A**	115 volts, 20 amps		85 lbs. (39 kg)
10-030-127	115 volts, 60 Hz, 14.0 A**	115 volts, 20 amps	•	85 lbs. (39 kg)
10-030-130	230 volts, 60 Hz, 7.0 A†	North America, 230 volts		85 lbs. (39 kg)
10-030-131	230 volts, 60 Hz, 7.0 A†	North America, 230 volts	•	85 lbs. (39 kg)
10-030-128*	230 volts, 50 Hz, 7.0 A†	Schuko		85 lbs. (39 kg)
10-030-129*	230 volts, 50 Hz, 7.0 A†	Schuko	•	85 lbs. (39 kg)

*FreeZone® 2.5 Liter Benchtop Freeze Dry Systems. See specifications on page 9.*

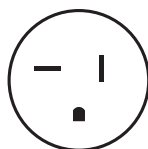
Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
10-030-132	115 volts, 60 Hz, 14.0 A**	115 volts, 20 amps		85 lbs. (39 kg)
10-030-133	115 volts, 60 Hz, 14.0 A**	115 volts, 20 amps	•	85 lbs. (39 kg)
10-030-136	230 volts, 60 Hz, 7.0 A†	North America, 230 volts		85 lbs. (39 kg)
10-030-137	230 volts, 60 Hz, 7.0 A†	North America, 230 volts	•	85 lbs. (39 kg)
10-030-134*	230 volts, 50 Hz, 7.0 A†	Schuko		85 lbs. (39 kg)
10-030-135*	230 volts, 50 Hz, 7.0 A†	Schuko	•	85 lbs. (39 kg)

### Plug Configurations

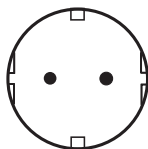
115 volts, 20 amps



North America, 230 volts



Schuko



\*International electrical configuration. \*\*System amperage shown includes 8 amp maximum vacuum pump rating. †System amperage shown includes 4.5 amp maximum vacuum pump rating.



# FreeZone® Freeze Dry Systems

## ORDERING INFORMATION

*FreeZone® Plus™ 2.5 Liter Cascade Benchtop Freeze Dry Systems. See specifications on page 11.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
10-030-138	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		129 lbs. (59 kg)
10-030-139	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	129 lbs. (59 kg)
10-030-142	230 volts, 60 Hz, 10.0 A†	North America, 230 volts		129 lbs. (59 kg)
10-030-143	230 volts, 60 Hz, 10.0 A†	North America, 230 volts	•	129 lbs. (59 kg)
10-030-140*	230 volts, 50 Hz, 10.0 A†	Schuko		129 lbs. (59 kg)
10-030-141*	230 volts, 50 Hz, 10.0 A†	Schuko	•	129 lbs. (59 kg)

*FreeZone® Plus™ 2.5 Liter Cascade Console Freeze Dry Systems. See specifications on page 13.*

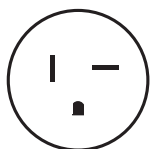
Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
10-030-144	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		171 lbs. (78 kg)
10-030-145	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	171 lbs. (78 kg)
10-030-148	230 volts, 60 Hz, 10.0 A†	North America, 230 volts		171 lbs. (78 kg)
10-030-149	230 volts, 60 Hz, 10.0 A†	North America, 230 volts	•	171 lbs. (78 kg)
10-030-146*	230 volts, 50 Hz, 10.0 A†	Schuko		171 lbs. (78 kg)
10-030-147*	230 volts, 50 Hz, 10.0 A†	Schuko	•	171 lbs. (78 kg)

*FreeZone® 4.5 Liter Benchtop Freeze Dry Systems. See specifications on page 15.*

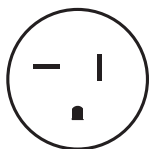
Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
10-271-10	115 volts, 60 Hz, 14.0 A**	115 volts, 20 amps		102 lbs. (46 kg)
10-271-11	115 volts, 60 Hz, 14.0 A**	115 volts, 20 amps	•	102 lbs. (46 kg)
10-271-14	230 volts, 60 Hz, 7.0 A†	North America, 230 volts		102 lbs. (46 kg)
10-271-15	230 volts, 60 Hz, 7.0 A†	North America, 230 volts	•	102 lbs. (46 kg)
10-271-12*	230 volts, 50 Hz, 7.0 A†	Schuko		102 lbs. (46 kg)
10-271-13*	230 volts, 50 Hz, 7.0 A†	Schuko	•	102 lbs. (46 kg)

### Plug Configurations

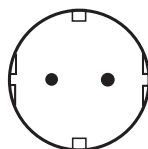
115 volts, 20 amps



North America, 230 volts



Schuko



\*International electrical configuration. \*\*System amperage shown includes 8 amp maximum vacuum pump rating. †System amperage shown includes 4.5 amp maximum vacuum pump rating.



# FreeZone® Freeze Dry Systems

## ORDERING INFORMATION

*FreeZone® 4.5 Liter Console Freeze Dry Systems. See specifications on page 17.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
10-271-16	115 volts, 60 Hz, 14.0 A**	115 volts, 20 amps		162 lbs. (73 kg)
10-271-17	115 volts, 60 Hz, 14.0 A**	115 volts, 20 amps	•	162 lbs. (73 kg)
10-271-20	230 volts, 60 Hz, 7.0 A†	North America, 230 volts		162 lbs. (73 kg)
10-271-21	230 volts, 60 Hz, 7.0 A†	North America, 230 volts	•	162 lbs. (73 kg)
10-271-18*	230 volts, 50 Hz, 7.0 A†	Schuko		162 lbs. (73 kg)
10-271-19*	230 volts, 50 Hz, 7.0 A†	Schuko	•	162 lbs. (73 kg)

*FreeZone® Plus™ 4.5 Liter Cascade Benchtop Freeze Dry Systems. See specifications on page 19.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
16-108-500	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		131 lbs. (59 kg)
16-108-501	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	131 lbs. (59 kg)
16-108-502	230 volts, 60 Hz, 10.0 A†	North America, 230 volts		131 lbs. (59 kg)
16-108-503	230 volts, 60 Hz, 10.0 A†	North America, 230 volts	•	131 lbs. (59 kg)
16-108-504*	230 volts, 50 Hz, 10.0 A†	Schuko		131 lbs. (59 kg)
16-108-505*	230 volts, 50 Hz, 10.0 A†	Schuko	•	131 lbs. (59 kg)

*FreeZone® Plus™ 4.5 Liter Cascade Console Freeze Dry Systems. See specifications on page 21.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
16-108-506	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		181 lbs. (82 kg)
16-108-507	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	181 lbs. (82 kg)
16-108-508	230 volts, 60 Hz, 10.0 A†	North America, 230 volts		181 lbs. (82 kg)
16-108-509	230 volts, 60 Hz, 10.0 A†	North America, 230 volts	•	181 lbs. (82 kg)
16-108-510*	230 volts, 50 Hz, 10.0 A†	Schuko		181 lbs. (82 kg)
16-108-511*	230 volts, 50 Hz, 10.0 A†	Schuko	•	181 lbs. (82 kg)

*FreeZone® -105° C 4.5 Liter Cascade Benchtop Freeze Dry Systems. See specifications on page 23.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
16-080-200	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		180 lbs. (82 kg)
16-080-201	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	180 lbs. (82 kg)
16-080-202	230 volts, 60 Hz, 10.0 A†	North America, 230 volts		180 lbs. (82 kg)
16-080-203	230 volts, 60 Hz, 10.0 A†	North America, 230 volts	•	180 lbs. (82 kg)
16-080-206*	230 volts, 50 Hz, 10.0 A†	Schuko		180 lbs. (82 kg)
16-080-207*	230 volts, 50 Hz, 10.0 A†	Schuko	•	180 lbs. (82 kg)
16-080-204*	230 volts, 50 Hz, 10.0 A†	British (UK)		180 lbs. (82 kg)
16-080-205*	230 volts, 50 Hz, 10.0 A†	British (UK)	•	180 lbs. (82 kg)
16-080-208*	230 volts, 50 Hz, 10.0 A†	China/Australia		180 lbs. (82 kg)
16-080-209*	230 volts, 50 Hz, 10.0 A†	China/Australia	•	180 lbs. (82 kg)

\*International electrical configuration. \*\*System amperage shown includes 8 amp maximum vacuum pump rating. †System amperage shown includes 4.5 amp maximum vacuum pump rating.



# FreeZone® Freeze Dry Systems

## ORDERING INFORMATION

*FreeZone® 6 Liter Benchtop Freeze Dry Systems. See specifications on page 25.*

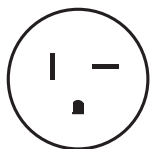
Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Shipping Weight
10-271-22	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		150 lbs. (68 kg)
10-271-23	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	150 lbs. (68 kg)
10-271-26	230 volts, 60 Hz, 8.0 A†	North America, 230 volts		150 lbs. (68 kg)
10-271-27	230 volts, 60 Hz, 8.0 A†	North America, 230 volts	•	150 lbs. (68 kg)
10-271-24*	230 volts, 50 Hz, 8.0 A†	Schuko		150 lbs. (68 kg)
10-271-25*	230 volts, 50 Hz, 8.0 A†	Schuko	•	150 lbs. (68 kg)

*FreeZone® 6 Liter Benchtop Freeze Dry Systems with Stoppering Tray Dryers. See specifications on page 25.*

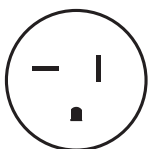
Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Stoppering Tray	Shipping Weight
16-208-502	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		•	572 lbs. (259 kg)
	115 volts, 60 Hz, 16.0 A††	115 volts, 20 amps			Shipped in two cartons
16-208-503	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	•	572 lbs. (259 kg)
	115 volts, 60 Hz, 16.0 A††	115 volts, 20 amps			Shipped in two cartons
10-274-57	230 volts, 50 Hz, 8.0 A†	North America, 230 volts		•	572 lbs. (259 kg)
	230 volts, 50 Hz, 9.0 A††	North America, 230 volts			Shipped in two cartons
10-274-58	230 volts, 50 Hz, 8.0 A†	North America, 230 volts	•	•	572 lbs. (259 kg)
	230 volts, 60 Hz, 9.0 A††	North America, 230 volts			Shipped in two cartons
10-274-55*	230 volts, 50 Hz, 8.0 A†	Schuko		•	572 lbs. (259 kg)
	230 volts, 50 Hz, 9.0 A††	Schuko			Shipped in two cartons
10-274-56*	230 volts, 50 Hz, 8.0 A**	Schuko	•	•	572 lbs. (259 kg)
	230 volts, 50 Hz, 9.0 A††	Schuko			Shipped in two cartons

### Plug Configurations

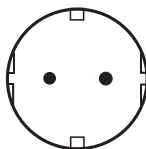
115 volts, 20 amps



North America, 230 volts



Schuko



\*International electrical configuration. \*\*System amperage shown includes 8 amp maximum vacuum pump rating. †System amperage shown includes 4.5 amp maximum vacuum pump rating.  
 ††Electrical requirements of the Stoppering Tray Dryer.



# FreeZone® Freeze Dry Systems

## ORDERING INFORMATION

*FreeZone® 6 Liter Console Freeze Dry Systems. See specifications on page 27.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Purge Valve	Mini Chamber	Shipping Weight
10-271-28	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps				254 lbs. (115 kg)
10-271-29	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•			254 lbs. (115 kg)
10-271-30	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		•		257 lbs. (117 kg)
10-271-31	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	•		257 lbs. (117 kg)
10-271-32	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		•	•	272 lbs. (123 kg)
10-271-33	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	•	•	272 lbs. (123 kg)
10-271-40	230 volts, 60 Hz, 8.0 A†	North America, 230 volts				254 lbs. (115 kg)
10-271-41	230 volts, 60 Hz, 8.0 A††	North America, 230 volts	•			254 lbs. (115 kg)
10-271-42	230 volts, 60 Hz, 8.0 A†	North America, 230 volts		•		257 lbs. (117 kg)
10-271-43	230 volts, 60 Hz, 8.0 A†	North America, 230 volts	•	•		257 lbs. (117 kg)
10-271-44	230 volts, 60 Hz, 8.0 A†	North America, 230 volts		•	•	272 lbs. (123 kg)
10-271-45	230 volts, 60 Hz, 8.0 A†	North America, 230 volts	•	•	•	272 lbs. (123 kg)
10-271-34*	230 volts, 50 Hz, 8.0 A†	Schuko				254 lbs. (115 kg)
10-271-35*	230 volts, 50 Hz, 8.0 A†	Schuko	•			254 lbs. (115 kg)
10-271-36*	230 volts, 50 Hz, 8.0 A†	Schuko		•		257 lbs. (117 kg)
10-271-37*	230 volts, 50 Hz, 8.0 A†	Schuko	•	•		257 lbs. (117 kg)
10-271-38*	230 volts, 50 Hz, 8.0 A†	Schuko		•	•	272 lbs. (123 kg)
10-271-39*	230 volts, 50 Hz, 8.0 A†	Schuko	•	•	•	272 lbs. (123 kg)

*FreeZone® 6 Liter Console Freeze Dry Systems with Purge Valves and Shell Freezers. See specifications on page 27.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Purge Valve	Shell Freezer	Shipping Weight
16-208-504	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		•	•	324 lbs. (147 kg)
16-208-505	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	•	•	324 lbs. (147 kg)
10-271-50	230 volts, 60 Hz, 10.0 A**	North America, 230 volts		•	•	324 lbs. (147 kg)
10-271-51	230 volts, 60 Hz, 10.0 A**	North America, 230 volts	•	•	•	324 lbs. (147 kg)
10-271-48*	230 volts, 50 Hz, 10.0 A†	Schuko		•	•	324 lbs. (147 kg)
10-271-49*	230 volts, 50 Hz, 10.0 A†	Schuko	•	•	•	324 lbs. (147 kg)

\*International electrical configuration. \*\*System amperage shown includes 8 amp maximum vacuum pump rating. †System amperage shown includes 4.5 amp maximum vacuum pump rating.



# FreeZone® Freeze Dry Systems

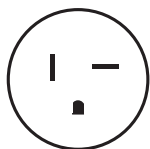
## ORDERING INFORMATION

FreeZone® 6 Liter Console Freeze Dry Systems with Stopping Tray Dryers. See specifications on page 27.

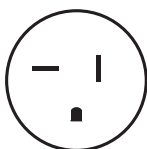
Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Purge Valve	Stopping Tray Dryer	Shipping Weight
16-208-506	115 volts, 60 Hz, 16.0 A** 115 volts, 60 Hz, 16.0 A††	115 volts, 20 amps 115 volts, 20 amps			•	676 lbs. (307 kg) Shipped in two cartons
16-208-507	115 volts, 60 Hz, 16.0 A** 115 volts, 60 Hz, 16.0 A††	115 volts, 20 amps 115 volts, 20 amps	•		•	676 lbs. (307 kg) Shipped in two cartons
16-208-508	115 volts, 60 Hz, 16.0 A** 115 volts, 60 Hz, 16.0 A††	115 volts, 20 amps 115 volts, 20 amps		•	•	679 lbs. (308 kg) Shipped in two cartons
16-208-509	115 volts, 60 Hz, 16.0 A** 115 volts, 60 Hz, 16.0 A††	115 volts, 20 amps 115 volts, 20 amps	•	•	•	679 lbs. (308 kg) Shipped in two cartons
10-274-67	230 volts, 60 Hz, 8.0 A† 230 volts, 60 Hz, 9.0 A††	North America, 230 volts North America, 230 volts			•	676 lbs. (307 kg) Shipped in two cartons
10-274-68	230 volts, 60 Hz, 8.0 A†† 230 volts, 60 Hz, 9.0 A†	North America, 230 volts North America, 230 volts	•		•	676 lbs. (307 kg) Shipped in two cartons
10-274-69	230 volts, 60 Hz, 8.0 A†† 230 volts, 60 Hz, 9.0 A†	North America, 230 volts North America, 230 volts		•	•	679 lbs. (308 kg) Shipped in two cartons
10-274-70	230 volts, 60 Hz, 8.0 A†† 230 volts, 60 Hz, 9.0 A†	North America, 230 volts North America, 230 volts	•	•	•	679 lbs. (308 kg) Shipped in two cartons
10-274-63*	230 volts, 50 Hz, 8.0 A† 230 volts, 50 Hz, 9.0 A††	Schuko Schuko			•	676 lbs. (307 kg) Shipped in two cartons
10-274-64*	230 volts, 50 Hz, 8.0 A† 230 volts, 50 Hz, 9.0 A††	Schuko Schuko	•		•	676 lbs. (307 kg) Shipped in two cartons
10-274-65*	230 volts, 50 Hz, 8.0 A† 230 volts, 50 Hz, 9.0 A††	Schuko Schuko		•	•	679 lbs. (308 kg) Shipped in two cartons
10-274-66*	230 volts, 50 Hz, 8.0 A† 230 volts, 50 Hz, 9.0 A††	Schuko Schuko	•	•	•	679 lbs. (308 kg) Shipped in two cartons

### Plug Configurations

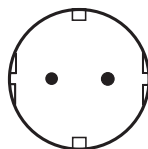
115 volts, 20 amps



North America, 230 volts



Schuko



\*International electrical configuration. \*\*System amperage shown includes 8 amp maximum vacuum pump rating. †System amperage shown includes 4.5 amp maximum vacuum pump rating.  
††Electrical requirements of the Stopping Tray Dryer.





