User's Manual

FreeZone® 6 Liter Benchtop Freeze Dry Systems

Models

7752020
7752021
7752030
7752031
7752040
7752041

Returned or Damaged Goods

Do not return goods without the prior authorization from Labconco. Unauthorized returns will not be

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CHAPTER 1
INTRODUCTION

pressure and ultimately overloads the collector and vacuum pump. Samples that have eutectic temperatures of –20°C or lower should be placed on the freeze dry system one flask at a time so that the vacuum in the system may recover before adding another sample to the system. If the vacuum does not recover, the capacity of the freeze dry system has been exceeded and the sample should be removed.

If there is a problem with a particular type of sample melting when placed on the freeze dry system, dilution of the sample with more water or providing some insulation around the flask to decrease the rate of heat absorption by the sample may help. If the eutectic temperature of the sample is –40 to –60°C, the freeze dry system selected for use must be equipped with cascade type refrigeration so that the collector temperature can be cooled to below –75°C, or a dry ice/solvent trap can be used between the collector and the vacuum pump.

Samples Containing Volatile Substances

In certain cases the solvent in a sample to be freeze dried may contain volatile components such as acetonitrile, methanol, acetic acid, formic acid or pyridine. In addition to these substances having an effect on the eutectic temperature, they may increase the vapor pressure at the surface of the sample. Also, compared to water, they will require the absorption of less heat for sublimation to occur. Hence, samples that contain volatile substances will have a greater tendency to melt, particularly when placed in flasks or exposed to room temperature. If a sample containing a volatile substance tends to melt when placed on a freeze dry system, dilution of the sample with more water will help keep the sample frozen. For example, a 0.2M solution of acetic acid is much easier to freeze dry than a 0.5M solution.

About This Manual

This manual is designed to help you learn how to install, use, and maintain your Freeze Dryer. Instructions for performing routine maintenance and making minor modifications to your Freeze Dryer are also included.

Chapter 1: Introduction provides a brief overview of the Freeze Dryer, explains the organization of the manual, and defines the typographical conventions used in the manual.

Chapter 2: Prerequisites explains what you need to do to prepare your site before you install your Freeze Dryer. Electrical requirements are discussed.

Chapter 3: Getting Started contains the information you need to properly unpack, inspect and install your Freeze Dryer.

Chapter 4: Using Your Freeze Dryer discusses the basic operation of your Freeze Dryer. Information on how to attach samples and run the Freeze Dryer is included.

Chapter 5: Maintaining Your Freeze Dryer explains how to perform routine maintenance on your Freeze Dryer.

Chapter 6: Using the RS232 Receptacle describes how to connect a computer for monitoring the operation.

Chapter 7: Troubleshooting contains a table of problems you may encounter while using your Freeze Dryer, including the probable causes of the problems, and suggested corrective actions.

Chapter 8: Modifying Your Freeze Dryer Display describes how to calibrate the vacuum display and restore factory settings.

Appendix A: Freeze Dryer Components contains labeled diagrams of the components of the Freeze Dryer.

Appendix B: Freeze Dryer Dimensions contains comprehensive diagrams showing the dimensions for the Freeze Dryer.

Appendix C: Freeze Dryer Specifications contains product specifications. A wiring diagram for the Freeze Dryer is also included.

Appendix D: Freeze Dryer Accessories lists the part numbers and descriptions of all of the accessories available for your Freeze Dryer.

Typographical Conventions

Recognizing the following typographical conventions will help you understand and use this manual:

- Book, chapter, and section titles are shown in italic type (e.g., *Chapter 3: Getting Started*).
- Steps required to perform a task are presented in a numbered format.
- Comments located in the margins provide suggestions, reminders, and references.

- Critical information is presented in boldface type in paragraphs that are preceded by the exclamation icon. Failure to comply with the information following an exclamation icon may result in injury to the user or permanent damage to your Freeze Dryer.

- Important information is presented in capitalized type in paragraphs that are preceded by the pointer icon. It is imperative that the information contained in these paragraphs be thoroughly read and understood by the user.

Refer to *Chapter 7: Troubleshooting* if you are experiencing problems with your Freeze Dryer.

CHAPTER 2
PREREQ

Location Requirements

The Freeze Dryer should be located in an area that provides an

CHAPTER 3
GETTING STARTED

Now that the site for your Freeze Dryer is properly prepared, you are ready to unpack, inspect, install and test your Freeze Dryer. Read this chapter to learn how to:

- unpack and move your Freeze Dryer.
- set up your Freeze Dryer.
- connect the electrical supply source to your Freeze Dryer.
- properly exhaust your Freeze Dryer.
- safely use solvents with your Freeze Dryer.

The FreeZone 6 Liter Benchtop Freeze Dry System weighs over 135 lbs. 61 kg). If you must lift the Freeze Dryer manually, use at least two (2) persons and follow safe lifting guidelines.

Unpacking Your Freeze Dryer

Carefully unpack your Freeze Dryer and inspect it for damage that may have occurred in transit. If your Freeze Dryer is damaged, notify the delivery carrier immediately and retain the entire shipment intact for inspection by the carrier.

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IF YOUR FREEZE DRYER WAS DAMAGED IN

be attacked and degraded by certain chemicals. The degree of degradation is dependent on the concentration and exposure duration. Some of the major components of the FreeZone Freeze Dry System that are susceptible to degradation are as follows:

Acetic Acid 3.5 rg.0001pBnBenCalcium Chloride001pBnBen Sodiu

(Delrin)001pBn6.49 1.1137TD0.0015Tc.892 Tw(C)688.6(D)

Component	Material	Acids	Buffers	Solvents
Hoses,001pBnBen1-41. TDpnBenGaskets & Bodies	Neopene	9119.6(C)-41.9(D	D)53.0	( )-294( )-70.5( )-305.4( )24(C)-590(C)
Chamber & Fittings	Stainless			

***An accessry glass lid is available.**
C – Moderate0degradation;Limited use.
use recommended;immediate0

- Most common compounds used in allowed to enu pump, will0degrade the oil and cause damage to the vacuum pump.

