



# 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.



**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*



# 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 7750020 and Utility Cart 8007000



### 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