# FreeZone® Freeze Dry Systems

## ORDERING INFORMATION

*FreeZone® Plus™ 6 Liter Cascade Console Freeze Dry Systems. See specifications on page 31.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Purge Valve	Mini Chamber	Shipping Weight
10-271-52	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps				270 lbs. (122 kg)
10-271-53	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•			270 lbs. (122 kg)
16-208-5010	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		•		273 lbs. (124 kg)
10-271-55	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	•		273 lbs. (124 kg)
16-208-5011	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps		•	•	288 lbs. (131 kg)
16-208-5012	115 volts, 60 Hz, 16.0 A**	115 volts, 20 amps	•	•	•	288 lbs. (131 kg)
10-271-64	230 volts, 60 Hz, 10.0 A†	North America, 230 volts				270 lbs. (122 kg)
10-271-65	230 volts, 60 Hz, 10.0 A†	North America, 230 volts	•			270 lbs. (122 kg)
10-271-66	230 volts, 60 Hz, 10.0 A†	North America, 230 volts		•		273 lbs. (124 kg)
10-271-67	230 volts, 60 Hz, 10.0 A†	North America, 230 volts	•	•		273 lbs. (124 kg)
10-271-68	230 volts, 60 Hz, 10.0 A†	North America, 230 volts		•	•	288 lbs. (131 kg)
10-271-69	230 volts, 60 Hz, 10.0 A†	North America, 230 volts	•	•	•	288 lbs. (131 kg)
10-271-58*	230 volts, 50 Hz, 10.0 A†	Schuko				270 lbs. (122 kg)
10-271-59*	230 volts, 50 Hz, 10.0 A†	Schuko	•			270 lbs. (122 kg)
10-271-60*	230 volts, 50 Hz, 10.0 A†	Schuko		•		273 lbs. (124 kg)
10-271-61*	230 volts, 50 Hz, 10.0 A†	Schuko	•	•		273 lbs. (124 kg)
10-271-62*	230 volts, 50 Hz, 10.0 A†	Schuko		•	•	288 lbs. (131 kg)
10-271-63*	230 volts, 50 Hz, 10.0 A†	Schuko	•	•	•	288 lbs. (131 kg)

*FreeZone® 12 Liter Console Freeze Dry Systems. See specifications on page 28.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Purge Valve	Mini Chamber	Shipping Weight
10-271-76	230 volts, 60 Hz, 9.0 A†	North America, 230 volts				275 lbs. (125 kg)
16-208-5013	230 volts, 60 Hz, 9.0 A†	North America, 230 volts	•			275 lbs. (125 kg)
10-271-78	230 volts, 60 Hz, 9.0 A†	North America, 230 volts		•		278 lbs. (126 kg)
16-208-5014	230 volts, 60 Hz, 9.0 A†	North America, 230 volts	•	•		278 lbs. (126 kg)
16-208-5015	230 volts, 60 Hz, 9.0 A†	North America, 230 volts		•	•	293 lbs. (133 kg)
10-271-81	230 volts, 60 Hz, 9.0 A†	North America, 230 volts	•	•	•	293 lbs. (133 kg)
10-271-70*	230 volts, 50 Hz, 9.0 A†	Schuko				275 lbs. (125 kg)
10-271-71*	230 volts, 50 Hz, 9.0 A†	Schuko	•			275 lbs. (125 kg)
10-271-72*	230 volts, 50 Hz, 9.0 A†	Schuko		•		278 lbs. (126 kg)
10-271-73*	230 volts, 50 Hz, 9.0 A†	Schuko	•	•		278 lbs. (126 kg)
10-271-74*	230 volts, 50 Hz, 9.0 A†	Schuko		•	•	293 lbs. (133 kg)
10-271-75*	230 volts, 50 Hz, 9.0 A†	Schuko	•	•	•	293 lbs. (133 kg)

\*International electrical configuration. †System amperage shown includes 4.5 amp maximum vacuum pump rating.



# FreeZone® Freeze Dry Systems

## ORDERING INFORMATION

*FreeZone® 12 Liter Console Freeze Dry Systems with Stoppering Tray Dryers. See specifications on page 28.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Purge Valve	Stoppering Tray Dryer	Shipping Weight
16-208-5016	230 volts, 60 Hz, 8.0 A <sup>†</sup> 230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts North America, 230 volts			•	697 lbs. (316 kg) Shipped in two cartons
16-208-5017	230 volts, 60 Hz, 8.0 A <sup>†</sup> 230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts North America, 230 volts	•		•	697 lbs. (316 kg) Shipped in two cartons
16-208-5018	230 volts, 60 Hz, 8.0 A <sup>††</sup> 230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts North America, 230 volts		•	•	700 lbs. (318 kg) Shipped in two cartons
16-208-5019	230 volts, 60 Hz, 8.0 A <sup>†</sup> 230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts North America, 230 volts	•	•	•	700 lbs. (318 kg) Shipped in two cartons
10-274-71*	230 volts, 50 Hz, 8.0 A <sup>†</sup> 230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko Schuko			•	697 lbs. (316 kg) Shipped in two cartons
10-274-72*	230 volts, 50 Hz, 8.0 A <sup>†</sup> 230 volts, 50 Hz, 9.0 A <sup>††</sup>	Schuko Schuko	•		•	697 lbs. (316 kg) Shipped in two cartons
10-274-73*	230 volts, 50 Hz, 8.0 A <sup>†</sup> 230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko Schuko		•	•	700 lbs. (318 kg) Shipped in two cartons
10-274-74*	230 volts, 50 Hz, 8.0 A <sup>†</sup> 230 volts, 50 Hz, 9.0 A <sup>††</sup>	Schuko Schuko	•	•	•	700 lbs. (318 kg) Shipped in two cartons

*FreeZone® Plus™ 12 Liter Cascade Freeze Dry Systems. See specifications on page 32.*

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Purge Valve	Mini Chamber	Shipping Weight
10-271-88	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts				319 lbs. (145 kg)
16-208-5020	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts	•			319 lbs. (145 kg)
10-271-90	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts		•		322 lbs. (146 kg)
10-271-91	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts	•	•		322 lbs. (146 kg)
16-208-5021	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts		•	•	337 lbs. (153 kg)
10-271-93	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts	•	•	•	337 lbs. (153 kg)
10-271-82*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko				319 lbs. (145 kg)
10-271-83*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko	•			319 lbs. (145 kg)
10-271-84*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko		•		322 lbs. (146 kg)
10-271-85*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko	•	•		322 lbs. (146 kg)
10-271-86*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko		•	•	337 lbs. (153 kg)
10-271-87*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko	•	•	•	337 lbs. (153 kg)

\*International electrical configuration. \*\*System amperage shown includes 8 amp maximum vacuum pump rating. †System amperage shown includes 4.5 amp maximum vacuum pump rating.

††Electrical requirements of the Stoppering Tray Dryer.



# FreeZone® Freeze Dry Systems

## ORDERING INFORMATION

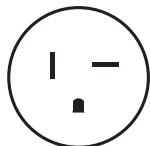
FreeZone® 18 Liter Console Freeze Dry Systems. See specifications on page 29.

Catalog Number	Electrical Requirements	Receptacle & Plug Type	PTFE-Coated Collector Coil & Chamber	Purge Valve	Mini Chamber	Shipping Weight
10-272-00	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts				285 lbs. (129 kg)
10-272-01	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts	•			285 lbs. (129 kg)
10-272-02	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts		•		288 lbs. (131 kg)
10-272-03	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts	•	•		288 lbs. (131 kg)
10-272-04	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts		•	•	303 lbs. (137 kg)
10-272-05	230 volts, 60 Hz, 9.0 A <sup>†</sup>	North America, 230 volts	•	•	•	303 lbs. (137 kg)
10-271-94*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko				285 lbs. (129 kg)
10-271-95*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko	•			285 lbs. (129 kg)
10-271-96*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko		•		288 lbs. (131 kg)
10-271-97*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko	•	•		288 lbs. (131 kg)
10-271-98*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko		•	•	303 lbs. (137 kg)
10-271-99*	230 volts, 50 Hz, 9.0 A <sup>†</sup>	Schuko	•	•	•	303 lbs. (137 kg)

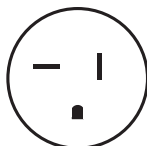
\*International electrical configuration. †System amperage shown includes 4.5 amp maximum vacuum pump rating.

### Plug Configurations

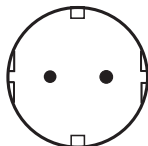
115 volts, 20 amps



North America, 230 volts



Schuko



## Dry Ice Benchtop Freeze Dry System

### SPECIFICATIONS & ORDERING INFORMATION



For the laboratory with occasional lyophilization requirements, the Dry Ice Benchtop Freeze Dry System provides a simple, economical means of freeze drying. Since dry ice cools alcohol or other heat transfer solutions to approximately **-75° C (-103° F)**, the Dry Ice Benchtop Freeze Dry System is ideal for processing materials with low eutectic points.

The Dry Ice Benchtop Freeze Dry System is equipped with a center well for dry ice and solvent that serves as a water vapor collector and doubles as a convenient pre-freezing bath. Flasks, serum bottles and ampules may be frozen by dipping and rotating them in the well.

**10-273-18 Dry Ice Benchtop Freeze Dry System.** Chamber, 9.8" h x 8.8" diameter (24.8 cm x 22.2 cm), type 304 stainless steel with twelve valves and single run capacity of 1 liter. Valves accommodate either 1/2" or 3/4" flask adapters. Includes dry ice/solvent center well with 1.92 liter capacity and cover, 1/2" OD port for connection to vacuum pump and 3/8" OD port for connection to vacuum gauge. **Dry ice, vacuum pump, vacuum gauge, tubing and glassware are required (not included).** See pages 57-59 for vacuum pumps and accessories. See pages 60-63 for glassware. Shipping weight 11 lbs. (5 kg)



# FreeZone® Triad™ Freeze Dry Systems

## FEATURES & BENEFITS

**FREEZONE TRIAD** is an all-in-one benchtop cascade lyophilizer and stoppering tray dryer. Just add a vacuum pump and glassware and begin pre-freezing, freeze drying and stoppering under vacuum.

One large processing shelf may be used to pre-freeze samples in containers or bulk to  $-75^{\circ}\text{C}$ . Dual refrigeration

systems cool to  $-85^{\circ}\text{C}$  to freeze dry low eutectic point samples on the shelf or on four sample valves mounted to the left-hand side. After freeze drying, serum bottles on the processing shelf may be stoppered under vacuum using a pneumatic mechanism that does not require compressed gas.

**Four sample valves increase the capacity and flexibility of the freeze dryer.** Four valves allow connection of flasks and other freeze dry glassware. Samples in the flasks and in the tray dryer may be lyophilized simultaneously.

**Hot gas defrost.** Hot gas from the compressor is circulated through the collector coil and automatically shuts off when the refrigerant reaches  $+60^{\circ}\text{C}$  ( $+140^{\circ}\text{F}$ ) or after 3 hours.

**Large clear acrylic door** provides complete visibility of the processing shelf.

**Automatic control of temperature enhances consistency and convenience of repetitive protocols.** A microprocessor-based controller permits up to five different temperature programs to be stored and repeated, each using a timed pre-freezing segment plus as many as five different ramping and holding segments.

**Rear-mounted RS-232 port** may be used to transmit data to a user-supplied computer.

**Rear-mounted electrical receptacle** allows connection of the vacuum pump (sold separately).



**Vacuum control/break valve maintains set point vacuum level to speed the freeze dry process.** At the same time, it protects the system from oil backstreaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is longer and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the vacuum pump.

**Durable exterior of brushed stainless steel and glacier white powder-coated steel with blue accents.**

**Stoppering control** regulates the stoppering mechanism when the chamber is under vacuum.



**ETL listed.** The 230 volt, 60 Hz model carries the ETL mark signifying it is certified to UL and CAN/CSA standards for laboratory equipment.



**CE marking.** The 230 volt, 50 Hz model conforms to the CE (European Community) directives.

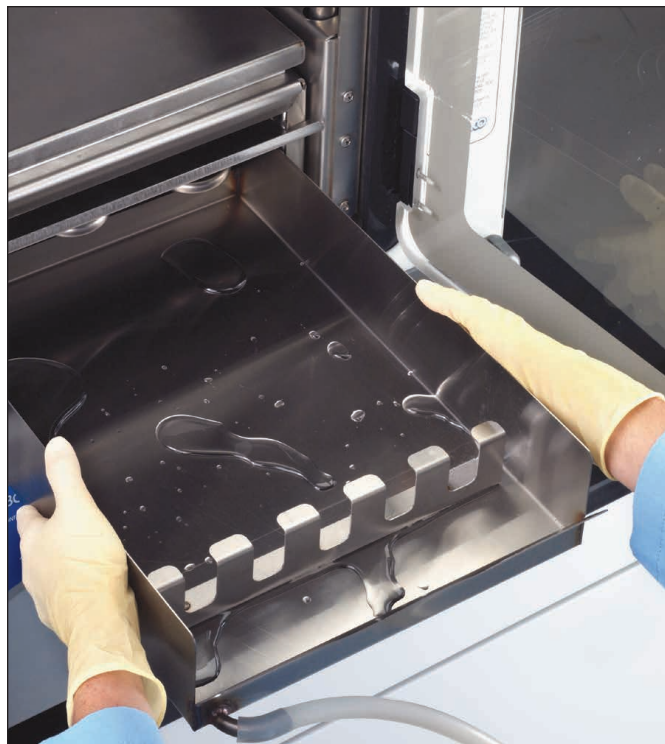
**1/8" OD backfill port** introduces sterile air or inert gas from an outside source to the chamber, protecting samples from atmospheric moisture and contaminants.

*Exclusive feature*



# FreeZone® Triad™ Freeze Dry Systems

## FEATURES & BENEFITS



❖ **Collector drain pan and hose.** A stainless steel drain pan (*above*) catches defrosted condensate, which may be conveniently emptied through the attached drain hose (*above, right*). The pan is removable for cleaning.

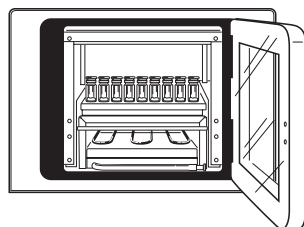
❖ **Built-in pneumatic mechanism stoppers containers on processing shelf.** Containers are stoppered while the chamber is under vacuum and **without the use of compressed gas.**

### *HCFC/CFC-free refrigeration system ensures environmentally-safe cooling.*

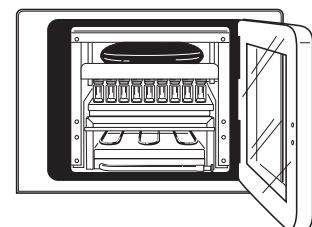
Two refrigeration modules, used in series, cool the collector coil to **-85° C (-121° F)**, ideal for freeze drying samples with low eutectic points including acetonitrile. The same refrigeration system and a 1000-watt heater efficiently cool and heat the shelf. Temperature of the fluid circulating through channels in the shelf may be set to a pre-freeze temperature of **-75° C (-103° F)** or between **-55° C to +50° C (-67 to +122° F)** for freeze drying and is maintained within 1° C of set point. The system uses a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**One sensor probe** monitors sample temperature, which is digitally displayed on the LCD.