- Sugars ll0have minimal negative effect on

When using compounds in the Freeze0Dryer that are0hostile to the m a

- Rubber and plastic components that have been exposed to damaging compounds should be removed and flushed with water.
- The oil in the vacuum pump should be checked often. It must be changed if it is cloudy, shows particles or is discolored. The useful life of vacuum pump oil can be extended if the vacuum pump is operated for an extended period of time after a freeze dry run. This allows contaminants to be purged from the hot oil. This must be done with the inlet to the pump blocked off to prevent air from free flowing through the pump. This is accomplished by closing all sample valves on a clean, dry freeze dry system and turning on the vacuum pump. If the pump is operated at an elevated vacuum level (> 10mBar), oil may be expelled from the pump and damage could occur.

Another way to extend the life of the vacuum pump is to install an optional secondary trap in the line between the Freeze Dryer and the vacuum pump. Contact Labconco for ordering information.

With prudent maintenance the FreeZone Freeze Dry System will provide years of service. Warranty on the affected parts will be voided if maintenance has been obviously neglected. If you have questions about using specific compounds in the Freeze Dryer, contact Labconco Technical Se

WARNING: The disposal of substances used in connection with this equipment may be governed by various Federal, State or local regulations. All users of this equipment are urged to become familiar with any regulations that apply in the user's area concerning the dumping of waste materials in or upon water, land or air and to comply with such regulations.

CHAPTER m541.62 24.72 l541.62 22.02 l46.8

- Press SELECT until the desired vacuum operating level is displayed. See “Setting the Operating Vacuum Level” for guidelines

- If “O” is selected, the vacuum control is disabled and the vacuum level in the Freeze Dry System will be determined by the capabilities of the vacuum pump.
- Press MENU.
- The display will show:

- Press SELECT until the desired units are flashing.
- Press MENU.
- The display will show:

- To reset the SERVICE HOUR to 0 press SELECT. This allows you to keep track of the time the refrigeration system operated since it was serviced.
- The display will show the refrigeration system hours.

- To reset the service hours to 0, continue to hold SELECT 5 seconds until hours are reset.
- TO03 Tc-11.555 -1.145 onds is

- To reset the SERVICE HOUR to 0, press SELECaftT32 TD(₹Tj/TT14 ing €

Manual Start-Up

To manually run the freeze dry process, press the REFRIGERATION MAN switch. This will start the refrigeration system. The green LED above the switch will illuminate. When the collector temperature reaches –40°C, the vacuum pump may be started by pressing the VACUUM switch. The Temperature and Vacuum Graphs will indicate collector temperature and system vacuum. The LCD display will show the actual temperature of the collector. When the vacuum in the system is above 5 mBar the vacuum display will indicate "HI." At 5 mBar and below, the display will show the actual vacuum.

When the system vacuum is between 0.450 and 0.133 mBar, the lower green vacuum graph LED will flash. When the system vacuum level is <0.133 mBar, the green LED will be lit steadily indicating that samples may be added.

Setting the Operating Vacuum Level

The vacuum level may be set by the user to optimize the freeze dry process. Normally, the sublimation rate will increase if there is less vacuum (a higher pressure) in the Freeze Dryer. A good starting place is to set the vacuum so its level is equivalent to about 10°C colder than the eutectic or collapse temperature of the sample. Adjustments to the vacuum level must be made for various freeze drying conditions. Factors that must be considered are whether the sample is freeze dried on heated shelves or in glassware attached to manifold valves, the volatility of the sample itself, the size of the sample and the heat energy supplied to the sample.

When the vacuum control is set to operate at less vacuum, the ice holding capacity of the collector may be decreased. This can be improved by installing a baffle in the collector. See Appendix D Freeze Dryer Accessories for the baffle part number. Position the baffle so it rests on the top of the collector coil. The arrow should point toward the front.

Some guidelines for setting the Freeze Dryer are shown below. These show pre-freezing temperatures and vacuum levels. Exact protocols must be determined by the user for the specific samples that are being freeze dried.

Material	Solidification/Eutectic Temperature	Pre-Freeze Temperatures	Vacuum Set Point
Bacteria,Virus	-40°C and Colder	-50°C & Colder	0.040 mBar & Lower
Milk	-5 to -13	-15 to -23	1.65 to 0.77
Fungi	-40 and Colder	-50 & Colder	0.04 and lower
Vegetable Tissue	-25 to -50	-35 to -60	0.22 to 0.01
Human Tissue	-30 to –40	-40 to –50	0.12 to 0.04
Blood Plasma	-10 to –25	-20 to –35	1.03 to 0.22
Vaccine	-30 to –40	-40 to –50	0.12 to 0.04

Pre-Freezing Samples

Appropriate containers for freeze drying include ampules, serum bottles, and wide mouth freeze drying flasks. Shell freezing of samples is recommended for wide mouth freeze drying flasks. Smaller samples in ampules and serum bottles may be frozen in a freezer. The sample container size should always be at least two to three times the sample size (i.e., 40 ml samples should be prepared in 80 ml containers or larger). The temperature required for pre-freezing is dependent on the characteristics of the sample. Pre-freezing temperature typically is at least 10° to 20°C below the eutectic or collapse temperature of the sample.

Adding Sample

The following procedure should be followed when using sample valves in the freeze dry process:

1. Connect a pre-frozen sample to a sample valve on the drying chamber or manifold using an adapter. Turn the plastic valve knob to the “VACUUM” position to open the valve. The bevel on the knob should be positioned toward the sample port to apply vacuum to the sample.

2. Before adding another sample, allow system vacuum to return to 0.133 mBar or lower. Any combination of valves and sample sizes may be utilized at one time provided that the system vacuum and collector temperature remain sufficiently low to prevent melting of the frozen sample.
3.

Shut Down

At the end of a run or when a sufficient amount of condensate accumulates on the collector coil to obstruct the flow of vapor to the collector chamber, the Freeze Dryer should be defrosted. First, release system vacuum by turning the plastic knob on a valve to the open position or by pulling the collector chamber drain plug out of the drain hose. Now press the Vacuum Switch on the control panel to turn the vacuum pump OFF. Press the Refrigeration Switch next to the illuminated LED to turn OFF the refrigeration system. Turn OFF the Main Power Switch on the left hand side of the cabinet.

