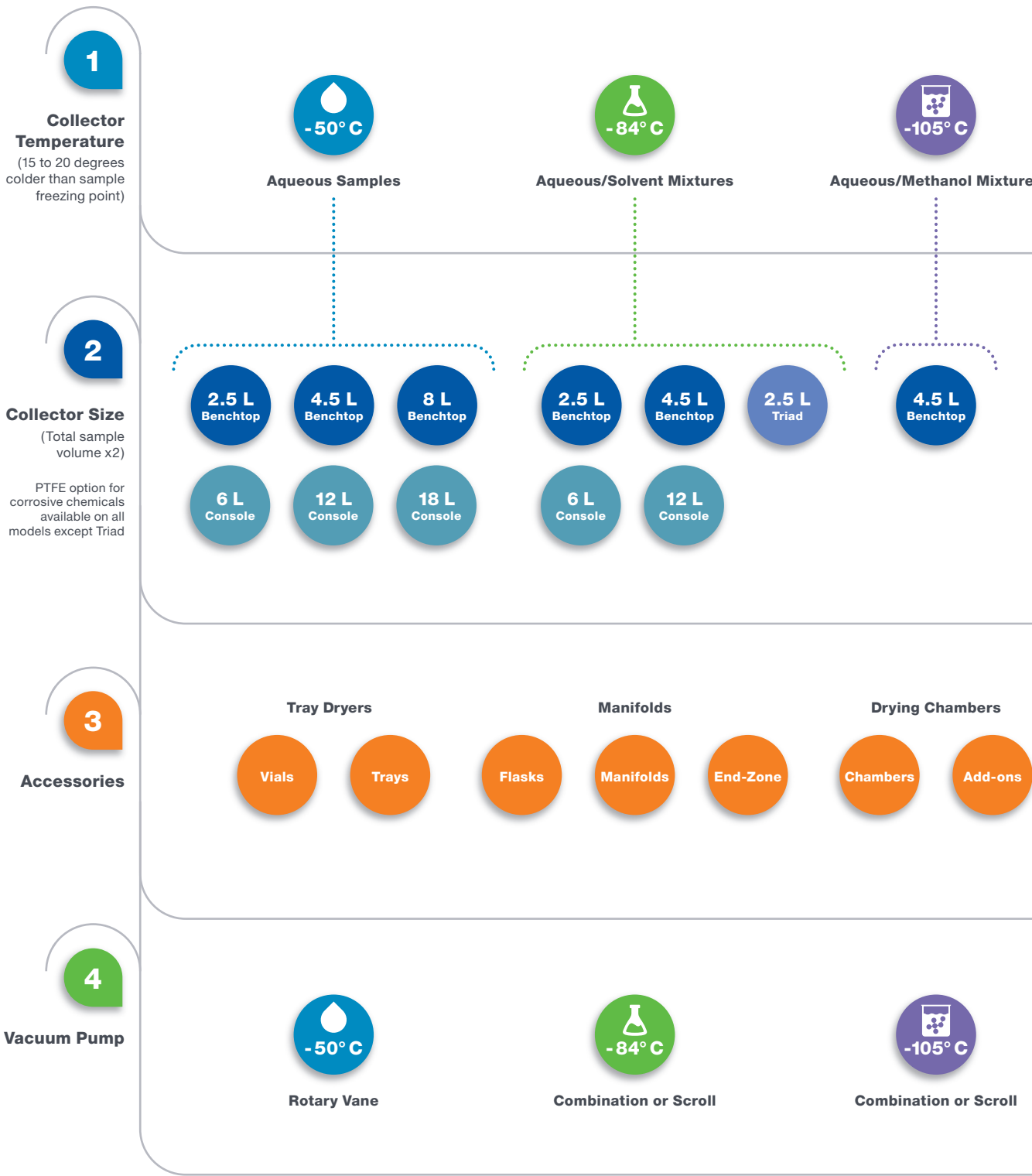


FreeZone® Freeze Dryers

Steps to Selecting a Freeze Dryer



FreeZone® Freeze Dryers

FreeZone Product Lines

Freeze Dryers



2.5 L 4.5 L 8 L

Benchtop



2.5 L

Triad Benchtop



6 L 12 L 18 L

Console and Console with Stoppering Tray Dryer

Accessories



Tray Dryers



Manifolds

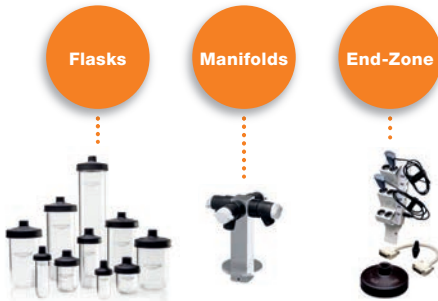


Drying Chambers



Vials

Trays



Flasks

Manifolds

End-Zone



Chambers

Add-ons

Vacuum Pumps



Rotary Vane Pump

-50° C



Combination Pump

-84° C -105° C



Scroll Pump

-84° C -105° C

FreeZone® Benchtop Freeze Dryers

Features & Benefits



Vacuum break valve
prevents oil backstreaming by bleeding air into the system when power to the freeze dryer or pump is shut off.

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

Durable steel cabinet
Benchtop models fit countertops and lab carts.

USB port and Ethernet connection

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

Quick disconnect drain hose fitting

For convenient defrost

Vacuum control valve
maintains set point vacuum level to speed the freeze drying process.

Hot gas defrost
automatically shuts off when defrosting is complete.

Full one year warranty

Lyo-Works™ OS Display



Data Logging
View data as table or graph.

Sensors
Displays sample temperatures when used with Tray Dryer.

Auto