**Chamber pre-freezes samples to save money and time.** Samples may be frozen on the shelf, eliminating the need for a separate freezer and product transfer.



*The shelf may be loaded with unstoppered serum bottles. Stoppers should be inserted in container openings in the raised position.*



*When the stoppering control is activated, atmospheric pressure causes the diaphragm to expand. Pressure from the expanding diaphragm forces the stoppering platen downward until it makes contact with the stoppers, forcing them into the containers.*

### Serum Bottle Capacity of the FreeZone Triad System

Size	Catalog Number	Shelf Capacity
2 ml	7575010*	400
3 ml	7575210*	441
5 ml	06-406-50A	233
10 ml	06-406-50B	196
20 ml	22-365-742	121
30 ml	06-406-50C	86
50 ml	7573810*	64
100 ml	7574010*	42
125 ml	7574210*	36

\* Contact Fisher Scientific for ordering information.

❖ *Exclusive feature*



# FreeZone® Triad™ Freeze Dry Systems

## FEATURES & BENEFITS

### User-Friendly Control Panel

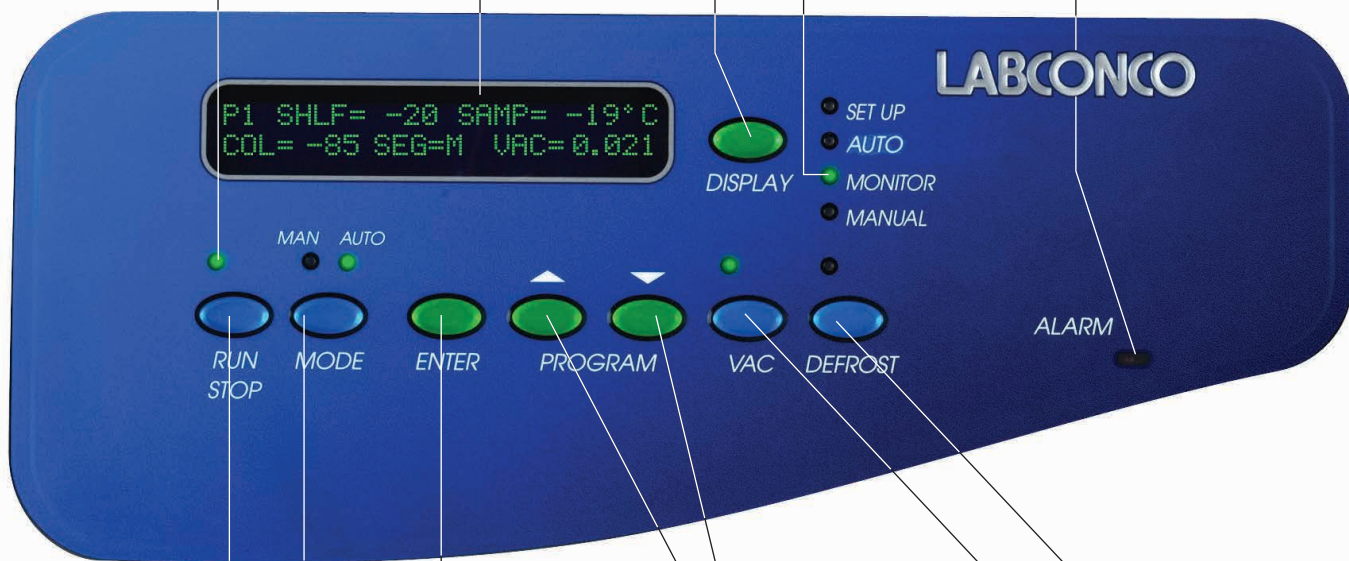
**Green RUN/STOP indicator** illuminates steadily while freeze drying is in progress and turns off when the RUN/STOP switch terminates a run. If a power failure occurs during processing, the indicator flashes when power is restored.

**LCD** prompts the user to set programming parameters and displays shelf, sample and collector temperatures in °C or °F; vacuum in mBar, Pa or Torr. When the automatic mode is selected, the display also indicates the program number selected, which segment of the program is in progress and the time remaining for that segment.

**DISPLAY switch** changes the screen format from SET UP to AUTO to MONITOR to MANUAL.

**Red LED Alarm indicator** flashes and beeper sounds to indicate that an abnormal system event has occurred. Alarm messages are displayed on the LCD. The beeper mutes after one minute.

**Green display indicators** glow to signify which display format is shown.



**RUN/STOP switch** initiates the start or stop of the lyophilization process.

**MODE switch** selects either manual or automatic operation.

**ENTER switch** is used in programming to enter a selected set point or program into memory.

**“Up” and “down” arrows** are used in programming to change a parameter set point or scroll through programs or choices.

**DEFROST switch** with LED indicator light controls the hot gas defrost function.

**VACUUM switch** with LED indicator light manually starts or stops the vacuum pump.



# FreeZone® Triad™ Freeze Dry Systems

## SPECIFICATIONS & ORDERING INFORMATION

### Specifications:

- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- Large acrylic door, 1" thick, with neoprene gasket.
- Processing shelf, 12.4" w x 14.5" d (31.5 cm x 36.8 cm). Spacing between the shelf and top of the chamber accommodates containers with stoppers up to a maximum height of 148 mm and minimum height of 31 mm.
- ❖ Pneumatic stoppering mechanism that inflates the diaphragm and lowers the stoppering plate above the shelf. **No compressed gas is required.**
- One probe for monitoring sample temperature.
- Stainless steel collector coil capable of removing 1.84 liters of water in 24 hours and holding 2.5 liters of ice before defrosting.\*
- ❖ Two 1/3 hp HCFC/CFC-free refrigeration systems, used in series, to cool the collector to **-85° C (-121° F)** and work in concert with a 1000-watt heater to cool and heat fluid medium circulating through channels in the shelf. Fluid temperature may be set from -55° C to +50° C (-67° to +122° F) or to pre-freeze shelf temperature of -75° C (-103° F). Microprocessor controls circulating fluid temperature to ±1° C of set point. For samples containing water or acetonitrile. Not for use with samples containing methanol or ethanol.
- Four left-side mounted neoprene valve ports.
- LCD that displays shelf, sample and collector temperature in ° C or ° F, vacuum in mBar, Pa or Torr. When in Automatic mode, LCD also displays the program selected, the present segment that is ramping or holding, time remaining in present segment, and end of program.
- Microprocessor-controlled temperature programming from -55° C to +50° C (-67° to +122° F) during ramping and holding and -75° C (-103° F) during pre-freezing; and memory to store five programs, each with a pre-freeze segment plus five additional segments, for repetition of identical protocols.
- Control panel that includes Run/Stop, Mode, Enter, "Up" arrow, "Down" arrow, Vacuum, Defrost, and Display switches; green indicator lights for Run/Stop, Automatic and Manual mode, and Set Up, Automatic, Monitor and Manual display; red LED Alarm indicator; Stoppering control knob; Vacuum Release valve control knob; and 1/8" OD Back Fill port.
- ❖ Red LED Alarm indicator that flashes and beeper sounds to indicate that an abnormal system event has occurred, including: shelf temperature variation more than ±2° C as measured by the shelf temperature sensor, collector temperature above -40° C, vacuum pressure changes more than 0.500 mBar, shelf temperature outside of set point during ramping, power failure, unevenly loaded shelf during stoppering, and service vacuum pump (after 1000 hours of vacuum use). Alarm messages are displayed on the LCD. The beeper mutes after one minute.
- Vacuum control valve that maintains set point vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is longer and the collector warms above safe limits, the freeze dryer will not automatically restart.

❖ Exclusive feature



FreeZone Triad Freeze Dry System 10-030-170 and miscellaneous glassware.

- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- ❖ Hot gas defrost with switch and automatic shut off when refrigerant reaches +65° C (+149° F) or after 3 hours.
- ❖ Stainless steel condensate pan with drain hose.
- Left side-mounted power switch and rear-mounted electrical receptacle for vacuum pump connection.
- Overall dimensions: 28.5" w x 29.5" d x 28.0" h (72.4 cm x 74.9 cm x 71.1 cm).

### Models conform to the following standards:

- UL Standard 61010A-1 (230 volt, 60 Hz model).
- CAN/CSA C22.2 No. 1010.1 (230 volt, 60 Hz model).
- CE Conformity marking (230 volt, 50 Hz model).

### Option includes:

- Domestic or international electrical configuration.

### All models require (not included):

- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

See page 51 for FreeZone Triad accessories.

Catalog	Electrical	Receptacle & Plug	Shipping
10-030-170	208/230 volts, 60 Hz, 9.0 A	North America, 230 volts	450 lbs. (204 kg)
10-030-171*	230 volts, 50 Hz, 9.0 A	Schuko	450 lbs. (204 kg)

\*Freeze drying rate will be lower for samples other than plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

\*\* International electrical configuration



# FreeZone® Stopping Tray Dryers

## FEATURES & BENEFITS

**Power switch** turns all power to the Tray Dryer on or off.

**Stopping control** regulates the up and down movement of the shelves while the chamber is under vacuum. See description on page 47.

**Three sensor probes** monitor sample temperature, which is digitally displayed on the LCD.

**Clear acrylic viewing door** provides complete visibility of the three process shelves.

**Three large shelves**, each with 196 square inches of space, accommodate bulk trays or batches of serum bottles or ampules. Samples may be lyophilized and then stoppered, if desired, on three large adjustable shelves. See the chart on page 47 for serum bottle capacities.

**Chamber pre-freezes samples to save money and time.** Samples may be frozen on the shelves, eliminating the need for a separate freezer and product transfer.

**Separate 1 hp HCFC/CFC-free refrigeration system and 1000-watt heater** ensure efficient cooling and heating of the shelves. Temperature of fluid circulating through channels in the shelves may be set between -40° C and +40° C (-40° F and +104° F). A microprocessor maintains system temperature within 1° C of set point. The system uses a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs).

**Automatic control of temperature** enhances consistency and convenience of repetitive protocols. A microprocessor-based controller permits up to five different temperature programs to be stored and repeated, each using as many as five different segments. For each segment, the length of time the temperature should hold and rate at which the temperature should be increased or decreased may be programmed.



**1/8" OD backfill port** introduces sterile air or inert gas from an outside source to the chamber, protecting samples from atmospheric moisture and contaminants.

**Optional Isolation Valve 7761500\*** isolates the Stopping Tray Dryer from the Freeze Dry System to shorten time necessary to reestablish working vacuum levels and to provide a means for checking end point. While the researcher loads and pre-freezes samples on the shelves, the Isolation Valve may be closed allowing the Freeze Dry System's vacuum and collector to reach working levels. At the end of lyophilization, the valve may be closed to test the rate of vacuum decay in the Tray Dryer. Rapid decay indicates end point has not been reached. See page 40 for ordering information.

**RS-232 cable connection port**, located on the back, allows communication of the Stopping Tray Dryer with the microprocessor of the Freeze Dry System when connected via the interconnect Cable 7353403\* included. This communication permits 1) automatic start up of the vacuum pump to occur after time has elapsed in Segment 1 when the Stopping Tray Dryer is used in the AUTO mode; 2) use of one computer to accept data from both the Stopping Tray Dryer and the Freeze Dry System.



**CE marking.** The 230 volt, 50 Hz model conforms to the CE (European Community) directives.

**Support stand** simplifies connection to FreeZone 6, 12 or 18 Liter Freeze Dry System. Support stand completes the connection between the Tray Dryer attachment port and the Freeze Dry System of your choice. The stand elevates the Tray Dryer above the work surface of the Freeze Dry System to allow unobstructed access to the collector compartment or optional built-in vacuum drying chamber or shell freezer.

**Vacuum release valve control** vents the chamber so the chamber door may be opened. This control may also be used to introduce inert gas into the chamber when the gas line is connected to the backfill port.



**ETL listed.** Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.

\* Contact Fisher Scientific for ordering information.





# FreeZone® Stoppering Tray Dryers

## FEATURES & BENEFITS

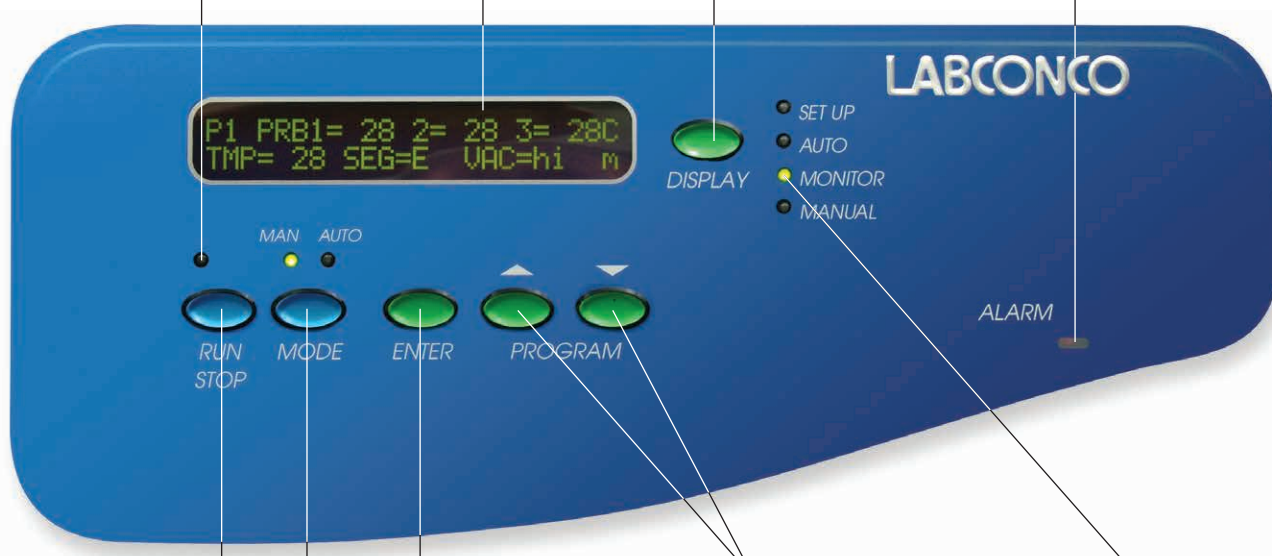
### User-Friendly Control Panel

**Green RUN/STOP indicator** illuminates steadily while freeze drying is in progress and turns off when the programmed cycle is completed or if the process is terminated in mid-cycle.

**LCD** prompts the user to set programming parameters and displays system and probe temperatures in °C or °F and vacuum in mBar, Pa or Torr. When the automatic mode is selected, the display also indicates which segment of the program is in progress.

**Red LED Alarm indicator flashes and beeper sounds** to indicate that an abnormal system event has occurred, including: system temperature variation more than  $\pm 2^{\circ}\text{C}$  as measured by the system temperature sensor, vacuum pressure changes more than 0.500 mBar, system temperature outside of set point during ramping, power failure, improper line voltage supply, and faulty temperature probe. Alarm messages are displayed on the LCD. The beeper mutes after one minute.

**DISPLAY** changes the screen format from SET UP to AUTO to MONITOR to MANUAL.



**RUN/STOP switch** initiates the start or stop of the lyophilization process.

**MODE switch** selects either manual or automatic operation.

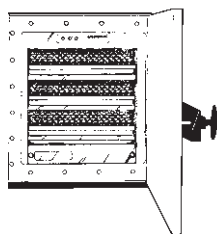
**ENTER** is used in programming to enter a selected set point or program into memory.

**“Up” arrow** is used in programming to increase a parameter set point or scroll through programs or choices.

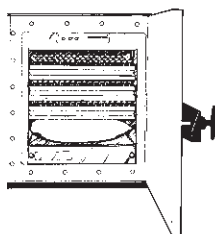
**“Down” arrow** is used in programming to decrease a parameter set point or scroll through programs or choices.

**Green display indicators** glow to signify which display format is shown. If a power failure occurs during processing, the indicator flashes when power is restored.

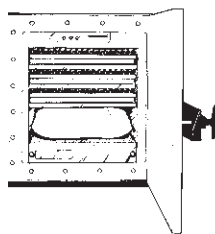
### Built-in pneumatic mechanism stoppers containers on all three shelves.