Defrosting

The following procedure should be followed when defrosting the collector coil:

1. Pull the collector chamber drain hose out from the right hand side of the Freeze Dryer and remove the drain plug. Place the drain hose in a suitable container to collect the condensate that will melt off the collector coil.
2. Remove the collector chamber lid and allow ambient room air to melt the ice. Dispose of the liquid appropriately.
3. Flush the collector chamber with water and wipe chamber dry.
4. If rapid defrost is desired, pour warm water over the collector coil. **Do not** allow the liquid to enter the vacuum port on the upper rear of the chamber.
5. Reinstall the drain hose plug and slide drain hose back into the side of the cabinet. Dispose of the liquid appropriately.

Utilization of acid requires immediate cleaning and neutralization after defrost or physical damage to the collector chamber and collector coil will result.

Do not attempt to chip ice from the collector coil as damage may occur to the coil.

Never attempt to start the vacuum pump when there is liquid in the collector chamber. This could result in damage to the vacuum pump.

Line Voltage Out of Range

If the voltage supplied to the Freeze Dryer varies beyond allowable limits, the alarm will be activated. When an alarm occurs, press MENU and the display will show:

LINE VOLTAGE ERROR

The alarm will self-cancel when the proper voltage is restored. The high and low alarm points are preset at the factory to correspond to the normal allowable voltage variations based on the nominal voltage specified for the freeze dryer. Some models may be operated outside the normal voltage limits. See *Appendix C*.

If necessary, the high and low alarm points may be adjusted for these models. See *Chapter 8.*

Temperature Out of Range

An alarm will be activated if the collector temperature rises above –40°C. If this occurs, the display will show:

COLLECTOR TEMPERATURE HOLD SELECT TO CLEAR IT

Press and hold SELECT for five seconds until the error message is cleared from the display.

Service Vacuum Pump

The vacuum pump normally plugs into the vacuum pump electrical receptacle on the back of the Freeze Dryer. When the Freeze Dryer has accumulated a total of 1000 operating hours, the alarm indicator will flash. Press MENU to display the alarm:

CHANGE VACUUM OIL HOLD SELECT TO CLEAR IT

Press and hold SELECT for five seconds until the error message is cleared from the display.

This will reset the 1000 hour timer. It may be necessary to service the vacuum pump more frequently than every 1000 hours depending on the operation of the Freeze Dryer. The pump oil should be regularly monitored to verify that it is clean.

Moisture in Collector

If there is liquid in the collector chamber and either a REFRIGERATION button or the VACUUM button is pressed, neither function will start and an alarm will be activated. When MENU is pressed, the display will show:

When the collector is drained, the alarm will self-cancel.

This feature prevents the inadvertent start of the vacuum pump when liquid is in the collector and thereby can extend the life of the vacuum pump. A few drops of liquid may remain in the drain hose after draining. When the vacuum pump is started these drops

CHAPTER 5
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Monthly:

1. The rubber components on the Freeze Dryer may eventually deteriorate and require replacement. The effective life of rubber parts depends upon both their usage and the surrounding environment. Check all rubber hoses and gaskets and replace any that show signs of hardening, permanent set or deterioration.
2. Using a soft cloth, sponge or chamois and a mild, non-abrasive soap or detergent, clean the acrylic chamber lid.
3. Using a soft cloth, sponge, or chamois and a mild, non-abrasive soap or detergent, clean the exterior surfaces of the Freeze Dryer. Liquid spray cleaners and polishes may be used on the exterior surfaces. Do not use solvents to remove stains from the exterior surfaces as they may damage the finish.

Annually:

1. Every 12 months, or more often if the Freeze Dryer is operated in a dusty environment, the refrigeration system condenser should be cleaned. Using a vacuum cleaner with brush attachment, clean the condenser to ensure proper airflow for peak performance.

CHAPTER 6
USING THE RS232 RECEPTACLE

The operation of the Freeze Dryer can be monitored using a computer when it is connected to the RS232 receptacle on the rear panel. The computer cannot control the operation of the Freeze Dryer. The monitored parameters are the collector temperature in °C and vacuum in microbars.

When a Labconco Stoppering Tray Dryer is connected to a Labconco Freeze Dryer as detailed in the Stoppering Tray Dryer User's Manual, the status of the Stoppering Tray Dryer may be monitored simultaneously with the status of the Freeze Dryer.

Computer Connection for Computer Interface

Check your computer to see which type of serial port is provided, then use a connecting cable below:

1. Computers with a 25 pin D-sub male serial connector should use Connect Cable, Labconco part number 7537801, to connect a computer to the Labconco Freeze Dryer.
2. Computers with a 9 pin D-sub male serial connector should use Connect Cable, Labconco part number 7537800, to connect a computer to the Labconco Freeze Dryer.

The purpose of the RS232 interface is to send data to a data logging computer to monitor the state and activity of the Freeze Dryer. This data is half duplex data. The data properties are as follows:

1. Data Rate 2400 Baud
2. 8 Bit word length
3. 1 Start bit, 1 Stop bit
4. No parity is transmitted
5. Standard ASCII character set

The time between data transmissions may be varied by the user to occur at 10, 30, 60, 300 or 600 second intervals. Press the MENU button until the RS232 screen appears on the display.

Press select until the desired time interval is shown.

The format of the transmitted message is as follows:

B<T= -48 V= 18 SF = 999 C=999 PG=9 >

Where:

B	=	Base Unit
T	=	Collector Temperature
-48	=	Collector Temperature in °Celsius
V	=	Vacuum
18	=	Vacuum Level in Micro Bars
SF	=	Shell Freezer Temperature (not available on 6L Benchtop models)
9	=	Feature not installed or out of range
C	=	Vacuum Chamber Temperature (not available on 6L Benchtop models)
PG	=	Purge (not available on 6L Benchtop models)

If a Stoppering Tray Dryer is attached to the Freeze Dryer and the data interconnect cable is installed, additional data about that accessory will be transmitted from the Freeze Dryer. See the

following describes how to use an IBM compatible computer with Hyper Terminal™ software (included with Windows® 95, 98, XP or 2000 operating systems) to collect the RS232 data from your Freeze Dryer:

1. Make sure that the Freeze Dryer is properly connected to the communication port on the computer.
2. Open Hyper Terminal™ software.

i)Windows® 95 or 98 use:
START/PROGRAMS/ACCESSORIES.