Initiates start up sequence: collector cool down, vacuum pull down and optional purge valve. Ensures collector reaches -40° C before vacuum is applied.

Collector
Manual start/stop collector and start/stop defrost.

Vacuum
Manual start/stop vacuum pump.

Help
Access diagnostic tools.

Programs
Stores up to 30 programs with up to 16 steps each.

*U.S. Patent No. 6,968,631



FreeZone® Benchtop Freeze Dryers

Ordering Information



2.5 Liter
Light sample loads



4.5 Liter
Light to moderate sample loads



8 Liter
Moderate sample loads

Catalog Number Configurator Use this key to configure the nine digit catalog number.

7 0 0

Select the **REFRIGERATION TEMPERATURE** of your freeze dryer's collector. This is the second digit.
0 = -50° C (-58° F). For samples containing water.
1 = -84° C (-119° F). For low eutectic point samples containing water or acetonitrile.
2 = -105° C (-157° F) at 60 Hz or -102° C (-152° F) at 50 Hz. For low eutectic point samples containing water, acetonitrile or dilute methanol or ethanol. (4.5 L only)

Select the **CAPACITY** of your freeze dryer's collector. These are the third and fourth digits.
02 = 2.5 L **04** = 4.5 L **08** = 8 L (-50° C only)

Select the **COLLECTOR COIL** and **CHAMBER MATERIAL** of your freeze dryer. This is the sixth digit.
1 = Stainless steel **2** = PTFE-coated stainless steel

Select the **ELECTRICAL CONFIGURATION** and **OUTLET TYPE** of your freeze dryer. These are the eighth and ninth digits.