The Stoppering Tray Dryer may be loaded with unstoppered serum bottles on all three shelves. Stoppers should be inserted in bottle openings in the raised position.



When the stoppering control is activated, atmospheric pressure causes the diaphragm to expand. Pressure from the expanding diaphragm causes the bottom shelf to rise until the loaded tray makes contact with the shelf above it.



The diaphragm continues to expand until all three shelves have made contact with each other allowing all serum bottles to be stoppered under vacuum.

### Serum Bottle Capacity of the Stoppering Tray Dryer

Size	Catalog Number	Shelf Capacity	No. of Shelves	Total Capacity
2 ml	7575010*	430	3	1290
3 ml	7575210*	483	3	1449
5 ml	06-406-50A	228	3	684
10 ml	06-406-50B	195	3	585
20 ml	22-365-742	132	3	396
30 ml	06-406-50C	86	3	258
50 ml	7573810*	72	2	144
100 ml	7574010*	42	2	84
125 ml	7574210*	36	1	36

\* Contact Fisher Scientific for ordering information.



# FreeZone® Stoppering Tray Dryers

## SPECIFICATIONS & ORDERING INFORMATION

### Specifications:

- ✦ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- Acrylic door, 1" thick.
- Three processing shelves, each 16.5" w x 12" d (41.9 cm x 30.5 cm) with 196 square inches of area. Spacing between the shelves accommodates containers with stoppers up to a maximum height of 75 mm and minimum height of 38 mm when three shelves are used, a maximum height of 107 mm and minimum height of 56 mm when two shelves are used, and a maximum height of 196 mm and minimum height of 114 mm when one shelf is used.
- Three probes for monitoring sample or shelf temperature.
- 3" diameter outlet, located on the bottom of the tray dryer cabinet, for connection to a FreeZone 6, 12 or 18 Liter Freeze Dry System (freeze dryer is required and not included).
- 1 hp HCFC/CFC-free refrigeration system and 1000-watt electric heater for cooling and heating fluid medium circulating through channels in the shelves from -40° C to +40° C (-40° to +104° F). Microprocessor controls circulating fluid temperature to ±1° C of set point.
- ✦ LCD that displays system and probe temperatures in ° C or ° F, vacuum in mBar, Pa or Torr, when in Monitor mode; and additionally, when in Auto mode, the segment of the program that is in progress, time remaining in present segment, and end of program.
- Microprocessor-controlled temperature ramp and hold programming from -40° C to +40° C (-40° to +104° F) and memory to store five programs and repetition of identical protocols.
- Control panel that includes Run/Stop, Mode, "Up" arrow, "Down" arrow, Enter and Display switches; green indicator lights for Run/Stop, Automatic and Manual mode, and Set Up, Automatic, Monitor and Manual display; red LED Alarm indicator; Stoppering control knob; Vacuum Release valve control knob; and 1/8" OD Back Fill port.
- ✦ Red LED Alarm indicator that flashes to indicate that an abnormal system event has occurred, including: system temperature variation more than ±2° C as measured by the system temperature sensor, vacuum pressure changes more than 0.500 mBar, system temperature outside of set point during ramping, power failure, improper line voltage supply, and faulty temperature probe. Alarm messages are displayed on the LCD. The beeper mutes after one minute.
- Rear-mounted RS-232 cable connection port and interconnect cable for communication of the Tray Dryer with the Freeze Dry System.
- Side-mounted power switch.
- Overall dimensions: 33.3" w x 24.6" d x 27.1"h (82.0 cm x 62.4 cm x 68.8 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).

### Option includes:

- Domestic or international electrical configuration.



FreeZone Stoppering Tray Dryer 10-274-50, 6-Port Tray Dryer Manifold 10-273-33 and FreeZone 12 Liter Freeze Dry System 10-271-76.

### All models require (not included):

- FreeZone 6, 12 or 18 Liter Freeze Dry System. The FreeZone Stoppering Tray Dryer and Freeze Dry System may be ordered as separate components or together as one catalog number on selected models of FreeZone 6 Liter Benchtop Freeze Dry Systems or FreeZone 6 or 12 Liter Freeze Dry Systems. See pages 24-32.
- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Freeze dry glassware if not bulk freeze drying. See pages 62-63.

Catalog Number	Electrical Requirements	Plug Type	Shipping Weight
10-274-50	115 volts, 60 Hz, 16.0 A	115 volts, 20 amps	422 lbs. (191 kg)
10-274-52	230 volts, 60 Hz, 9.0 A	North America, 230 volts	422 lbs. (191 kg)
10-274-51*	230 volts, 50 Hz, 9.0 A	Schuko	422 lbs. (191 kg)

See page 51 for Stoppering Tray Dryer accessories.

✦ Exclusive feature

\* International electrical configuration



# FreeZone® Bulk Tray Dryers

## FEATURES & BENEFITS

**Power switch** turns all power to the Tray Dryer on or off.

**RS-232 cable connection port**, located on the back, allows communication of the Bulk Tray Dryer with user-supplied PC. Parameters that may be monitored include shelf set point temperature, actual temperature of each shelf, run time and operating status. **RS-232 Cable is required (not included)**. See page 64.

**Support stand** simplifies connection to FreeZone 6, 12 or 18 Liter Freeze Dry System. Support stand completes the connection between the Tray Dryer attachment port and the Freeze Dry System of your choice. The stand elevates the Tray Dryer above the work surface of the Freeze Dry System to allow unobstructed access to the collector compartment or optional built-in vacuum drying chamber or shell freezer.



**ETL listed.** All 115 volt models carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.

**Vacuum release valve control** vents the chamber so the chamber door may be opened.

**Clear acrylic viewing door** provides visibility of the chamber interior.

**Three shelves, each with a 200-watt heater**, provide ample room for bulk samples or samples in serum bottles. Each shelf is 12.7" w x 16.6" d (32.2 cm x 42.2 cm) to provide 210 square inches of area. Each shelf may be set above sample temperature up to +60° C (+140° F). A microprocessor maintains system temperature within 3° C of set point. (Shelves are not cooled. The only cooling is from the frozen sample.) The chamber can accommodate two additional shelves. See page 51 for ordering information.

**Three sensor probes** monitor sample temperature, which is digitally displayed on the LCD. Connections are provided for two additional sensor probes (Additional sensors are sold separately and as a component to Heated Shelves with Sensors).



**Six-Port Manifold (models 16-317-92 and 16-317-94)** increases flexibility and capacity of the FreeZone System. Six valves, which accommodate either 1/2" or 3/4" flask adapters, allow connection of flasks and other freeze dry glassware so that samples attached to the manifold and in the Tray Dryer may be lyophilized simultaneously.



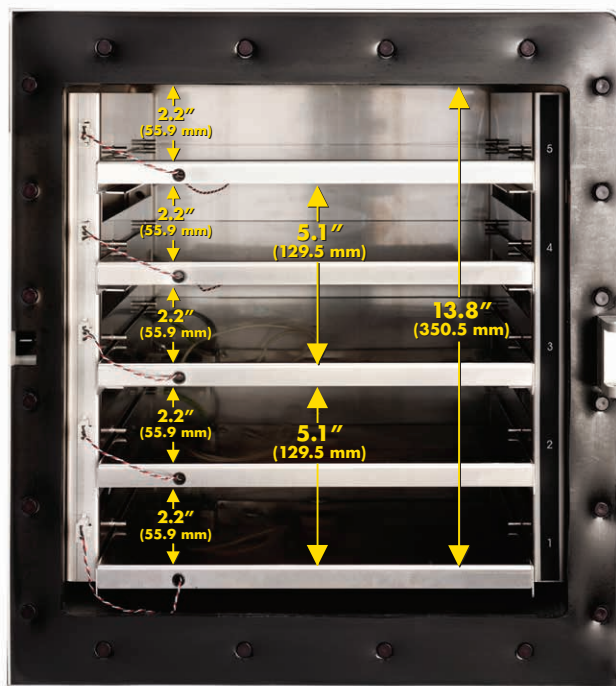
**CE marking.** All 230 volt models conform to the CE (European Community) directives.

**LCD** displays set point temperature, actual temperatures and Run ("R") or Stop ("S") mode.



**RUN/STOP switch** initiates the Bulk Tray Dryer to control the temperature of the shelves at the set point temperature.

**"Up" and "down" arrows** are used in programming to change the set point temperature above sample temperature to +60° C (+140° F). The chamber is not cooled. The only cooling is from the frozen sample.





# FreeZone® Bulk Tray Dryers

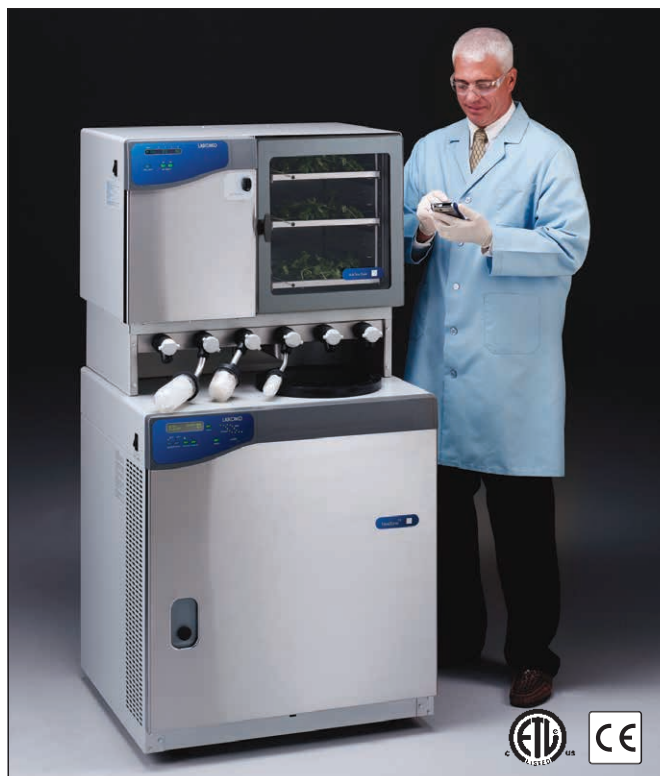
## SPECIFICATIONS & ORDERING INFORMATION

### Specifications:

- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- Acrylic door, 1" thick.
- Three shelves, each 12.7" w x 16.6" d (32.2 cm x 42.2 cm) to provide 210 square inches of area. Chamber may accommodate two additional shelves (sold separately).
- ❖ 200-watt heater on each shelf for heating to +60° C (+140° F). A microprocessor maintains system temperature within 3° C of set point. (Shelves are not cooled by the Bulk Tray Dryer. The only cooling is from the frozen sample.)
- Three sensor probes for monitoring sample or shelf temperature. Connections for two additional sensors are provided (additional sensors sold separately).
- LCD that displays set point and temperature (°C) of each shelf and "R" for Run mode or "S" for Stop mode.
- Control panel with Run/Stop, "Up" arrow and "Down" arrow switches.
- Vacuum release valve for venting the chamber so the chamber door may be opened.
- Rear-mounted RS-232 cable connection port for communication with a user-supplied PC. Monitored parameters are shelf set point temperature, actual temperature of each shelf, run time and operating status. **RS-232 Cable is required (not included).** See page 64.
- Side-mounted power switch.
- ❖ Integral Support Stand completes the connection between the Tray Dryer attachment port and the FreeZone 6, 12 or 18 Liter Freeze Dry System of your choice. The stand elevates the Tray Dryer above the work surface of the Freeze Dry System to allow unobstructed access to the collector compartment.
- Overall dimensions: 27.1" h x 32.2" w x 21.5" d (69 cm x 82 cm x 55 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (115 volt models).
- CAN/CSA C22.2 No. 61010.1 (115 volt models).
- CE Conformity marking (230 volt models).



FreeZone Bulk Tray Dryer with 6-Port Manifold 16-317-92 and FreeZone 12 Liter Freeze Dry System with PTFE-Coated Collector 16-208-5013.

### Options include:

- Pre-installed 6-Port Tray Dryer Manifold 10-273-33.
- Domestic or international electrical configuration.

### All models require (not included):

- FreeZone 6, 12 or 18 Liter Freeze Dry System. See pages 24-32.
- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure, and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Freeze dry glassware if not bulk freeze drying. See pages 62-63.

Catalog Number	Electrical Requirements	Plug Type	6-Port Manifold	Shipping Weight
16-317-91	115 volts, 60 Hz, 8.0 A	115 volts, 15 amps		262 lbs. (119 kg)
16-317-92	115 volts, 60 Hz, 8.0 A	115 volts, 15 amps	•	262 lbs. (119 kg)
16-208-5022	230 volts, 60 Hz, 4.0 A	North America, 230 volts		262 lbs. (119 kg)
7806041**	230 volts, 60 Hz, 4.0 A	North America, 230 volts	•	262 lbs. (119 kg)
16-317-93*	230 volts, 50 Hz, 4.0 A	Schuko		262 lbs. (119 kg)
16-317-94*	230 volts, 50 Hz, 4.0 A	Schuko	•	262 lbs. (119 kg)

See page 51 for Bulk Tray Dryer accessories.

❖ Exclusive feature

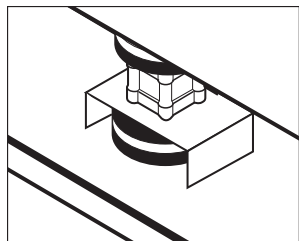
\* International electrical configuration

\*\* Contact Fisher Scientific for ordering information.



# FreeZone® Triad™ Stoppering Tray Dryers & Bulk Tray Dryers

## ACCESSORIES



**7761500\*\* Isolation Valve**  
Isolates the Tray Dryer from the Freeze Dry System to shorten the time necessary to reestablish working vacuum levels and to provide a means for determining end point. Consists of a valve, valve handle, clamps, couplings and installation instructions. Mounts underneath the support stand

included with the Tray Dryer. May be installed before or after the Tray Dryer is installed on the Freeze Dry System. For use with Stoppering Tray Dryers 16-317-91, 16-208-5022 and 16-317-93 and Bulk Tray Dryers 7806060\*\* and 7806070\*\*. The Isolation Valve and 6-Port Tray Dryer Manifold 10-273-33 may not be field installed together.\* Shipping weight 5 lbs. (2.3 kg)



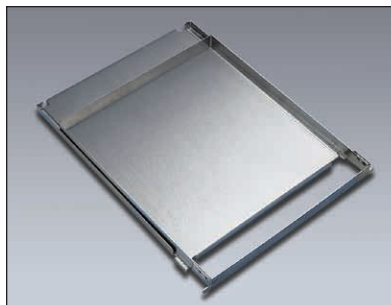
**10-273-33 6-Port Tray Dryer Manifold**  
30.0" w x 16.5" d x 7.0" h (76.2 cm x 41.9 cm x 17.8 cm). Six valves provide the flexibility to connect flasks and other freeze dry glassware to the Freeze Dry System with Tray Dryer. Valves accommodate either 1/2" or 3/4" flask adapters. Mounts to the support stand included with the FreeZone Stoppering and Bulk Tray Dryer. May be field installed before or after the Tray Dryer is installed on the Freeze Dry System. The 6-Port Tray Dryer Manifold and Isolation Valve 7761500\*\* may not be field installed together.\* Included with Bulk Tray Dryer 16-317-92, 7806041, 16-317-94, 7806061\*\* and 7806071\*\*. Shipping weight 19 lbs. (8.6 kg)



**10-273-34 Support Grid**  
7.0" w x 7.0" d (17.8 cm x 17.8 cm). Stainless steel tray with removable plastic grid to provide support for Stoppering Ampoules and other small specimen containers. Grid holds 144 containers of 12 mm diameter. Shipping weight 2.5 lbs. (1.1 kg)



**10-269-106 Bulk Tray**  
11.5" w x 15.0" d x 0.8" h (29.2 cm x 38.1 cm x 2.0 cm). Stainless steel tray contains liquids for pre-freezing and bulk drying. Shipping weight 3 lbs. (1.4 kg)



**10-273-35 Tray with Slide-Out Bottom**  
12.0" w x 14" d (30.5 cm x 35.6 cm). Stainless steel tray has separate steel tray that slides out to allow glassware containers direct contact with shelf. Shipping weight 5 lbs. (2.3 kg)



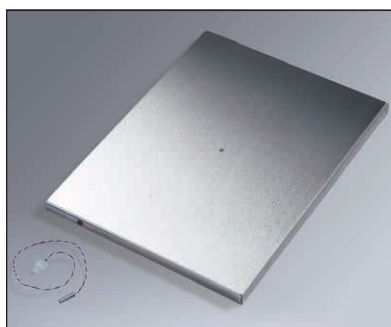
**7439300\*\* Microcentrifuge Tube Holder** 3.0" w x 2.25" d x 1.0" h (7.6 cm x 5.7 cm x 2.5 cm). Anodized aluminum block with twelve bore holes that accommodate 1.7 ml microcentrifuge tubes. Holder may be placed on any flat freeze drying surface such as inside Clear Chambers or the built-in vacuum drying

chamber of FreeZone Console Systems; or on FreeZone Stoppering or Bulk Tray Dryer Shelves, Product Shelves, or Heated Product Shelves. One each. **Microcentrifuge tubes are not included.** Shipping weight 0.6 lb. (0.3 kg)

### For FreeZone Stoppering Tray Dryers

**10-273-36 Shelf Spacers**  
9.0" w x 13.0" d x 2.5" h (22.9 cm x 33.0 cm x 6.4 cm). Stainless steel spacers placed on one or two empty shelves assist stoppering of partial loads of small serum bottles. One pair. Shipping weight 3 lbs. (1.4 kg)

### For FreeZone Bulk Tray Dryers



**Heated Shelves with Sensors**  
12.7" w x 16.6" d (32.2 cm x 42.2 cm). Stainless steel shelves include 200-watt heater and sensor probe. FreeZone Bulk Tray Dryers include three and can accommodate two additional Heated Shelves with Sensors. The Sensor, included with the Heated

Shelf or sold separately, may be used to monitor sample or shelf temperature, which is displayed on the LCD of the FreeZone Bulk Tray Dryer.