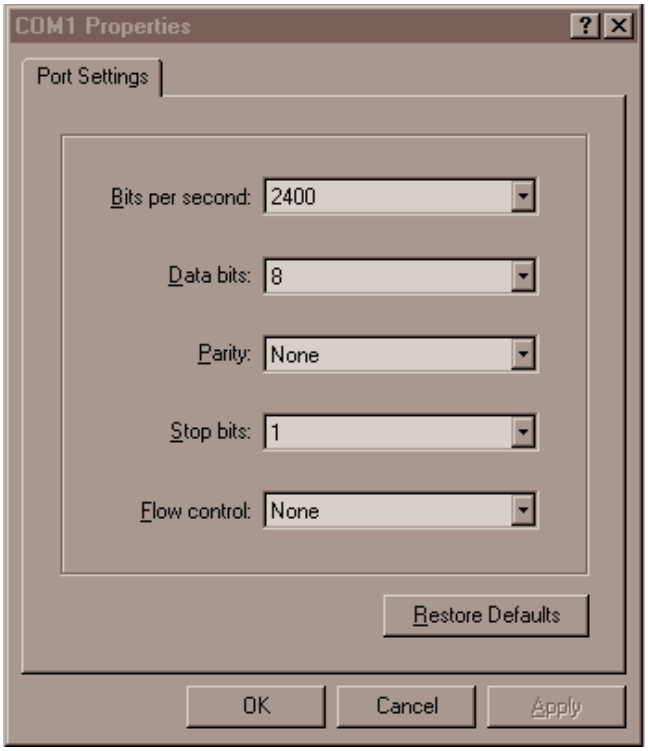
ii) Windows® 2000 or XP use:
START/PROGRAMS/ACCESSORIES/COMMUNICATIONS

The first time Hyper Terminal™ is opened a dialogue box requesting an area code and phone number will appear. Enter the appropriate numbers and continue.

3. The "Connection Description" dialogue box will open. Type in a user defined name and select an icon for the new connection. Press "OK."

4. The "Connect To" dialogue box will open. Using the down arrow selection button, select the communication port to which the cable has been connected. Press "OK."

5. The “Com X Properties” dialogue box will open. Enter the appropriate data properties and press “OK.”



6. When the Freeze Dryer main power switch is on, the data will

CHAPTER 7
TROUBLESHOOTING

Refer to the following if your Freeze Dryer fails to operate properly. If the suggested corrective actions do not solve your problem, contact Labconco for additional assistance.

Labconco Freeze Dry Systems that are clean, dry and without samples attached should reach a vacuum of 0.133 mBar within 10 minutes and should achieve an ultimate vacuum of 0.033 mBar within 18 hours when the refrigeration is operating. If the Freeze Dryer does not obtain a satisfactory vacuum, perform the following maintenance tests.

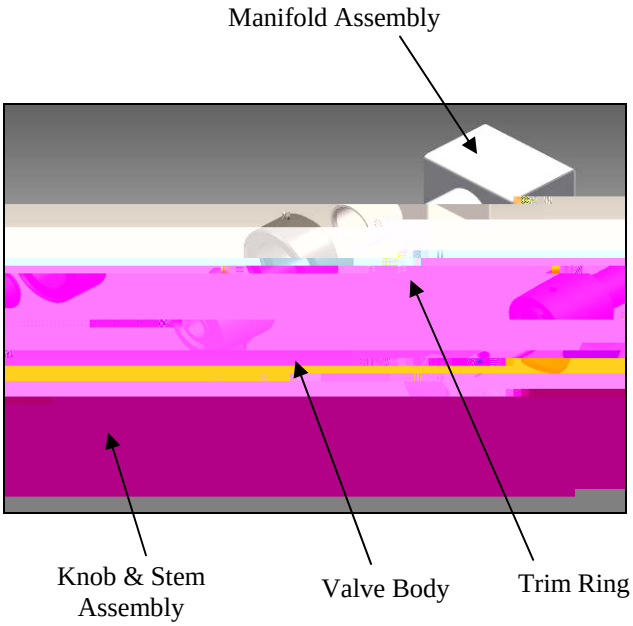
I. Vacuum Pump

First make sure that the vacuum pump operates. If it fails to operate, check the electrical connections of the Freeze Dryer to the power source and then check the electrical connection of the vacuum pump to the Freeze Dryer. If the vacuum pump has a power switch, make sure that it is turned on. If the vacuum is not dm Tw[adeqoilcvacuu)51.86o. ny particul

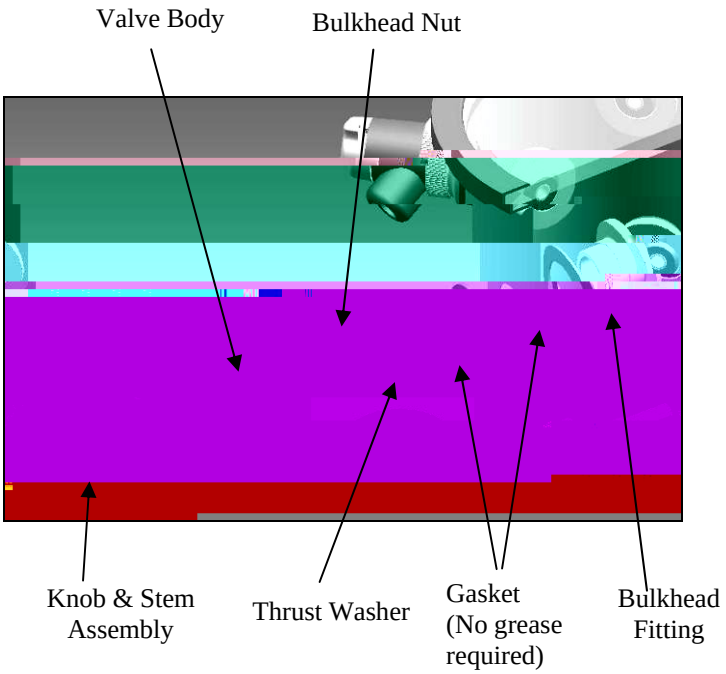
7. Make sure that the sample valve bulkhead nuts are tight. Either tighten by hand or use the wrench supplied with chambers. To use the wrench, first remove the knob and stem assembly and also the valve body. The pins on the wrench fit into the round holes of the nut. The nut should be snug, but avoid over-tightening. Replace the valve body, knob and stem assembly.

The illustrations below show how the sample valve installs on a chamber and a manifold.