- 00** = 115V, 60 Hz, with 20A plug for North America
- 10** = 230V, 60 Hz, with plug for North America
- 15** = 230V, 60 Hz, with plug for Saudi Arabia
- 30** = 230V, 50 Hz, with Schuko plug
- 40** = 230V, 50 Hz, with plug for China/Australia
- 50** = 230V, 50 Hz, with plug for Great Britain (UK)
- 70** = 230V, 50 Hz, with plug for India

All models require (not included):

- Vacuum pump with a displacement of at least 98 L/min, 0.007 mBar ultimate pressure and fitting for 3/4" ID vacuum hose. See pages 17-18
- Drying accessory. See pages 15, 20-23, 25
- Freeze dry glassware if not bulk freeze drying. See pages 27-30

Electrical Requirements, Dimensions & Shipping Weights

Collector Capacity	Water removed in 24 hrs	Refrigeration Temperature	Volts	Amps	Overall Dimensions (w x d x h)	Shipping Weight
2.5 L*	2 L	-50° C (-58° F)	115	14**	14.5" x 19.2" x 16.9"	120 lbs. (54 kg)
2.5 L	2 L	-50° C (-58° F)	230	7†	14.5" x 19.2" x 16.9"	120 lbs. (54 kg)
2.5 L*	2.2 L	-84° C (-119° F)	115	16**	14.5" x 24.5" x 16.9"	165 lbs. (75 kg)
2.5 L	2.2 L	-84° C (-119° F)	230	10†	14.5" x 24.5" x 16.9"	165 lbs. (75 kg)
4.5 L*	2 L	-50° C (-58° F)	115	14**	16.5" x 22.4" x 18.9"	139 lbs. (63 kg)
4.5 L	2 L	-50° C (-58° F)	230	7†	16.5" x 22.4" x 18.9"	139 lbs. (63 kg)
4.5 L*	4 L	-84° C (-119° F)	115	16**	22.5" x 26.5" x 18.5"	197 lbs. (89 kg)
4.5 L	4 L	-84° C (-119° F)	230	10†	22.5" x 26.5" x 18.5"	197 lbs. (89 kg)
4.5 L*	2.5 L	-105° C (-15° F)	115	16**	22.5" x 26.5" x 18.5"	205 lbs. (93 kg)
4.5 L	2.5 L	-105° C (-15° F)	230	10†	22.5" x 26.5" x 18.5"	205 lbs. (93 kg)
8 L*	4 L	-50° C (-58° F)	115	14*	22.5" x 26.5" x 18.5"	173 lbs. (79 kg)
8 L	4 L	-50° C (-58° F)	230	7**	22.5" x 26.5" x 18.5"	173 lbs. (79 kg)

*Requires 20 amp dedicated circuit.

**System amperage shown includes 8 amp maximum vacuum pump rating. †System amperage shown includes 4.5 amp maximum vacuum pump rating.

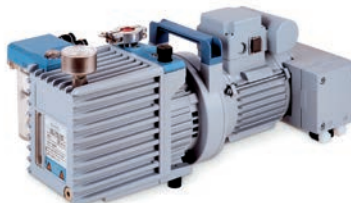
Vacuum Pumps

Features & Benefits



General Purpose Rotary Vane Vacuum Pumps

- Designed for use with aqueous samples
- 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
- Ultimate vacuum (total pressure) 2×10^{-3} mBar (1.5 micron)



VACUUBRAND HYBRID* Vacuum Pumps

- Designed for use with acids and other harsh chemicals including TFA, TFA by-products, acetonitrile, HBe and HNO_3 present in samples such as HPLC-prepared and peptide purified materials
- Comprised of a two-stage rotary vane pump and two-stage, chemical-resistant diaphragm pump. Provide deep vacuum required for good freeze drying and evaporation and have superior solvent and acid handling capabilities
- Ultimate vacuum (partial pressure) 2×10^{-3} mBar (1.5 micron)



Scroll Vacuum Pumps

- Designed for use with acids below 20% concentration and solvents including acetonitrile
- Two spiral scrolls compress air and vapors to move them toward the exhaust
- Oil-free design has no hydrocarbons
- Ultimate vacuum (partial pressure) 7×10^{-3} mBar (5.3 micron)