Catalog Number	Description	Shipping Weight
10-269-104	Heated Shelf with Sensor for 115 volt, 50/60 Hz operation	15 lbs. (6.8 kg)
10-269-105	Heated Shelf with Sensor for 230 volt, 50/60 Hz operation	15 lbs. (6.8 kg)
7754100**	Sensor only	0.5 lb. (0.2 kg)

\*Contact Labconco for ordering information on models with factory-installed 6-Port Tray Dryer Manifold and Isolation Valve.

\*\* Contact Fisher Scientific for ordering information.



## Drying Accessories

Use the key below to select the drying chamber or manifold that will fit the FreeZone System you have selected.

- |                                                                                                                                    |                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <b>1</b> = Fits any FreeZone 1 Liter Freeze Dry System                                                                             | <b>4.5P</b> = Fits any FreeZone Plus 4.5 Liter Cascade Freeze Dry System |
| <b>2.5</b> = Fits any FreeZone 2.5 Liter Freeze Dry System                                                                         | <b>6</b> = Fits any FreeZone 6 Liter Freeze Dry System                   |
| <b>4.5</b> = Fits any FreeZone 4.5 Liter Freeze Dry System                                                                         | <b>12</b> = Fits any FreeZone 12 Liter Freeze Dry System                 |
| <b>4.5A</b> = Fits any FreeZone 4.5 Liter Freeze Dry System with Attachment Port Lid Accessory 10-271-G attached (sold separately) | <b>18</b> = Fits any FreeZone 18 Liter Freeze Dry System                 |



**10-273-19 12-Port Drying Chamber**  
9.75" h x 8.0" diameter (24.8 cm x 20.3 cm). Type 304 stainless steel, 1/2" thick acrylic lid with neoprene gasket, complete with 12 neoprene valves

with molded plastic knobs that accommodate both 1/2" and 3/4" adapters for connection of flasks. Shipping weight 11 lbs. (5 kg) **1, 2.5, 4.5P, 6, 12, 18**



**10-273-20 16-Port Drying Chamber**  
13.0" h x 13.0" diameter (33 cm x 33 cm). Type 304 stainless steel, 3/4" thick acrylic lid with neoprene gasket, complete with 16 neoprene valves

with molded plastic knobs that accommodate both 1/2" and 3/4" adapters for connection of flasks. Shipping weight 21 lbs. (9.5 kg) **4.5P, 6, 12, 18**



**Clear Chambers with Valves**  
Provide visibility into the acrylic chamber during bulk drying as well as accommodate connection of freeze dry glassware to eight valves. Include clear

acrylic cylinder; anodized aluminum lid; eight neoprene valves with molded plastic knobs for use with both 1/2" and 3/4" adapters; clear acrylic attachment port lid with 3" diameter opening and neoprene gasket.



**Clear Chambers**  
Provide visibility into the chamber during bulk drying. Include clear acrylic lid with neoprene gasket, vacuum release valves and pass-through for electrical transformer

cords, clear acrylic attachment port lid with 3" diameter opening and neoprene gasket.

Catalog	Dimensions	Accommodate	For use with:	Shipping Wt.
<b>Cylinder</b>				
<b>10-030-155</b>	9.25" dia. x 9.75" h (23.5 cm x 24.4 cm)	Product Shelves 10-030-152 Heated Product Shelves 10-273-6, 10-273-7, 10-030-150 and 10-030-151	<b>1, 2.5, 4.5, 6, 12, 18</b>	13.5 lbs. (5.9 kg)
	<b>Overall</b> 14.6" dia. x 12.2" h (37.1 cm x 31.0 cm)			
<b>Cylinder</b>				
<b>10-030-156</b>	12.0" dia. x 12.6" h (30.5 cm x 38.0 cm)	Product Shelves 10-030-152 and 10-030-153 Heated Product Shelves 10-030-150, 10-030-151, 10-273-10, 10-273-11, 10-273-6 and 10-273-7	<b>6, 12, 18</b>	15 lbs. (6.8 kg)
	<b>Overall</b> 17.3" dia. x 15.0" h (43.9 cm x 38.1 cm)			

Catalog	Dimensions	Accommodate	For use with:	Shipping Wt.
<b>Cylinder</b>				
<b>10-030-154</b>	9.25" dia. x 9.75" h (23.5 cm x 24.4 cm)	Product Shelves 10-030-152 Heated Product Shelves 10-030-150, 10-030-151, 10-273-6 and 10-273-7	<b>1, 2.5, 4.5, 6, 12, 18</b>	13.5 lbs. (5.9 kg)
	<b>Overall</b> 10.3" dia. x 13.1" h (26.2 cm x 33.3 cm)			
<b>Cylinder</b>				
<b>10-271-1A</b>	12.0" dia. x 12.6" h (30.5 cm x 36.6 cm)	Product Shelves 10-030-152 and 10-030-153 Heated Product Shelves 10-030-150, 10-030-151, 10-273-10, 10-273-11, 10-273-6 and 10-273-7	<b>6, 12, 18</b>	15 lbs. (6.8 kg)
	<b>Overall</b> 13.6" dia. x 16.3" h (34.5 cm x 41.4 cm)			



## Drying Accessories



**Clear Stopping Chambers**  
23.0" h x 13.5" diameter (58.4 cm x 34.3 cm). Provide an economical means of stoppering serum bottles under original vacuum. Consists of clear acrylic cylinder, stainless steel top plate, two 10.0" diameter aluminum shelves and low voltage transformer with variable heat control to +40° C (±104° F) and electrical cord with plug. Clear, 3/4" thick acrylic lid has neoprene gasket, vacuum release valve and stoppering handle. Also include 3/4" thick, clear acrylic attachment port lid with 3" diameter opening; neoprene gasket and

pass-through for electrical transformer cord. Serum bottles with stoppers in the raised position may be loaded on the two shelves. After freeze drying is complete, the stoppering handle may be turned, slowly moving the top plate downward until it makes contact with the sample containers on the top shelf and the sample containers on the bottom shelf make contact with the top shelf. Pressure from the top plate and shelf push the stoppers into the containers, stoppering them under vacuum. Accommodate small containers from 2 to 5 milliliters.

### Clear Stopping Chambers

Catalog Number	Electrical Requirements	For use with:	Shipping Weight
10-030-164	115 volts, 50/60 Hz	6, 12, 18	30 lbs. (13.6 kg)
10-030-165	230 volts, 50/60 Hz	6, 12, 18	30 lbs. (13.6 kg)



**10-269-825 Mini Stopping Chamber**  
Ideal for lyophilizing sample in small serum bottles with split stoppers. Mini Stopping Chamber attaches to a neoprene valve on any Labconco Drying Chamber or Manifold. Once the samples are lyophilized, the bottles can be stoppered while still under vacuum. Accommodates up

to forty-eight 2 milliliter serum bottles or eight 30 milliliter serum bottles. Stopping travel distance is 0.5" (12.7 mm). Using zero, one or two of the spacers provided, the chamber can accommodate bottles that range in height from 1.38" (35 mm) to 2.48" (63 mm). Includes one tray, two spacers; 1" OD and 1/2" ID PVC tubing, 36" long; two hose clamps; and 1/2" diameter stainless steel connector. Shipping weight 15 lbs. (6.8 kg)

**Product Shelves** Accommodate bulk samples, microtiter plates or serum bottles.



**Product Shelves**  
Consist of three aluminum shelves with 1/4" rims, three stainless steel support rods, nine clips for shelf height adjustment, and three rubber feet.



**Heated Product Shelves with Variable Heat Control**  
Consist of three aluminum shelves with 1/4" rims, three stainless steel support rods, nine clips for shelf height adjustment, low voltage transformer with variable heat control to +40° C (+104° F), and three rubber feet.

### Product Shelves

Catalog Number	Shelves Dimensions	For use with Chambers:	Shipping Weight
10-030-152	9.4" h. x 6.25" dia. (23.9 cm x 15.9 cm)	10-273-20, 10-030-154, 10-030-155, 10-030-156, 10-273-19 and 10-271-1A	1.5 lbs. (0.7 kg)
10-030-153	12.2" h. x 9.9" dia. (31.0 cm x 25.1 cm)	10-273-20, 10-030-156 and 10-271-1A	2.0 lbs. (0.9 kg)

### Heated Product Shelves with Variable Heat Control

Catalog Number	Shelves Dimensions	Electrical Requirements	For use with Chambers:	Shipping Weight
10-273-6	6.5" dia. x 9.0" h (15.9 cm x 22.9 cm)	115 volts, 50/60 Hz	10-273-19, 10-273-20, 10-030-155, 10-030-156, 10-030-154 and 10-271-1A	13 lbs. (5.9 kg)
10-030-150	7.25" dia. x 9.4" h (18.1 cm x 23.9 cm)	115 volts, 50/60 Hz	10-273-20, 10-030-155, 10-030-156, 10-030-154 and 10-271-1A	14 lbs. (6.4 kg)
10-273-10	10.0" dia. x 11.75" h (24.5 cm x 29.8 cm)	115 volts, 50/60 Hz	10-273-20, 10-030-156 and 10-271-1A	15 lbs. (6.8 kg)
10-273-7*	6.5" dia. x 9.0" h (15.9 cm x 22.9 cm)	230 volts, 50/60 Hz	10-273-19, 10-273-20, 10-030-155, 10-030-156, 10-030-154 and 10-271-1A	13 lbs. (5.9 kg)
10-030-151*	7.25" dia. x 9.4" h (18.1 cm x 23.9 cm)	230 volts, 50/60 Hz	10-273-20, 10-030-155, 10-030-156, 10-030-154 and 10-271-1A	14 lbs. (6.4 kg)
10-273-11*	10.0" dia. x 11.75" h (24.5 cm x 29.8 cm)	230 volts, 50/60 Hz	10-273-20, 10-030-156 and 10-271-1A	15 lbs. (6.8 kg)

\*International electrical configuration



## Drying Accessories



**10-030-157 4-Port Manifold**  
9.0" h x 8.7" w x 8.7" d (22.9 cm x 22.1 cm x 22.1 cm). Type 304 stainless steel, complete with four neoprene valves with molded plastic knobs that accommodate both 1/2" and 3/4" adapters for connection of flasks. Shipping weight 2 lbs. (1 kg)  
**1, 2.5, 4.5A, 4.5P**



**10-273-16 20-Port Manifold with Support Shelves**  
10.0" h x 29.6" w x 24.2" d (25.4 cm x 75.2 cm x 61.5 cm). Type 304 stainless steel, complete with twenty neoprene valves with molded plastic knobs that accommodate both 1/2" and 3/4" adapters and two adjustable aluminum support shelves with stainless steel rods. Shipping weight 15 lbs. (7 kg) **6, 12, 18**



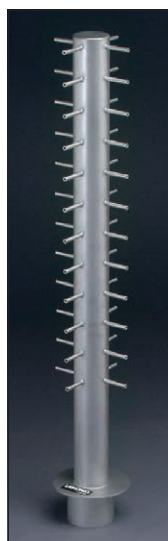
**10-273-14 20-Port Manifold**  
11.0" h x 27.4" w x 8.7" d (27.9 cm x 68.5 cm x 22.1 cm). Type 304 stainless steel, complete with 20 neoprene valves with molded plastic knobs that accommodate both 1/2" and 3/4" adapters for connection of flasks. Shipping weight 15 lbs. (7 kg) **1, 2.5, 4.5A, 4.5P, 6, 12, 18**



**7548000\*\* 24-Port Two-Tier Manifold**  
20.0" h x 26.4" w x 10.6" d (50.8 cm x 67.1 cm x 26.9 cm), type 304 stainless steel, complete with 24 neoprene valves with molded plastic knobs that accommodate both 1/2" and 3/4" adapters for connection of flasks. Shipping weight 20 lbs. (9 kg)  
**6, 12, 18**



**10-273-15 10-Port Manifold with Support Shelf**  
10.0" h x 29.6" w x 14.6" d (25.4 cm x 75.2 cm x 37.1 cm). Type 304 stainless steel, complete with ten neoprene valves with molded plastic knobs that accommodate both 1/2" and 3/4" adapters and adjustable aluminum support shelf with stainless steel rods. Shipping weight 11 lbs. (5 kg) **6, 12, 18**



**10-273-2 48-Port Ampule Manifold**  
28.6" h x 5.0" w x 5.0" d (72.7 cm x 12.7 cm x 12.7 cm). Type 304 stainless steel, tree-type, with 48 each 1/4" OD pipe stems that accommodate gum rubber or similar tubing to fit over any Labconco Ampule. **Tubing is not included.** Shipping weight 12 lbs. (5 kg)  
**1, 2.5, 4.5P, 6, 12, 18**



**10-271-G Attachment Port Lid**  
10.38" diameter (26.4 cm). Replaces the lid to the drying chamber on FreeZone 4.5 Liter Systems, to permit use of the 4-Port Manifold 10-030-

157, 20-Port Manifold 10-273-14, 48-Port Manifold 10-273-2 or Clear Chamber 10-271-1A. Includes 3/4" thick, clear acrylic cover with 3" diameter opening and gasket and acrylic plug with gasket (for periods of non-use). Shipping weight 2 lbs. (1 kg)

\*\* Contact Fisher Scientific for ordering information.