Valve Assembly (Clear Chamber with Valves)



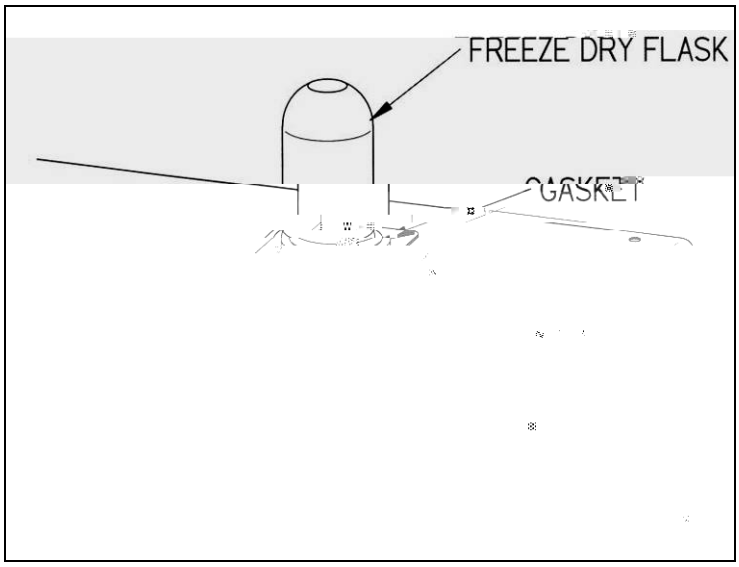
Valve Assembly (Manifold)



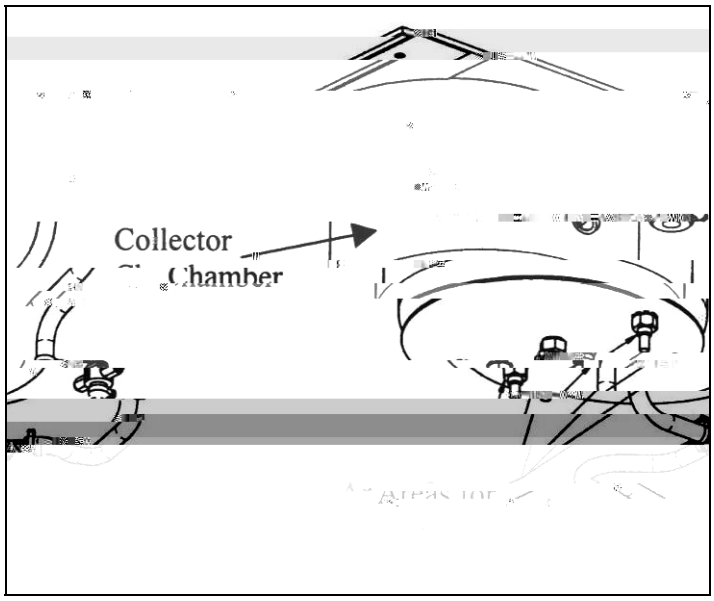
Valve Assembly (Stainless Steel Chamber)

III. System Components and Collection Chamber Isolation

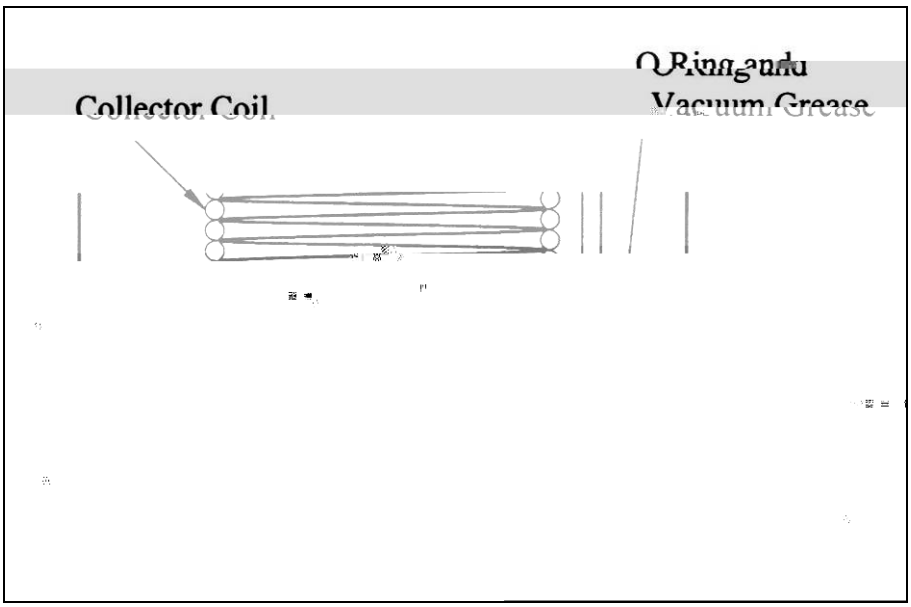
1. Remove the drying chamber or manifold.
2. Leave the gasket on and turn a large freeze dry flask upside down to cover the connection port.
3. Start the freeze dryer and observe the vacuum indication. If the vacuum indication is good, then the problem is in the drying chamber or manifold and you should return to *Section II, Gaskets, Tubing, Connections, Sample Valves.*


FREEZE DRY FLASK
GASKET

The following test is used to check the collection chamber integrity. The figure below points out potential areas to locate a leak:



1. Remove the stopper from the side of the chamber and place a freeze dry flask over the connection port.
2. Fill the collection chamber with approximately 2 inches of water, enough to cover all fittings. Replace the collection chamber lid and turn on the vacuum pump. Allow the vacuum pump to run for approximately 5 to 10 seconds. (If the vacuum pump is left on, the water will begin to boil and the test will not be effective.) Look inside the chamber for any bubbling while the pump is running and after you shut the pump off.
3. If bubbling is observed around the bulkhead fittings, access the bottom of the chamber and remove the insulation. Tighten the appropriate fitting by placing a wrench on the fitting inside the chamber and use a second wrench to turn the nut on the bottom of the chamber. Be careful not to damage the evaporator coils or the brazed joints to the refrigeration system. Once the fitting is tightened, perform the test again. Should the bubbling still be present, loosen the bulkhead fittings and apply vacuum grease to the O-rings, then reassembly and test.