FreeZone Model	Sample Contains	Pump Type	Recommended Pump (≥ 98 lpm)**		Recommended Pump (≥ 163 lpm)	
			115 Volts	230 Volts	115 Volts	230 Volts
 Benchtop 2.5, 4.5, 6 & 8 Liter or Dry Ice Freeze Dryer	Water	Rotary Vane	1472100	7739402	1467700	7739403
	Acids & Solvents	Combination	7584000	7584002		
	Acids & Solvents	Scroll			7587000	7587002
 Console 6, 12 & 18 Liter	Water	Rotary Vane	1472100	7739402	1467700	7739403
	Acids & Solvents	Combination	7584000	7584002		
	Acids & Solvents	Scroll			7587000	7587002
 Console 6, 12 & 18 Liter with Stoppering Tray Dryer, Bulk Tray Dryer or Tall Clear Chamber	Water	Rotary Vane			1467700	7739403
	Acids & Solvents	Scroll			7587000	7587002
 Triad	Water	Rotary Vane		7739402		7739403
	Acids & Solvents	Combination		7584002		
	Acids & Solvents	Scroll				7587002

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

**Faster freeze drying rates may be achieved by using pumps with larger displacement capacities.

Vacuum Pumps & Accessories

Ordering Information



General Purpose Rotary Vane Vacuum Pumps

Catalog Number	Electrical Configuration	Displacement at 60 Hz (50 Hz) L/min	Dimensions (w x d x h)	Shipping Weight
1472100	115V, 50/60 Hz, 4.6A (Includes 115V NEMA 5-15P plug)	117 (98)	6.5" x 17.0" x 10.4"	62 lbs. (28 kg)
7739400*	230V, 50/60 Hz, 2.4A (Includes 220V NEMA 6-15P plug)	117 (98)	6.5" x 17.0" x 10.4"	62 lbs. (28 kg)
7739402	230V, 50/60 Hz, 2.4A (Includes 230V reverse IEC plug)	117 (98)	6.5" x 17.0" x 10.4"	62 lbs. (28 kg)
1467700	115V, 50/60 Hz, 7.8A (Includes 115V NEMA 5-15P plug)	195 (163)	6.5" x 18.5" x 10.4"	65 lbs. (30 kg)
7739401*	230V, 50/60 Hz, 4.0A (Includes 220V NEMA 6-15P plug)	195 (163)	6.5" x 18.5" x 10.4"	65 lbs. (30 kg)
7739403	230V, 50/60 Hz, 4.0A (Includes 230V reverse IEC plug)	195 (163)	6.5" x 18.5" x 10.4"	65 lbs. (30 kg)



VACUUBRAND HYBRID** Vacuum Pumps

Catalog Number	Electrical Configuration	Displacement at 60 Hz (50 Hz) L/min	Dimensions (w x d x h)	Shipping Weight
7584000	115V, 60 Hz, 5.7A (Includes 115V NEMA 5-15P plug)	115 (98)	20.0" x 12.0" x 9.1"	66 lbs. (30 kg)
7584002	230V, 50/60 Hz, 2.7A (Includes 230V reverse IEC plug)	115 (98)	20.0" x 12.0" x 9.1"	66 lbs. (30 kg)



Scroll Vacuum Pumps

Catalog Number	Electrical Configuration	Displacement (L/min)	Dimensions (w x d x h)	Shipping Weight
7587000	115V, 50/60 Hz, 10A (Includes 115V NEMA 5-15P plug)	190	20.0" x 12.0" x 15.0"	59 lbs. (27 kg)
7587002	230V, 50/60 Hz, 6.0A (Includes 230V reverse IEC plug)	190	20.0" x 12.0" x 15.0"	59 lbs. (27 kg)

Rotary Vane and Combination Vacuum Pump Accessories

1472200—Inlet Filter. For Rotary Vane Vacuum Pumps 1472100, 7739400, 7739402, 1467700, 7739401 and 7739403. Prevents oil backstreaming from the pump and protects pump from submicron particle damage. Includes filter assembly and one filter cartridge. Life is approximately 1000 hours at 1.33×10^{-2} mBar (10 microns) vacuum. Shipping weight 1.0 lb. (0.5 kg)