## Secondary Traps



**7394800\*\*  
Liquid Nitrogen  
Secondary Trap**  
For processing samples with ultra low eutectic points. Secondary Trap connects in series with a freeze dry system and vacuum pump to prevent contaminants from migrating

into the vacuum pump. After pulling a vacuum, liquid nitrogen may be introduced via the liquid nitrogen port. Liquid nitrogen cools to  $-196^{\circ}\text{C}$  ( $-321^{\circ}\text{F}$ ) to trap contaminants with low eutectic points. The well may be defrosted and the liquid drained from the drain hose. Glacier white powder-coated steel construction. Two valves may be opened (trap) or closed (by-pass). Opened valves allow gaseous contaminants to be trapped in the liquid nitrogen well. Closed valves allow gaseous contaminants to by-pass the well during defrosting and draining. 3/4" OD inlet and outlet connections. Includes an insulated filler tube for connection to a user-supplied liquid nitrogen tank; 20" wire-reinforced PVC tubing, 3/4" ID; and two clamps. **Liquid nitrogen is required (not included).** Shipping weight 24 lbs. (10.9 kg)



### 16-316-14 Soda Acid Trap

Secondary trap connects in series with freeze dry system and vacuum pump to prevent migration of corrosive chemicals into pump interior. Clear acrylonitrile body allows visual check of color indicating media. Media changes from white to blue when exhausted. 3/4" OD inlet and outlet connections. Includes 20" wire-reinforced PVC tubing, 3/4" ID, and one clamp. Shipping weight 12 lbs. (5.4 kg)

**7772100\*\* Replacement Cartridge for Soda Acid Trap 16-316-14**  
Shipping weight 4 lbs. (1.8 kg)

### 16-109-458 Activated Carbon Solvent Trap

Secondary trap connects in series with freeze dry system and vacuum pump to prevent migration of organic solvents into pump interior. Cartridge contains 11 ounces of activated carbon media. 3/4" OD inlet and outlet connections. Includes 20" wire-reinforced PVC tubing, 3/4" ID, and one clamp. Shipping weight 12 lbs. (5.4 kg)

**7772600\*\* Replacement Cartridge for Activated Carbon Solvent Trap**  
Shipping weight 4 lbs. (1.8 kg)



### Dry Ice Secondary Traps

For processing samples with low eutectic points. Traps connect in series with a freeze dry system and vacuum pump to prevent contaminants from migrating into the vacuum pump. An insulated

well, when dry ice and solvent are added, cools to approximately  $-75^{\circ}\text{C}$  ( $-103^{\circ}\text{F}$ ). When used alone, Dry Ice Secondary Traps may serve as an inexpensive collector. Simply connect a sample directly to the incoming port and add a vacuum pump to the outgoing port. **Dry ice and solvent, such as alcohol, are required (not included).**

Catalog Number	Dimensions (h x diameter)	Inlet/Outlet Connections	Well Volume	Ice Trapping Capacity	Shipping Weight
10-269-46A	9.75" x 7.8" (24.8 x 19.8 cm)	3/4" OD	3.10 liters	900 ml	9 lbs. (4.1 kg)
10-269-46B*	9.75" x 7.8" (24.8 x 19.8 cm)	1/2" OD	3.10 liters	900 ml	9 lbs. (4.1 kg)
10-269-46C*	7.8" x 6.6" (19.8 x 16.8 cm)	1/2" OD	1.92 liters	200 ml	5 lbs. (2.3 kg)

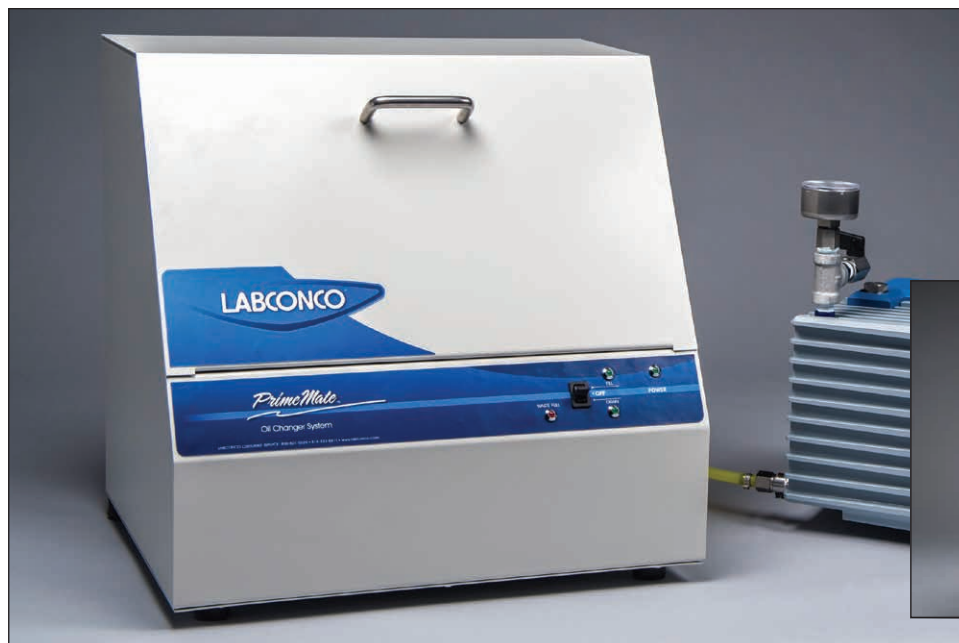
\*Not for use with FreeZone Systems in this catalog.

\*\* Contact Fisher Scientific for ordering information.



# PrimeMate™ Oil Change Systems

SPECIFICATIONS & ORDERING INFORMATION



Scan this code to see a demonstration.



**PRIME MATE OIL CHANGE SYSTEM** reduces the hassle and mess of changing the oil in your rotary vane or hybrid pump. Depending on your pump, the PrimeMate performs up to four oil changes before the clean oil container must be

replaced or refilled and the used oil container emptied. In less than 13 minutes, the used oil is drained and the pump filled with clean oil. A quick connect coupler attached to your pump's drain port provides easy tube attachment.

### Specifications:

Components include powder-coated housing with lift off cover; one empty 1 gallon (3.8 L) plastic used oil container; one empty 1 gallon (3.8 L) plastic clean oil container; two peristaltic pumps (one fill and one drain); 6' (1.83 meters) drain/fill flexible tubing with connectors; power switch; drain switch; fill switch; and indicator lights for 'power', 'draining', 'filling' and 'waste full'. Also includes 12 volt DC power supply, power cord with plug, and male 1/4 NPT coupler for connection to a user-supplied rotary vane vacuum pump. *Note: the coupler fits rotary vane vacuum pumps sold by Labconco Corporation. If user-supplied pump has a drain port not compatible with a 1/4 NPT coupling connection, a suitable adapter will be required.* See accessories. Dimensions: 16.4" w x 13.4" d x 15.75" h (41.6 x 33.9 x 40.0 cm). Shipping weight 32 lbs. (14.5 kg)

**Battery Packs.** For providing up to 8 hours of power to the PrimeMate when electricity is not accessible. Pack mounts to the back of the PrimeMate. Battery, bracket, charger and fasteners are provided.

**Installation is required.** Shipping weight 7 lbs. (3.2 kg)

Catalog Number	Electrical Requirements	Plug Type
10-269-730	115 volts, 60 Hz, 1 A	115 volts, 15 amp NEMA 5-15P
10-269-731*	230 volts, 50/60 Hz, 0.5 A	230 volts, Schuko CEE 7/7
10-269-732*	230 volts, 50/60 Hz, 0.5 A	230 volts, British (UK) PS 1363
10-269-733*	230 volts, 50/60 Hz, 0.5 A	230 volts, China/Australia CHI-10P
10-269-734	230 volts, 50/60 Hz, 0.5 A	230 volts, North America NEMA 6-15P

Catalog Number	Battery Pack for use with
10-269-735	PrimeMate 10-269-730 & 10-269-734
10-269-736*	PrimeMate 10-269-731
10-269-737*	PrimeMate 10-269-732
10-269-738*	PrimeMate 10-269-733

**10-269-742 Coupler.** Quick connecting. For attaching the drain/fill tubing to vacuum pumps with 1/4 NPT plug threads. Useful when PrimeMate is servicing multiple vacuum pumps (One per pump is required). One is supplied with each PrimeMate. Shipping weight 0.5 lb. (0.2 kg)

**10-269-741 Adapter.** For attaching the drain/fill coupler to vacuum pumps with 7/8-14 drain plug threads. **Requires 10-269-742 Coupler (one included with each PrimeMate).** Shipping weight 0.5 lb. (0.2 kg)

See page 64 for an accessory Utility Cart.

\*International electrical configuration



# Rotary Vane Vacuum Pumps

Rotary Vane Vacuum Pumps provide the performance required for good freeze drying results and fit easily into the cabinets of FreeZone console models. Belt driven pumps of equivalent performance are also suitable; however, due to the large size of these pumps, they may not fit into the FreeZone System's cabinet.

Use the Selection Guide below to find the recommended Combination Rotary Vane/Diaphragm Pump or General Purpose Rotary Vane Vacuum Pump based on your sample type and FreeZone System's electrical configuration.

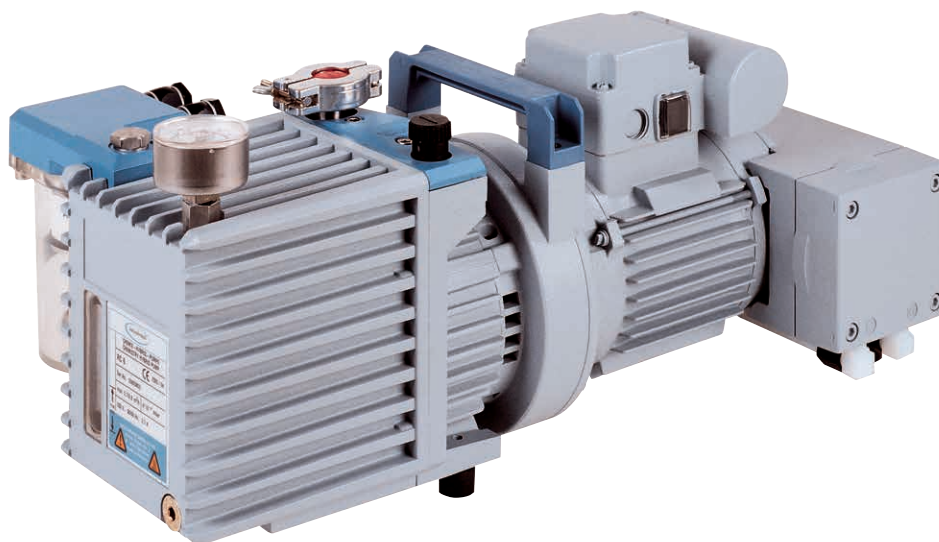
## Selection Guide

FreeZone Freeze Dry System	Sample Type	Recommended Vacuum Pump(s)		See Page
		With 115 volt plug	With 230 volt reverse IEC plug	
<b>1 Liter Benchtop</b>				
10-030-126, 10-030-127	Aqueous	01-096-21		59
	Acids and/or Solvents	10-269-60		58
10-030-128, 10-030-129, 10-030-130, 10-030-131, 7740060*, 7740061*, 7740070*, 7740071*	Aqueous		16-108-436	59
	Acids and/or Solvents		10-030-182	58
<b>2.5 Liter Benchtop, Cascade Benchtop &amp; Console</b>				
10-030-144, 10-030-145, 10-030-138, 10-030-139, 10-030-132, 10-030-133	Aqueous	01-096-21		59
	Acids and/or Solvents	10-269-60		58
10-030-146, 10-030-147, 10-030-148, 10-030-149, 7420060*, 7420061*, 7420070*, 7420071*, 10-030-140, 10-030-141, 10-030-142, 10-030-143, 7670060*, 7670061*, 7670070*, 7670071*, 10-030-134, 10-030-135, 10-030-136, 10-030-137, 7670560*, 7670561*, 7670570*, 7670571*	Aqueous		16-108-436	59
	Acids and/or Solvents		10-030-182	58
<b>2.5 Liter Cascade Triad</b>				
10-030-171, 10-030-170, 7400060*, 7400070*	Aqueous		16-108-436	59
	Acids and/or Solvents		10-030-182	58
<b>4.5 Liter Benchtop &amp; Console, Cascade Benchtop &amp; Console, -105° C Benchtop</b>				
16-080-200, 16-080-201, 16-108-500, 16-108-501, 16-108-506, 16-108-507, 10-271-10, 10-271-11, 10-271-16, 10-271-17	Aqueous	01-096-21		59
	Acids and/or Solvents	10-269-60		58
16-080-206, 16-080-207, 16-080-204, 16-080-205, 16-080-208, 16-080-209, 16-080-202, 16-080-203, 16-108-504, 16-108-505, 16-108-502, 16-108-503, 7386060*, 7386061*, 7386070*, 7386071*, 16-108-510, 16-108-511, 16-108-508, 16-108-509, 7387060*, 7387061*, 7387070*, 7387071*, 10-271-12, 10-271-13, 10-271-14, 10-271-15, 7750060*, 7750061*, 7750070*, 7750071*, 10-271-18, 10-271-19, 10-271-20, 10-271-21, 7751060*, 7751061*, 7751070*, 7751071*	Aqueous		16-108-436	59
	Acids and/or Solvents		10-030-182	58
<b>6 Liter Benchtop &amp; Console</b>				
10-271-22, 10-271-23, 10-271-28, 10-271-29, 16-208-504, 16-208-505, 16-208-502, 16-208-503, 16-208-506, 16-208-507, 16-208-508, 16-208-509, 10-271-52, 10-271-53, 16-208-5010, 10-271-55, 16-208-5011, 16-208-5012	Aqueous	10-962-0		59
	Acids and/or Solvents	10-269-60		58
10-271-24, 10-271-25, 10-271-26, 10-271-27, 7752060*, 7752061*, 7752070*, 7752071*, 10-271-34, 10-271-35, 10-271-36, 10-271-37, 10-271-38, 10-271-39, 10-271-40, 10-271-41, 10-271-42, 10-271-43, 10-271-44, 10-271-45, 7753060*, 7753061*, 7753062*, 7753064*, 7753066*, 7753067*, 7753070*, 7753071*, 7753072*, 7753074*, 7753076*, 7753077*, 10-271-48, 10-271-49, 10-271-50, 10-271-51, 7753562*, 7753564*, 7753572*, 7753574*, 10-274-63, 10-274-64, 10-274-65, 10-274-66, 10-274-67, 10-274-68, 10-274-69, 10-274-70, 7758560*, 7758561*, 7758562*, 7758564*, 7758570*, 7758571*, 7758572*, 7758574*, 10-271-58, 10-271-59, 10-271-60, 10-271-61, 10-271-62, 10-271-63, 10-271-64, 10-271-65, 10-271-66, 10-271-67, 10-271-68, 10-271-69, 7934060*, 7934061*, 7934062*, 7934064*, 7934066*, 7934067*, 7934070*, 7934071*, 7934072*, 7934074*, 7934076*, 7934077*	Aqueous		10-030-180	59
	Acids and/or Solvents		10-030-182	58
<b>12 Liter Console &amp; Cascade Console</b>				
10-271-70, 10-271-71, 10-271-72, 10-271-73, 10-271-74, 10-271-75, 10-271-76, 16-208-5013, 10-271-78, 16-208-5014, 16-208-5015, 10-271-81, 7754060*, 7754061*, 7754062*, 7754064*, 7754066*, 7754067*, 7754070*, 7754071*, 7754072*, 7754074*, 7754076*, 7754077*, 10-274-71, 10-274-72, 10-274-73, 10-274-74, 16-208-5016, 16-208-5017, 16-208-5018, 16-208-5019, 7759060*, 7759061*, 10-269-101, 7759064*, 7759070*, 7759071*, 7759072*, 7759074*, 10-271-82, 10-271-83, 10-271-84, 10-271-85, 10-271-86, 10-271-87, 10-271-88, 16-208-5020, 10-271-90, 10-271-91, 16-208-5021, 10-271-93, 7960060*, 7960061*, 7960062*, 7960064*, 7960066*, 7960067*, 7960070*, 7960071*, 7960072*, 7960074*, 7960076*, 7960077*	Aqueous		10-030-180	59
	Acids and/or Solvents		10-030-182	58
<b>18 Liter Console</b>				
10-271-94, 10-271-95, 10-271-96, 10-271-97, 10-271-98, 10-271-99, 10-272-00, 10-272-01, 10-272-02, 10-272-03, 10-272-04, 10-272-05, 7755060*, 7755061*, 7755062*, 7755064*, 7755066*, 7755067*, 7755070*, 7755071*, 7755072*, 7755074*, 7755076*, 7755077*	Aqueous		10-030-180	59
	Acids and/or Solvents		10-030-182	58

\* Contact Fisher Scientific for ordering information.



# Combination Rotary Vane/Diaphragm Vacuum Pumps



## VACUUBRAND HYBRID\* Vacuum Pumps

- Designed for use with acids and other harsh chemicals including TFA, TFA by-products, acetonitrile, HBe and HNO<sub>3</sub> present in samples such as HPLC-prepared and peptide purified materials.
- Compatible with FreeZone Freeze Dry Systems and CentriVap® Centrifugal Concentrators.
- Combination pump system consists of a two-stage rotary vane pump and two-stage, chemical-resistant diaphragm pump. The rotary vane pump provides the deep vacuum required for good freeze drying results and other evaporation needs. These pumps have the vacuum capabilities of a rotary vane pump and, in combination with the diaphragm pump, have improved solvent and acid handling capabilities.
- Low maintenance, longer lasting. The diaphragm pump, made of PTFE and other chemical-resistant fluoropolymer components, removes the condensable vapors in the rotary vane pump before they can contaminate the oil, thus extending the life of the oil and ultimately the life of the pump.