4. If bubbling was observed on the chamber surface, the chamber must be replaced. This type of leak cannot be successfully repaired. The leading cause of a chamber surface leak is corrosive residue left in the chamber after use.

Refrigeration Module Operation

Under a no-load condition, the FreeZone Single Stage Freeze Dry System can achieve a collector temperature of –47°C or lower when the system is under vacuum, within 40 minutes when the vacuum pump is running, dependi

Low line limit may be lowered in 5 increments of approximately 2 to 3V increments for 115V models or disabled.

Low line limit may be lowered in 5 increments of approximately 4 to 5V increments for 230V models or disabled.

High line limit may be raised in 5 increments of approximately 2 to 3V increments for 115V models or disabled.

High line limit may be raised in 5 increments of approximately 4 to 5V increments for 230V models or disabled.

Moisture Sensor Alarm

The moisture sensor alarm may be disabled. It is shipped enabled as the factory default setting.

Modifying the Display

The display will default to the main freeze dry display information.

If you do not want to restore all factory settings, but want to adjust offsets, press MENU briefly and the display will show:

Press SELECT until the appropriate offset is shown. Each number represents 1°C

Press MENU and if the drying chamber has been installed, the display will show:

Press SELECT until the appropriate offset is shown. Each number represents 1°C

Press MENU and the display will show

Press SELECT until the appropriate offset is shown. Each number represents 0.001mBar.

Press MENU and the display will show

Press SELECT until the appropriate offset is shown. If the Freeze Dryer is operating on nominal 115V, each number represents 2V. If 3 is entered into the display, the low line alarm will alarm when the voltage drops to approximately 97V, for example 103-(2x3)=97V. If the Freeze Dryer is

Press SELECT until the appropriate offset is shown. If the Freeze Dryer is operating on nominal 115V, each number represents 2V. If 3 is entered into the display, the high line alarm will alarm when the voltage raises to approximately 133V, for example. 127+(2x3)=133V. If the Freeze Dryer is operating on nominal 230V each number represents 4V (if 3 is entered into the display, the low line alarm will alarm when the voltage drops to approximately 266V, for example. 254+(4x3)=266V. There will be no alarm indicated if DISABLED is selected.

Press MENU and the display will show

DRYING CHAMBER: NOT INSTALLED

Press and hold SELECT to change the status.

Press MENU and the display will show

PURGE VALVE: NOT INSTALLED

Press and hold SELECT to change the status.

Press MENU and the display will show

DEFROST HEATER: NOT INSTALLED

Press and hold SELECT to change the status.

Press MENU and the display will show

MOISTURE SENSOR: INSTALLED

Press and hold SELECT if you want to disable the moisture sensor.

Press MENU and the display will show

SHELL FREEZER: NOT INSTALLED

Press and hold SELECT to change the status

Press MENU and the display will show

HOLD SELECT TO CLEAR ALL TOTAL HOURS?

If you want to reset Total Hours, press and hold SELECT until an audible beep is heard. The display will default to the main freeze dry display information.

If you do not want to set Total Hours, press MENU and the display will show.

PRODUCTION MENU: MASTER RESET?

The routine will repeat by pressing MENU or wait approximately 10 seconds for the display to default to the main freeze dry information display information.

In order to store offsets in memory, you Must Press and Hold MENU until display shows,

PASSWORD:

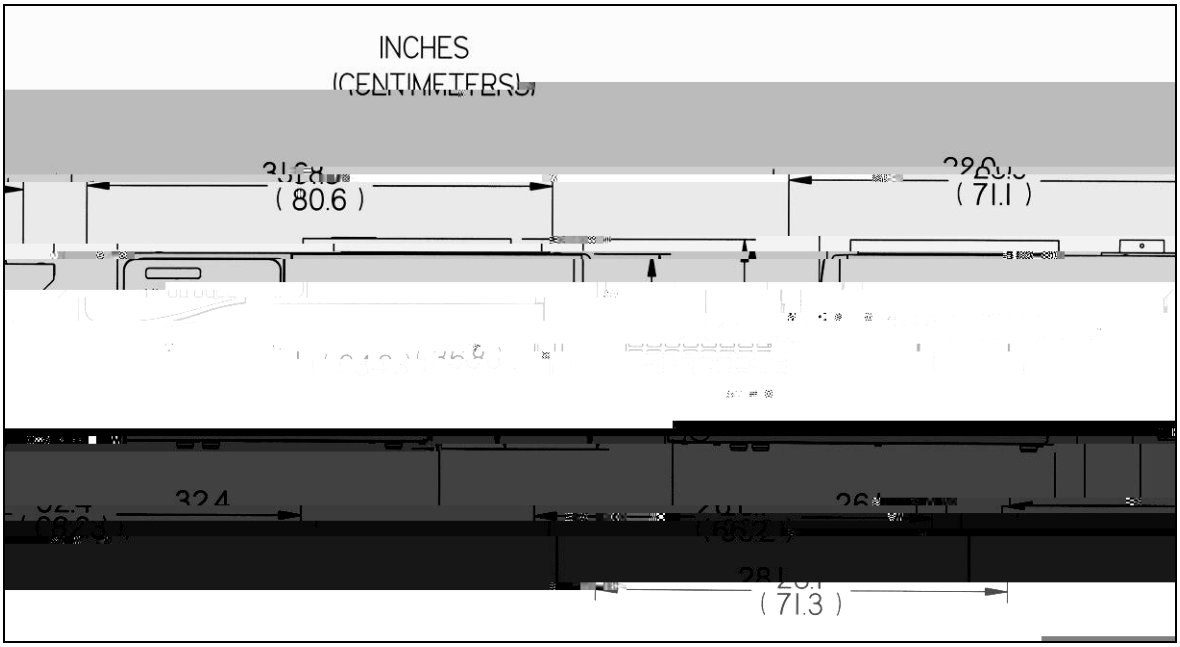
Wait approximately 10 seconds and the display will default to the main freeze dry display information. This can be done anytime throughout the Modifying the Display routine.

APPENDIX A
FREEZE DRYER
COMPONENTS

The following pages list components that are available for your Freeze Dryer. The parts shown are the most common replacement parts. If other parts are required, contact Product Service.