7584300—VACUUBRAND B-Oil.** One liter. Replacement oil for Combination Vacuum Pumps 7584000 and 7584002. Shipping weight 2.0 lbs. (0.9 kg)

7541300—Vacuum Pump Oil. One gallon (3.8 L) synthetic hydrocarbon oil. Shipping weight 12 lbs. (5 kg)

1473500—Oil Return Kit. Allows extended operation of the pump with the ballast open and helps to keep oil purged of contaminants. Consists of a stainless steel cylinder and tubing with clamp. When the excess oil collects in the filter, it is directed back to the pump to conserve oil. Shipping weight 0.5 lb. (0.2 kg)

Vacuum Pump Oil. Hydro-treated paraffinic hydrocarbon oil. Replacement oil for Rotary Vane Vacuum Pumps 1472100, 7739400, 7739402, 1467700, 7739401 and 7739403.

Catalog Number	Volume	Shipping Weight
1988000	One liter	2.0 lbs. (0.9 kg)
1988001	One gallon (3.8 L)	12 lbs. (5 kg)

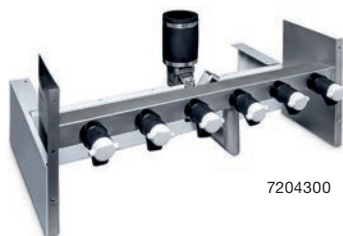
Scroll Vacuum Pump Accessories

7587300—Pump Silencer. Filters exhaust while silencing exhaust pump noise. Includes filter, centering ring and clamp to attach to exhaust outlet. Shipping weight 2.0 lbs. (0.9 kg)

*Not for direct electrical connection to FreeZone Freeze Dryers in this catalog.
**VACUUBRAND HYBRID™ is a trademark of VACUUBRAND GMBH + CO KG.

Accessories

Tray Drying



7204300

7204300—6-Port Manifold with Isolation Valve. For 1/2" or 3/4" flask adapters. **Not for use with Small Tray Dryers.** 30.1" w x 20.6" d x 13.5" h. Shipping weight 45 lbs. (21 kg)

7726500—6-Port Tray Dryer Manifold. Not field installable with 7761500. **Not for use with Small Tray Dryers.** 30.0" w x 16.5" d x 7.0" h. Shipping weight 19 lbs. (9 kg)

7761500—Isolation Valve. Separates tray and freeze dryers to shorten time necessary to reestablish working vacuum levels and provide a means for checking end point. Includes valve and handle, clamps and couplings. Not field installable with 7726500. **Not for use with Small Tray Dryers.** Shipping weight 5.0 lbs. (2.3 kg)

7756300—Shelf Spacers. Assist stoppering of partial loads of small serum bottles. 304 stainless steel. One pair. 9.0" w x 13.0" d x 2.5" h. Shipping weight 3.0 lbs. (1.4 kg)



Bulk Trays. Contain pre-frozen liquids for bulk drying. 304 stainless steel with 0.9" lip. **Large Tray not for use with Small Tray Dryer.** Shipping weight 3.0 lbs. (1.4 kg)

7377900—Small. 10.3" x 11.6"

7756200—Large. 11.5" x 15.0"

7756100—Tray with Slide-Out Bottom. Stainless steel. **Not for use with Small Tray Dryer.** 12.0" w x 14.0" d. Shipping weight 5.0 lbs. (2.3 kg)



7369600—Microwell Plate Holder. Holds a 127.8 x 85.5 mm microplate. 5.7" w x 8.0" d x 0.7" h. One each. Aluminum. **Microplate not included.** Shipping weight 2.0 lbs. (0.9 kg)



Rectangular Test Tube & Microcentrifuge Tube Racks. 304 stainless steel. 12.0" w x 10.0" d x 2.5" h. Holds up to 70 each 12-13 mm test tubes or microcentrifuge tubes. **Tubes not included.**