- Environmentally-friendly. Pump oil lasts up to 10 times longer than in conventional rotary vane pumps under virtually all conditions. Fewer oil changes conserves resources.
- Ultimate vacuum (partial pressure)  $2 \times 10^{-3}$  mBar (1.5 micron).
- Pressure control valve compensates for the different volumes displaced by the two pumps.
- Glass separator captures downstream condensate vapors.
- 3/4" OD inlet adapter.
- Include one liter bottle of vacuum pump oil, power switch, power cord and plug.

Catalog Number	Electrical Configuration	Displacement At 60 Hz (50 Hz) liter/minute	Dimensions w x d x h inches (cm)	Shipping Weight lbs. (kg)
10-269-60	115 volts, 60 Hz, 5.1 A Includes 115 volt NEMA 5-15P plug.	115 (98)	20.0 x 12.0 x 9.1 (51.0 x 30.5 x 23.0)	66 (30 kg)
10-030-182	230 volts, 50/60 Hz, 2.7 A Includes 230 volt reverse IEC plug.	115 (98)	20.0 x 12.0 x 9.1 (51.0 x 30.5 x 23.0)	66 (30 kg)

\*VACUUBRAND HYBRID™ is a trademark of VACUUBRAND GMBH + CO KG.



# Rotary Vane Vacuum Pumps & Vacuum Pump Accessories



## General Purpose Rotary Vane Vacuum Pumps

- Designed for use with aqueous samples.
- Compatible with FreeZone Freeze Dry Systems, CentriVap Centrifugal Concentrators and Protector® Controlled Atmosphere Glove Boxes.
- Ultimate vacuum (total pressure)  $2 \times 10^{-3}$  mBar (1.5 micron).
- On/off switch. Two inlet adapters (1/2" and 3/4" OD). Cast aluminum casing and rubber feet.
- Mode selector with two positions: High Vacuum and High Throughput.
- Gas ballast with three positions: Closed, Low Flow and High Flow.
- Single phase direct drive motor, totally enclosed and fan cooled. Should the motor overheat, the thermal overload device switches off the pump. When the pump cools down, the motor automatically restarts.
- Isolation valve seals the inlet to prevent oil and air contamination of the system in the event of power failure.
- Include four each one liter bottles of vacuum pump oil and one exhaust filter with oil mist and odor filter elements.
- Retractable lifting handle (Models 01-096-21, 16-315-51 and 16-108-436).
- Lifting bracket (Models 10-962-0, 16-315-52 and 10-030-180).

## Vacuum Pump Accessories

**Vacuum Pump Oil.** Hydro-treated paraffinic hydrocarbon oil.

Replacement oil for General Purpose Vacuum Pumps 01-096-21, 16-315-51, 16-108-436, 10-962-0, 16-315-52 and 10-030-180.

Catalog Number	Volume	Shipping Weight
1988000**	One liter	2 lbs. (1 kg)
10-269-739	One gallon (3.8 L)	12 lbs. (5 kg)

**1472200\*\* Inlet Filter.** For General Purpose Vacuum Pumps 01-096-21, 16-315-51, 16-108-436, 10-962-0, 16-315-52 and 10-030-180. Prevents oil back streaming from the pump and protects the pump from damage from submicron particles. Includes filter assembly and one filter cartridge. Life approximately 1000 hours at  $1.33 \times 10^{-2}$  mBar (10 microns) vacuum. Shipping weight 1 lb. (0.5 kg)

**1472500\*\* Replacement Inlet Filter Cartridge.** For 1472200. Shipping weight 0.5 lb. (0.2 kg)

**1473400\*\* Replacement Exhaust Filter.** For General Purpose Vacuum Pumps 01-096-21, 16-315-51, 16-108-436, 10-962-0, 16-315-52 and 10-030-180. Removes oil mist and odor from pump exhaust. Ducting to outside not required. Includes filter assembly, one oil mist filter cartridge and one odor filter cartridge. Oil mist filter cartridge life is approximately one year and odor filter cartridge life is approximately six months at  $1.33 \times 10^{-2}$  mBar (10 microns) vacuum. Shipping weight 1 lb. (0.5 kg)

**1473200\*\* Replacement Oil Mist Exhaust Filter Cartridge.** For 1473400. Life is approximately one year at  $1.33 \times 10^{-2}$  mBar (10 microns) vacuum. Shipping weight 0.5 lb. (0.2 kg)

**1473300\*\* Replacement Odor Exhaust Filter Cartridge.** For 1473400. Life is approximately one year at  $1.33 \times 10^{-2}$  mBar (10 microns) vacuum. Package of five. Shipping weight 0.5 lb. (0.2 kg)

**10-030-181 VACUUBRAND® B-Oil.** One liter. Replacement oil for VACUUBRAND HYBRID® Vacuum Pumps 10-269-60 and 10-030-182. Shipping weight 2 lbs. (1 kg)

**10-269-740 Vacuum Pump Oil.** One gallon (3.8 L) synthetic hydrocarbon oil. Shipping weight 12 lbs. (5 kg)

† VACUUBRAND™ and VACUUBRAND HYBRID™ are trademarks of VACUUBRAND GMBH + CO KG.

Catalog Number	Electrical Configuration	Displacement At 60 Hz (50 Hz) liter/minute	Dimensions w x d x h inches (cm)	Shipping Weight lbs. (kg)
01-096-21	115 volts, 50/60 Hz, 4.6 A Includes 115 volt NEMA 5-15P plug.	117 (98)	6.5 x 17.0 x 10.4 (15.8 x 43.0 x 26.1)	62 (28)
16-315-51*	230 volts, 50/60 Hz, 2.4 A Includes 220 volt NEMA 6-15P plug.	117 (98)	6.5 x 17.0 x 10.4 (15.8 x 43.0 x 26.1)	62 (28)
16-108-436	230 volts, 50/60 Hz, 2.4 A Includes 230 volt reverse IEC plug.	117 (98)	6.5 x 17.0 x 10.4 (15.8 x 43.0 x 26.1)	62 (28)
10-962-0	115 volts, 50/60 Hz, 7.8 A Includes 115 volt NEMA 5-15P plug.	195 (163)	6.5 x 18.5 x 10.4 (15.8 x 47.0 x 26.1)	65 (30)
16-315-52*	230 volts, 50/60 Hz, 4.0 A Includes 220 volt NEMA 6-15P plug.	195 (163)	6.5 x 18.5 x 10.4 (15.8 x 47.0 x 26.1)	65 (30)
10-030-180	230 volts, 50/60 Hz, 4.0 A Includes 230 volt reverse IEC plug.	195 (163)	6.5 x 18.5 x 10.4 (15.8 x 47.0 x 26.1)	65 (30)

\* Not for direct electrical connection to FreeZone Systems in this catalog.

\*\* Contact Fisher Scientific for ordering information.



## Fast-Freeze® Flasks



### Fast-Freeze Flasks

Select Fast-Freeze Flasks based on your sample sizes. Flasks should be filled to no more than one-third of their volume so that maximum surface area is achieved and efficient lyophilization is assured. A complete Fast-Freeze Flask includes a rubber top, glass bottom and a supply of filter paper. Tops, bottoms and filter paper are available separately as replacement components. Adapters are required to attach flasks to freeze dry valve ports.

Flask Size	Complete Flask	Flask Bottom	Flask Top	Flask Top Adapter Diameter*	Dimensions/Flask Bottom H x D
40 ml	10-269-50	10-269-50B	10-269-50A	1/2"	76 mm x 34 mm
80 ml	10-269-51	10-269-51B	10-269-50A	1/2"	115 mm x 34 mm
120 ml	10-269-62	10-269-62A	10-269-52A	3/4"	68 mm x 59.2 mm
150 ml	10-269-52	10-269-52B	10-269-52A	3/4"	85 mm x 59.2 mm
300 ml	10-269-53	10-269-53B	10-269-52A	3/4"	145 mm x 59.2 mm
600 ml	10-269-54	10-269-54B	10-269-54A	3/4"	135 mm x 90.2 mm
750 ml	10-272-06	7542700**	10-269-54A	3/4"	162 mm x 90.2 mm
900 ml	10-269-63	10-269-63A	10-269-54A	3/4"	190 mm x 90.2 mm
1200 ml	10-269-55	10-269-55B	10-269-54A	3/4"	240 mm x 90.2 mm
2000 ml	10-269-56	10-269-56B	10-269-54A	3/4"	380 mm x 90.2 mm



### Flask Holders

Help to prevent sample melt back. They allow a small Fast-Freeze Flask Bottom containing the sample to be placed inside a larger Fast-Freeze Flask so that the vacuum surrounding the sample insulates it from the room atmosphere. Stainless steel. Flasks not included. Shipping weight 1 lb. (0.5 kg)

Catalog Number	Description
10-269-601	Small Flask Holder. Compatible with inner flasks 10-269-50B (40 ml) and 10-269-51B (80 ml) and outer flasks 10-272-06 (750 ml) and 10-269-63 (900 ml).
10-269-600	Large Flask Holder. Compatible with inner flasks 10-269-62A (120 ml), 10-269-52B (150 ml) and 10-269-53B (300 ml) and outer flasks 10-272-06 (750 ml) and 10-269-55 (1200 ml).

See Tube Holder accessories on page 61.

**Variety of adapters available.** You may select from glass or stainless steel adapters, available straight or with 45° bend. (Required — order separately.)

**Top seals easily.** The flexible silicone rubber top snaps on and off easily, yet provides a reliable, high vacuum seal.

**Only two pieces per flask.** The complete Fast-Freeze Flask has only two components:

- a high strength borosilicate glass bottom to withstand extreme temperatures and high vacuum.
- a flexible, non-contaminating silicone rubber top.

**Entire flask may be autoclaved.**

**Compatible with all major brands of laboratory freeze dry apparatus.**

**No complex filter retainer is necessary.** For those who use filters, they are easily inserted between the adapter and top of the flask. One hundred filters are supplied with each flask.

**Wide mouth opening loads fast, cleans easily.**

**Horizontal shell freezing.** Flask may be placed in a horizontal position and rotated in a bath for shell freezing.

**Available in ten convenient sizes.**

**Flat bottom reduces spills, provides better balance.**

**No vacuum grease is necessary.**

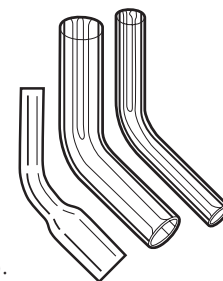
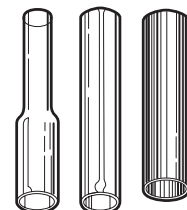
### 7540100\*\* FreeZone Freeze Dry Glassware Kit

Includes one each 600 ml Complete Fast-Freeze Flask (10-269-54), one each 300 ml Complete Fast-Freeze Flask (10-269-53), one each 3/4" dia. Stainless Steel Straight Adapter (10-269-61A), and one each 3/4" dia. Stainless Steel 45° Bend Adapter. Shipping weight 5 lbs. (2 kg)

### Adapters

Add the Adapters for connecting the Fast-Freeze Flasks to the valve ports on your drying chamber or manifold. Choose borosilicate glass or stainless steel adapters in 1/2" and 3/4" diameters.

Diameter	Straight Adapter	45° Bend Adapter
<b>Borosilicate Glass</b>		
1/2" flask top to 1/2" valve*	10-269-57A	10-269-57B
3/4" flask top to 3/4" valve*	10-269-58A	10-269-58B
1/2" flask top to 3/4" valve*	10-269-59A	10-269-59B
3/4" flask top to 1/2" valve*	10-269-59A	10-269-59B
<b>Stainless Steel</b>		
1/2" flask top to 1/2" valve*	10-269-60A	10-269-60B
3/4" flask top to 3/4" valve*	10-269-61A	10-269-61B



### 10-269-64 Replacement Filter Paper

1000 (10 packages of 100). 1" diameter (28 mm). Pore size 17 microns. Shipping weight 0.5 lb. (0.2 kg)

\*Valves on the freeze dry systems, drying chambers and manifolds offered in this catalog fit adapters of both 1/2" and 3/4" sizes. Size information is provided for selecting adapters for older Labconco models and other freeze dryers.

\*\* Contact Fisher Scientific for ordering information.



# Lyph-Lock® Flasks



## Lyph-Lock Flasks

Select the Lyph-Lock Flasks based on your sample sizes. Flasks should be filled to no more than one-third of their volume so that maximum surface area is achieved and efficient lyophilization is ensured. A complete Lyph-Lock Flask includes a glass top and bottom and a rubber ring seal. Tops, bottoms and seals are available separately as replacement components. Adapters are required to attach flasks to freeze dry valve ports.

Flask Size	Complete Flask 19/38 STJ	Complete Flask 24/40 STJ	Flask Top 19/38 STJ	Flask Top 24/40 STJ	Lyph-Lock Seal	Flask Bottom	Dimensions Flask Bottom H x ID
25 ml	10-269-67A	10-269-68A	7552000**	7556000**	7559000**	7557000**	37 mm x 34 mm
50 ml	10-269-67B	10-269-68B	7552000**	7556000**	7559000**	7557200**	67 mm x 34 mm
100 ml	10-269-67C	10-269-68C	7552200**	7556200**	7559200**	7557400**	50 mm x 59.2 mm
250 ml	10-269-67D	10-269-68D	7552200**	7556200**	7559200**	7557600**	110 mm x 59.2 mm
500 ml	10-269-67E	10-269-68E	7552400**	7556400**	7559400**	7557800**	103 mm x 90.2 mm
750 ml	10-269-67G	10-269-68G	7552400**	7556400**	7559400**	10-269-66G	145 mm x 90.2 mm
1000 ml	10-269-67F	10-269-68F	7552400**	7556400**	7559400**	7558000**	187 mm x 90.2 mm



### 10-030-158 Tube Holder

Stainless steel. Accommodates up to 15 each 12 or 13 millimeter diameter tubes in an upright position inside a 750 ml or larger Fast-Freeze Flask or Lyph-Lock Flask (tubes and glassware are not included). 144 mm h x 83.3 mm diameter. Shipping weight 1.0 lb. (0.5 kg)



### 10-030-159 Tube Holder

Stainless steel. Accommodates up to 30 each 2.0 ml microcentrifuge tubes in an upright position inside a 750 ml or larger Fast-Freeze Flask or Lyph-Lock Flask (tubes and glassware are not included). 139 mm h x 83.3 mm diameter. Shipping weight 1.0 lb. (0.5 kg)

**Borosilicate glass adapters** with either 19/38 or 24/40 standard taper joints have 90° bend. (Required — order separately.)

Compatible with all major brands of laboratory freeze dry apparatus.

**Only three pieces per flask** — no hooks or springs. The complete Lyph-Lock Flask includes:

- a flask top of high strength borosilicate glass
- a flexible, non-contaminating silicone rubber seal
- a flask bottom of borosilicate glass to withstand extreme temperatures and high vacuum.

Available in seven convenient sizes.

Entire flask may be autoclaved.

Provides a high vacuum seal for efficient lyophilization.

Silicone rubber seal grasps top and bottom. The flexible ring holds securely together during pre-freezing and lyophilization.

Flat bottom reduces spills, provides better balance.

## Adapters

Add the Adapters for connecting the Lyph-Lock Flasks to the valve ports on your drying chamber or manifold.



90° Bend Adapter	Description
10-269-69A	Connects 19/38 STJ Flask Top to 1/2" valve*
10-269-69B	Connects 19/38 STJ Flask Top to 3/4" valve*
10-269-69C	Connects 24/40 STJ Flask Top to 1/2" valve*
10-269-69D	Connects 24/40 STJ Flask Top to 3/4" valve*

\*Valves on the freeze dry systems, drying chambers and manifolds offered in this catalog fit adapters of both 1/2" and 3/4" sizes. Size information is provided for selecting adapters for older Labconco models and other freeze dryers.

\*\* Contact Fisher Scientific for ordering information.