Item	Part No.	Description
1	7690800	Lid Gasket
2	7532900	Lid
3	7448000	Printed Circuit Board RS232
4	7953800	Motor Fan, 115V
	7953801	Motor Fan, 230V
5	7750602	Compressor, 115V, 60 Hz
	7750601	Compressor, 230V, 50 Hz
	7750600	Compressor, 230V, 60 Hz
6	1302300	Switch
7	7426000	Control Panel Label
8	7445590	Printed Circuit Board
9	7728000	Drain Plug
10	1643600	O-Ring
11	7645904	Drain Hose
12	7646000	Vacuum Hose (Not Shown)
13	1336400	Power Cord 115V (Not Shown)
	1342100	Power Cord, 230V (Not Shown)
14	7445400	Vacuum Sensor
15	7515300	Temperature Sensor (Not Shown)
16	7400502	Wire Harness, Power, 115V (Not Shown)
	7400503	Wire Harness, Power, 230V (Not Shown)
17	7432700	Vacuum Control/Bleed Valve
18	7429700	Moisture Sensor
19	7418400	Wire Harness, Control 115V and 230V (Not Shown)
20	1289320	Circuit Breaker 115V 20A

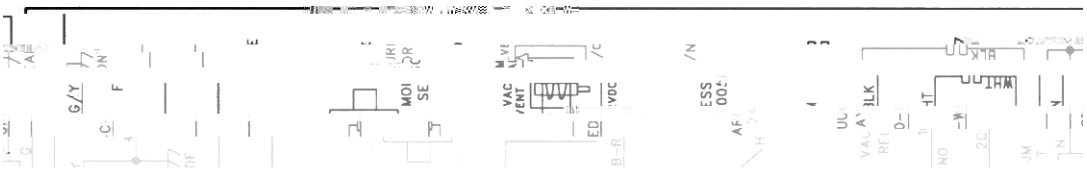
APPENDIX B
FREEZE DRYER
DIMENSIONS



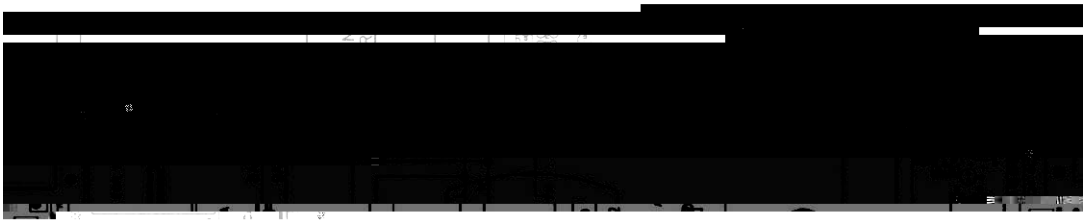
APPENDIX C
FREEZE DRYER
SPECIFICATIONS

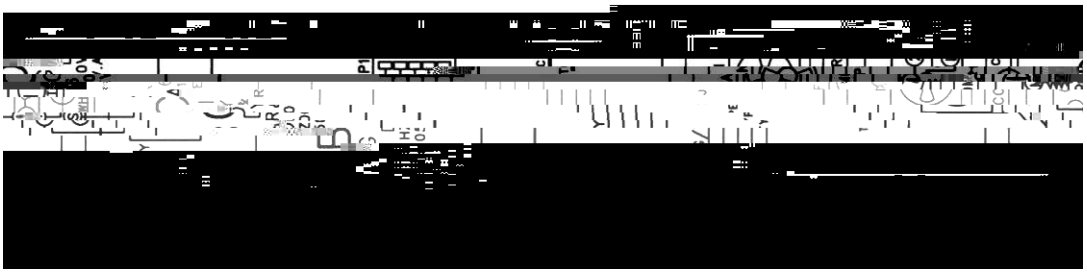
Environmental Conditions

- Indoor use only.
- Maximum altitude: 6562 feet (2000 meters).
- Ambient temperature range: 41° to 104°F (5° to 40°C).
- Maximum relative humidity: 80% for temperatures up to 88°F (31°C), decreasing linearly to 50% relative humidity at 104°F (40°C).
- Main supply voltage fluctuations not to exceed ±10% of the nominal voltage.
- Transient over voltages according to Installation Categories II (Over voltage Categories per IEC 1010). Temporary voltage spikes on the AC input line that may be as high as 1500V for 115V models and
  allowed.
- Used in an environment of Pollution degrees 2 (i.e., where normally only non-conductive atmosphereingre preient). Occasionally, however, a temporary conductivity caused by condensation must be expected, in accordance with IEC 664.