7370000—Test Tube Rack. Shipping weight 2.8 lbs. (1.3 kg)

7370001—Microcentrifuge Tube Rack. Includes adapter plate for microcentrifuge tubes. Shipping weight 3.5 lbs. (1.6 kg)



7439300—Microcentrifuge Tube Holder. 3.0" w x 2.25" d x 1.0" h. Holds twelve 1.7 ml tubes. Anodized aluminum. One each. May be placed on any flat freeze drying surface. **Tubes not included.** Shipping weight 0.6 lb. (0.3 kg)



7516200—Support Grid. Stainless steel tray with removable plastic grid holds 144 containers of 12 mm dia. 7.0" w x 7.0" d. Shipping weight 2.5 lbs. (1.1 kg)

Accessories

Chambers



304 Stainless Steel Drying Chambers. Acrylic lid with neoprene gasket and valves and plastic molded knobs. For 1/2" and 3/4" flask adapters.

7522800—12-Port. 304 stainless steel chamber with 1/2" thick lid and twelve neoprene valves. 8.0" dia. x 9.75" h. Shipping weight 11 lbs. (5 kg)

7522801—12-Port. PTFE-coated 304 stainless steel chamber with 1/2" thick lid and twelve neoprene valves. 8.0" dia. x 9.75" h. Shipping weight 11 lbs. (5 kg)

7522900—16-Port. 304 stainless steel chamber with 3/4" thick lid and sixteen neoprene valves. 13.0" dia. x 13.0" h. Shipping weight 21 lbs. (10 kg)

7522901—16-Port. PTFE-coated 304 stainless steel chamber with 3/4" thick lid and sixteen neoprene valves. 13.0" dia. x 13.0" h. Shipping weight 21 lbs. (10 kg)



Clear Chambers with Valves. For interior view of product shelves and glassware connection. Includes acrylic base, anodized aluminum lid, and eight neoprene valves with molded plastic knobs. For 1/2" and 3/4" flask adapters. 8" dia. opening and cap for 3" dia. attachment port.

7318802—Short. For use with 7317100.
12.0" ID dia. x 15.0" h.
Shipping weight 22 lbs. (10 kg)

7318800—Tall. For use with 7317100 and 7317200.
12.0" ID dia. x 22.8" h.
Shipping weight 25 lbs. (11 kg)



Clear Chambers. For view of product shelves during bulk drying. Includes acrylic lid and base, neoprene gasket, vacuum release valves and pass-through for electrical cords. 8" dia. opening and cap for 3" dia. attachment port on console freeze dryer.

7318702—Short. For use with 7509200 and 7509201.
12.0" ID dia. x 16.5" h.
Shipping weight 17 lbs. (8 kg)

7318700—Tall. For use with 7509400 and 7509401.
12.0" ID dia. x 24.3" h.
Shipping weight 20 lbs. (10 kg)

Accessories

Product Shelves & Test Tube Racks



Product Shelves. For bulk samples, microwell plates or serum bottles. Aluminum 10" dia. with 1/4" rims, three steel support rods and rubber feet.

7317100—Three. Overall height: 9.8".
Shipping weight 4.5 lbs. (2.0 kg)

7317200—Five. Overall height: 17.5".
Shipping weight 7.0 lbs. (3.2 kg)



Heated Product Shelves. Aluminum with 1/4" rims, three stainless steel support rods and rubber feet. Nine clips for height adjustment, low voltage transformer with variable heat control to +40° C (+104° F). **Requires Drying Chamber (not included).**

7509200—Short. 6.5" dia. x 9.0" h. 115V, 50/60 Hz.
For chamber 7318702
Shipping weight 13 lbs. (6 kg)

7509400—Tall. 10.0" dia. x 11.75" h. 115V, 50/60 Hz.
For chamber 7318700
Shipping weight 15 lbs. (7 kg)