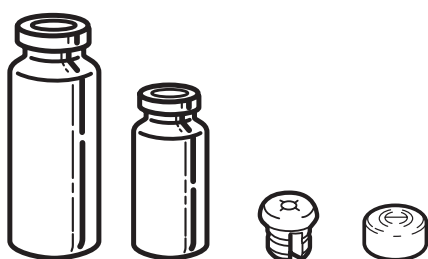


## Serum Bottles



### Serum Bottles

Perfect for long term storage of freeze dried samples. Labconco Serum Bottles are specifically designed for lyophilization applications. Their uniform thin wall construction ensures even freezing and drying. Serum Bottles are ideal containers for use in the FreeZone Stopping Tray Dryer. Serum Bottles also connect to valve ports on drying chambers and manifolds. Serum Bottles, Stoppers and Seals are supplied in packages of 100.



Size	20 mm Corkage	13 mm Corkage	Split Stoppers	Aluminum Seals
2 ml		7575010**	7576010**	7577010**
3 ml		7575210**	7576010**	7577010**
5 ml	06-406-50A		10-269-81B	06-406-51
10 ml	06-406-50B		10-269-81B	06-406-51
20 ml	22-365-742		10-269-81B	06-406-51
30 ml	06-406-50C		10-269-81B	06-406-51
50 ml	7573810**		10-269-81B	06-406-51
100 ml	7574010**		10-269-81B	06-406-51
125 ml	7574210**		10-269-81B	06-406-51

\*\* Contact Fisher Scientific for ordering information.

## Accessories



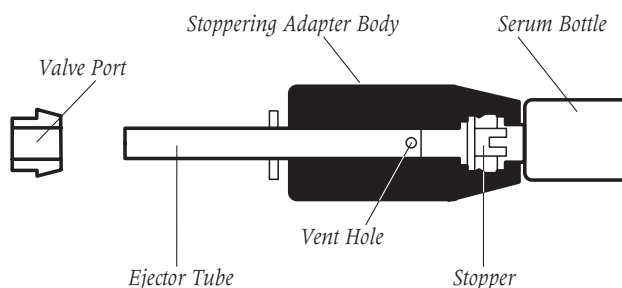
### Seal Crimpers

Secure tear-away Aluminum Seals.

**22-365-841 Seal Crimper.** For 13 mm corkage. Shipping weight 3 lbs. (1.4 kg)

**06-406-52 Seal Crimper.** For 20 mm corkage. Shipping weight 3 lbs. (1.4 kg)

**10-269-90 Vacuum Stopping Adapter.** Connects to a valve port for manual stoppering of a 20 mm corkage serum bottle under original vacuum. The stopper and serum bottle are inserted into the adapter body and lyophilization begins. After the process is completed, the researcher slides the stopper into position so when the valve is turned from vacuum to vent the serum bottle is tightly sealed by the stopper. The ejector tube is then used to force the serum bottle out of the adapter. Shipping weight 1 lb. (0.4 kg)



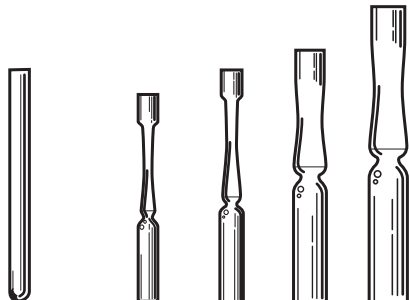




## Ampules & Miscellaneous Accessories

### Ampules

Labconco Ampules are fabricated of highest quality borosilicate glass for strength and durability. Ampules are supplied in packages of 100.



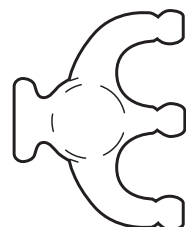
Size	Straight	Pre-Scored Flat Bottom
1 ml	7572710**	10-269-77A
2 ml		10-269-77B
5 ml		10-269-77C
10 ml		7571210**



**10-269-82 Oxygen/Natural Gas Sealing Torch.** Specifically designed for flame sealing freeze dry ampules. Seals all types of heat-resistant glass. Connects to natural gas, butane or propane and oxygen with 1/4" ID hose connectors. Shipping weight 3 lbs. (1.4 kg)



**10-269-80 Ampule Valve Adapters.** Connect ampules to valve ports or stainless steel stems. Ten per package. Shipping weight 0.5 lb. (0.2 kg)



**7762700\*\* Three Way Adapter.** Permits attachment of three ampules to a single valve port. Ampules are attached using Ampule Valve Adapters or 1/8" surgical tubing (not provided). Cavity in adapter body can be filled with cotton fiber media to help prevent contamination between samples. Shipping weight 3 oz. (0.1 kg)



**7543800\*\* 29/32 Stainless Steel Adapter.** Allows connection of 29/32 round bottom flasks to valve ports on drying chambers and manifolds. Shipping weight 1 lb. (0.5 kg)



**7439300\*\* Microcentrifuge Tube Holder.** 3.0" w x 2.25" d x 1.0" h (7.6 cm x 5.7 cm x 2.5 cm). Anodized aluminum block with twelve bore holes that accommodate 1.7 ml microcentrifuge tubes. Holder may be placed on any flat freeze drying surface such as inside Clear Chambers, the built-in vacuum drying

chamber of FreeZone Console Systems; or on FreeZone Stopping or Bulk Tray Dryer Shelves, Product Shelves, or Heated Product Shelves. One each. **Microcentrifuge tubes are not included.** Shipping weight 0.6 lb. (0.3 kg)



### Digital Electronic Vacuum Gauges

Provide a LCD display of vacuum measurement in mBar, PA or Torr. Range is 0.02 mBar to 5 mBar. Stainless steel and glacier white powder-coated steel casing, 8.1" w x 4.1" d x 6.4" h. Include a cord with 3/8" to 1/2" OD adapter

for connection to either vacuum tubing or a valve on a drying chamber. All FreeZone Freeze Dry Systems include a digital vacuum gauge. The Dry Ice Benchtop Freeze Dry System or other freeze dryers may use the Digital Electronic Vacuum Gauge as an accessory.

Catalog Number	Electrical Requirements	Shipping Weight
7395000**	115 volts, 60 Hz, 0.4 A	10 lbs. (4.5 kg)
7395001* **	230 volts, 50 Hz, 0.2 A	10 lbs. (4.5 kg)

\* International electrical configuration

### 16-315-60 Bleed Valve

Bleeds vacuum when all valves are in use on the Dry Ice Freeze Dry System. 1/2" OD connections. Shipping weight 0.5 lb. (0.2 kg)

### 10-273-12 Replacement Valve

For drying chambers and manifolds manufactured after March, 1996. Consists of neoprene body and gaskets, molded plastic knob and fittings.

Accommodates both 1/2" and 3/4" adapters. Shipping weight 1 lb. (0.5 kg)



\*\* Contact Fisher Scientific for ordering information.



## Miscellaneous Accessories

### RS-232 Cables

Provide connection from the RS-232 port on any FreeZone 2.5, 4.5, 6, 12 or 18 Liter Freeze Dry System or FreeZone Bulk Tray Dryer to a user-supplied PC. An RS-232 Cable may also be connected to the RS-232 port on the FreeZone Stoppering Tray Dryer connected to a computer; however, the Interconnect Cable 7353403\* included with the Stoppering Tray Dryer is recommended since it allows the Stoppering Tray Dryer to communicate with the Freeze Dry System. See page 46 for more information.

Catalog Number	RS-232 Cable	Shipping Weight
7537800*	For connection to computer with 9-pin serial data port	0.5 lb. (0.2 kg)
7537801*	For connection to computer with 25-pin serial data port	0.5 lb. (0.2 kg)



### 10-030-163 Support Shelves

Attach easily without tools to the sides of the FreeZone 1, 2.5 or 4.5 Liter Freeze Dry System or left-hand side of the FreeZone Triad System cabinet to provide support for large flasks attached to the drying chamber or manifold. Multiple rows of perforations

on the sides of the FreeZone cabinet allow for height adjustment of the shelves to support various sizes of flasks. One pair. Glacier white powder-coated steel. Each shelf is 7.4" w x 12.0" d (18.7 cm x 30.5 cm). Shipping weight 2 lbs. (1 kg)

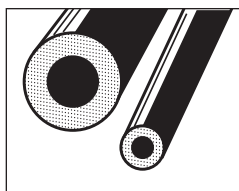


### Corrosion-resistant Lids

Replace the acrylic lids included with FreeZone Freeze Dry Systems and Drying Chambers. Provide additional protection from solvents and corrosives that attack acrylic, such as acetonitrile. Lids 10-269-683, 10-269-684 and 10-030-160

are glass. Lid 16-081-003 is stainless steel. Include neoprene gasket.

Catalog Number	For Use With:	Diameter	Shipping Weight
10-269-683	FreeZone 4.5 Liter Systems	10.12"	2.5 lbs. (1.1 kg)
10-269-684	FreeZone 6, 12 & 18 Liter Systems 16-Port Drying Chamber	14.0"	3.5 lbs. (1.6 kg)
10-030-160	12-Port Drying Chamber	9.25"	2.0 lbs. (0.9 kg)
16-081-003	FreeZone 1 & 2.5 Liter Systems FreeZone Plus 4.5 Liter Systems FreeZone -105° C 4.5 Liter Systems	10.12"	5.0 lbs. (2.3 kg)



### 7645900\* Replacement Neoprene Tubing

For Dry Ice Benchtop Freeze Dry System connections, 5/16" ID, 3' length. Shipping weight 5 lbs. (2 kg)

### 16-109-453 Vacuum Tubing

For vacuum pump connection to the Freeze Dry System, 3/4" ID, 3' length. Wire-reinforced PVC. Shipping weight 5 lbs. (2.3 kg)



### 11-925-108 Portable Table

May be used to support FreeZone 1, 2.5 or 4.5 Liter Benchtop Freeze Dry System on the top shelf while supporting a Rotary Vane or Combination Rotary Vane/Diaphragm Vacuum Pump on the lower shelf. Glacier white powder-coated tubular steel. 4" diameter casters,

two with toe locks. Extruded rubber handle grips. Supports loads up to 400 pounds. Lifetime guarantee. Dimensions: 34.9" x 19.0" x 36.4" h (37.4 cm x 48.3 cm x 92.5 cm). Shipping weight 44 lbs. (20 kg)



### 11-926-110 Variable Height Bench

May be used to support a FreeZone 6 Liter Benchtop Freeze Dry System with any drying accessory except the Stoppering Tray Dryer mounted on top. Glacier white powder-coated tubular steel. Phenolic board with melamine high-pressure

laminated surface. Height is adjustable from 29.6" to 37.4" (75.1 cm to 94.9 cm) using steel pins with nuts inserted in vertical frame members. 5" diameter, non-marking, toe-locking casters with bearings. Supports loads up to 540 pounds. Lifetime guarantee. Work surface dimensions: 38.0" x 28.0" x 1.1" thick (96.5 cm x 71.1 cm x 2.8 cm). Shipping weight 111 lbs. (50 kg)



### 16-317-73 Utility Cart

Upper open shelf accommodates the PrimeMate for transport. Lower 2.0" (5.1 cm) deep powder-coated steel removable watertight pan holds lightweight supplies. Power strip with 115 volts, 60 Hz, 12 amps capacity, has 6 electrical outlets, cord bracket and a 12' (3.7 meters), 3-wire cord and plug. Two corrosion-resistant, one-piece, vacuum-formed ABS plastic drawers, 15.75"

x 14.9" x 4.2" h (40.0 x 37.8 x 10.7 cm), hold small supplies. 4" diameter (10 cm) casters, two with toe locks. Supports loads up to 400 lbs. (181 kg). Lifetime guarantee. Dimensions: 34.9" x 19.0" x 36.4" h (88.6 x 48.3 x 92.4 cm). Shipping weight 70 lbs. (32 kg)

\* Contact Fisher Scientific for ordering information.



# FreeZone® Benchtop Shell Freezers

## SPECIFICATIONS & ORDERING INFORMATION

FreeZone Benchtop Shell Freezers provide a compact system for pre-freezing samples for lyophilization. The stainless steel bath has two rollers that rotate Fast-Freeze Flasks in a low temperature heat transfer solution, such as methanol or ethanol, so that a uniform thin coating of sample freezes to the interior surface of the container. Shell freezing increases the surface area to volume ratio, which facilitates efficient vapor flow from the sample to the collector during lyophilization.

### All models feature:

- Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- 1/2 hp HCFC/CFC-free refrigeration system capable to cool the heat transfer solution to -40° C (-40° F).
- Stainless steel bath, 5.5" w x 12.0" d x 6.5" h (14.0 cm x 30.5 cm x 16.5 cm), surrounded by urethane foam insulation with white high-density polyethylene cover. Two chain-driven rollers, powered by a sparkless induction motor, rotate flasks up to 1200 ml.  
**Approximately two liters of transfer solution are required (not included).**
- LED temperature "wave" for at-a-glance display of bath temperature from -20 to -42° C. LEDs illuminate amber as the system cools. When the system reaches operating temperature, the bottom LED illuminates green.
- Right-side mounted power switch.
- Left-side mounted retractable bath drain hose.
- 8-foot, 3-wire cord with plug.
- Overall dimensions: 15.1" w x 22.1" d x 19.7" h (38.4 cm x 56.1 cm x 50.0 cm).

### Models conform to the following standards:

- UL Standard 61010-1 (115 and 230 volt, 60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (115 and 230 volt, 60 Hz models).
- CE Conformity marking (230 volt, 50 Hz model).

### Option includes:

- Domestic or international electrical configuration.



FreeZone Benchtop Shell Freezer 16-317-95.

Catalog Number	Electrical Requirements	Plug Type	Shipping Weight
16-317-95	115 volts, 60 Hz, 6.0 A	115 volts, 15 amps	96 lbs. (44 kg)
16-317-97	230 volts, 60 Hz, 3.0 A	North America, 230 volts	96 lbs. (44 kg)
16-317-96*	230 volts, 50 Hz, 3.0 A	Schuko	96 lbs. (44 kg)

### Fast-Freeze Flask Capacity of Benchtop Shell Freezer

Flask Size	Quantity
40 ml	2
80 ml	2
120 ml	2
150 ml	2
300 ml	1
600 ml	1
750 ml	1
900 ml	1
1200 ml	1

\* International electrical configuration



# Contact Labconco for more information about these quality products for your laboratory.



HEPA-Filtered Biological Safety Cabinets, Enclosures & Clean Benches



Fume Hoods & Ductless Enclosures



Balance & Bulk Powder Enclosures



Laboratory Animal Research Stations



Nanotechnology Enclosures



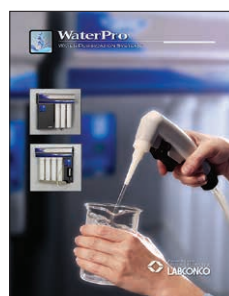
Forensic Enclosures



Glove Boxes



Glassware Washers



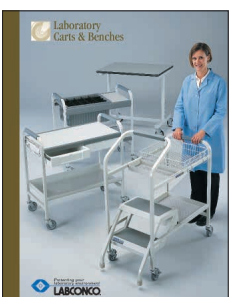
Water Purification Systems



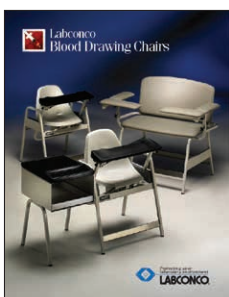
Vacuum Concentrators & Cold Traps



Multiple Sample Evaporation Systems



Laboratory Carts & Benches



Blood Drawing Chairs



Vacuum Desiccator

## Labconco Corporation

8811 Prospect Avenue  
Kansas City, Missouri 64132-2696  
816-333-8811 or 800-821-5525  
FAX 816-363-0130  
labconco@labconco.com  
www.labconco.com



© 2014 Thermo Fisher Scientific Inc. All rights reserved.  
Trademarks used are owned as indicated at [www.fishersci.com/trademarks](http://www.fishersci.com/trademarks).

### In the United States:

For customer service, call 1-800-766-7000  
To fax an order, use 1-800-926-1166  
To order online: [www.fishersci.com](http://www.fishersci.com)

### In Canada:

For customer service, call 1-800-234-7437  
To fax an order, use 1-800-463-2996  
To order online: [www.fishersci.ca](http://www.fishersci.ca)



A Thermo Fisher Scientific Brand