7509201*—Short. 6.5" dia. x 9.0" h. 230V, 50/60 Hz.
For chamber 7318702
Shipping weight 13 lbs. (6 kg)

7509401*—Tall. 10.0" dia. x 11.75" h. 230V, 50/60 Hz.
For chamber 7318700
Shipping weight 15 lbs. (7 kg)

*International electrical configuration



Round Test & Microcentrifuge Tube Racks. 304 stainless steel. 9.0" dia. x 2.5" h. Holds up to 104 each 12-13 mm test tubes or microcentrifuge tubes. For use with 7317100, 7317200 and Heated Product Shelf Chambers with nine-digit catalog numbers. **Tubes not included.**

7379000—Round Test Tube Rack. Shipping weight 2.8 lbs. (1.3 kg)

7379001—Microcentrifuge Tube Rack. Includes adapter plate for microcentrifuge tubes. Shipping weight 2.8 lbs. (1.3 kg)



Clear Stoppering Chambers. For an economical means of stoppering serum bottles under vacuum. Includes acrylic chamber and 3/4" thick attachment port base, stainless steel top plate, two 10" dia. aluminum shelves and low voltage transformer with variable heat control to +40° C (+104° F). 3/4" thick base has neoprene gasket and pass-through for electrical transformer cord. When lyophilization is complete, handle is turned to collapse top plate onto shelves, stoppering samples under vacuum. For use with small containers from 2 - 5 ml.

7868020—115V, 50/60 Hz. Shipping weight 30 lbs. (14 kg)

7868030—230V, 50/60 Hz. Shipping weight 30 lbs. (14 kg)

Drying Accessories

Heated Shelf Chambers

Heated Product Shelf Chambers. For bulk drying solid samples or batch drying small serum bottles or vials. Include 12" dia. acrylic cylinder and base, 10" dia. removable shelves, temperature probes and vacuum release valve. Temperature settings from -20° C (-4° F) to +60° C (+140° F). Overall dimensions: 13.5" w x 15.2" d. Has 8" dia. opening and cap for 3" dia. attachment port.



Three Shelves & Probes. 17.0" h. Shipping weight 80 lbs. (36 kg)

780801000 —  115V, 50/60 Hz for North America

780801010 —  230V, 50/60 Hz for North America

780801015 —  230V, 50/60 Hz for Saudi Arabia

780801030 —  230V, 50/60 Hz Schuko

780801040 —  230V, 50/60 Hz for China/Australia

780801050 —  230V, 50/60 Hz for British (UK)

780801070 —  230V, 50/60 Hz for India



Five Shelves & Probes. 24.6" h. Shipping weight 85 lbs. (39 kg)

780801100 —  115V, 50/60 Hz for North America

780801110 —  230V, 50/60 Hz for North America

780801115 —  230V, 50/60 Hz for Saudi Arabia

780801130 —  230V, 50/60 Hz Schuko

780801140 —  230V, 50/60 Hz for China/Australia

780801150 —  230V, 50/60 Hz for British (UK)

780801170 —  230V, 50/60 Hz for India

Accessories

Manifolds

Manifolds. 304 stainless steel with neoprene valves and molded plastic knobs. For 1/2" and 3/4" flask adapters.



7201700—4-Port. 8.6" w x 8.6" d x 11.2" h.
Shipping weight 5.5 lbs. (2.5 kg)



7201800—8-Port. 8.6" w x 8.6" d x 15.7" h.
Shipping weight 8.5 lbs. (3.9 kg)



7522300—20-Port. 27.4" w x 8.7" d x 11.0" h.
Shipping weight 15 lbs. (7 kg)



7201900—14-Port. For Console and 6 L Legacy
Benchtop models only. 24.3" w x 10.6" d x 10.3" h.
Shipping weight 21 lbs. (10 kg)



7202000—28-Port. For Console and 6 L Legacy
Benchtop models only. 24.3" w x 10.6" d x 18.3" h.
Shipping weight 38 lbs. (17 kg)