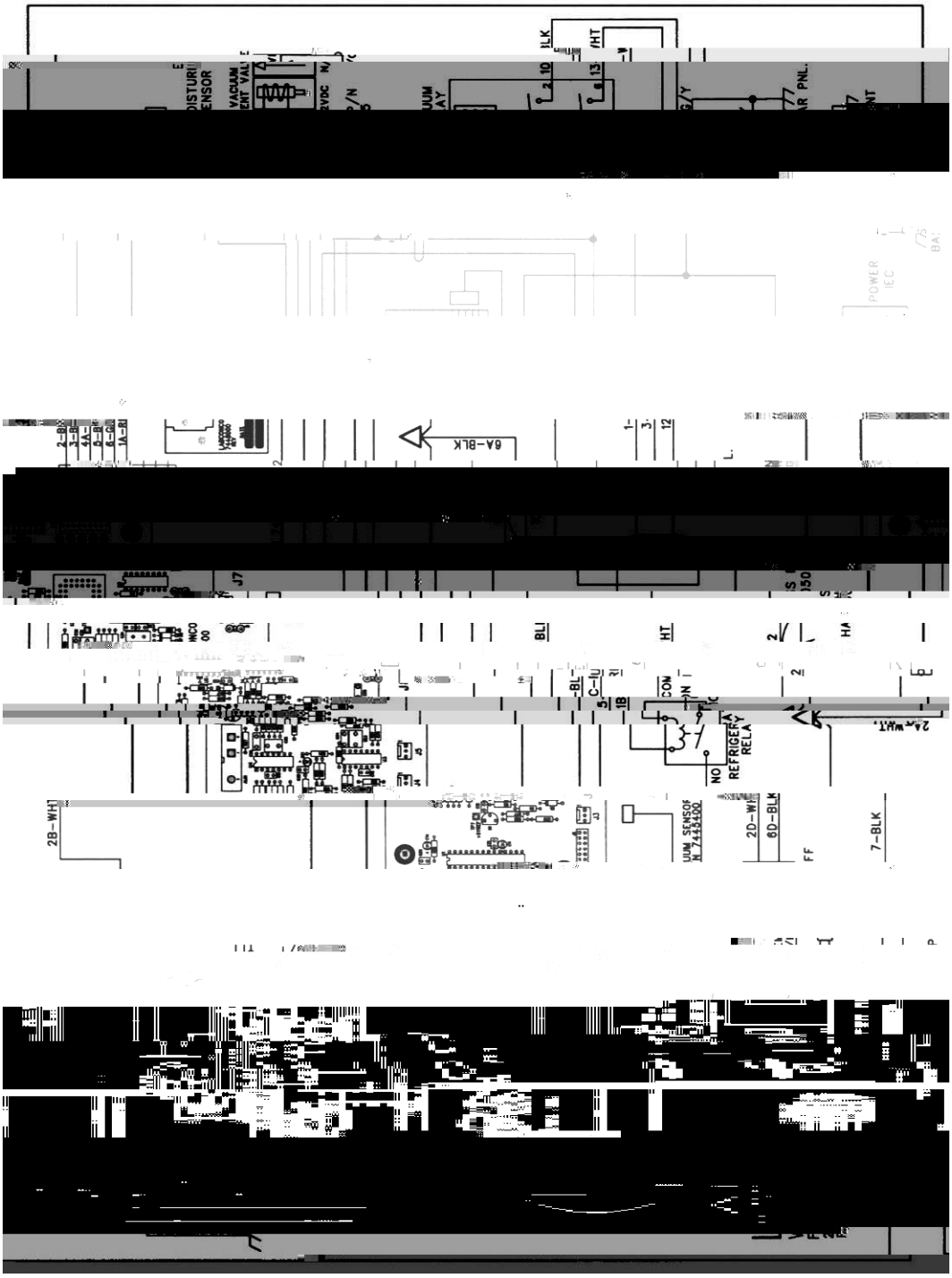



2-BLK
3-BLK
4A-WHT
5-BLU
6-GRN
1A-RED
1-BL
3-G
2A-





Wiring Diagram Catalog #7752030, 7752031, 7752040 7752041 (230V, 50 or 60 Hz Models)



APPENDIX D
FREEZE DRYER
ACCESSORIES

The following accessories are available for the Freeze Dryer.

PART #	DESCRIPTION
1467700	**Vacuum Pump** Two stage direct drive pump, 195 liters/minute. 115 VAC, 50/60 Hz, single phase, 7.8 amps. Includes Pump Exhaust Filter 1473400. (Catalog #1473400)
7739403	**Vacuum Pump** Two stage direct drive pump, 195 liters/minute. 230 VAC, 50/60 Hz, single phase, 4.0 amps. Includes Pump Exhaust Filter 1473400. (Catalog #1473400)
7439000	**Vacuum Pump** Two stage direct drive pump, 173 liters/minute. 115 VAC, 50/60 Hz, single phase 5.8 amps. Includes Pump Exhaust Filter. (Catalog #7670400)
7439200	**Vacuum Pump** Two stage direct drive pump, 173 liters/minute. 230 VAC, 50/60 Hz, single phase 2.9 amps. Includes Pump Exhaust Filter. (Catalog #7670400)
7769600	**Vacuum Pump, Chemical Resistant** Two stage direct drive pump, 173 liters/minute. 115 VAC, 50/60 Hz, single phase 5.8 amps. Includes Pump Exhaust Filter. (Catalog #7670400)
7769800	**Vacuum Pump, Chemical Resistant** Two stage direct drive pump, 173 liters/minute. 115 VAC, 50/60 Hz, single phase 2.9 amps. Includes Pump Exhaust Filter.(Catalog #7670400)

PART #	DESCRIPTION
1472200	**Pump Inlet Filter** Disposable filter that prevents oil back streaming and protects vacuum pump from sub micron particles. Fits vacuum pumps 1466700 and 7739403.
1473400	**Pump Exhaust Filter** Disposable filter that removes visible oil mist and odor from vacuum pump exhaust. Fits vacuum pumps 1467700 and 7739403.

PART #	DESCRIPTION
7538000	**Secondary Vacuum Cold Trap** Provides additional protection for the vacuum pump when processing low eutectic samples. 9 ¾" high x 7 7/8" diameter, 304 stainless steel with ¾" vacuum connections. For use with dry ice and solvent. Cools to approximately –75°C.
7522800	**12 Port Drying Chamber** 9 ¾" high x 7 7/8" diameter, 304 stainless steel with 12 freeze dry valves.
7522900	**16 Port Drying Chamber** 13" high x 138" diameter, 304 stainless steel with 16 freeze dry valves.
7443500	**Clear Drying Chamber with 8 Valves** For bulk drying or drying in flasks. 9.0 Dia.
7444000	**Clear Drying Chamber with 8 Valves** For bulk drying or drying in flasks. 12.0 Dia.
7442900	**Clearing Drying Chamber** For bulk drying. 9.0 Dia.
7867000	**Clear Drying Chamber** For Bulk Drying 12.0 Dia.
7521000	**Heated Drying Chamber** 10 ½" high x 9" diameter type 304 stainless steel. The 3 shelf product heaters heat to 43°C (110°F). 115V.
7521001	**Heated Drying Chamber** 10 ½" high x 9" diameter type 304 stainless steel. The 3 shelf product heaters heat to 43°C (110°F). 230V.
7509200	**Product Heater** For use in chamber 7522800. Provides 3 heated shelves operating at 43°C (110°F). 115V
7509201	**Product Heater** For use in chamber 7522800. Provides 3 heated shelves operating at 43°C (110°F). 230V
7442100	**Drying Rack- Unheated** Provides three shelves. For use in chambers 7443500 and 7522800.
7441700	**Drying Rack – Unheated** Provides three shelves for use in chambers 7444000, 7867000, 7522900
7522300	**20 Port Manifold** 10" high x 27 ½" wide x 8 5/8" deep. Type 304 stainless steel manifold with 20 freeze dry valves.

PART #	DESCRIPTION

PART #	DESCRIPTION
7806023	**Bulk Tray Dryer** 115V, 60 Hz, three shelves, 630 square inches of area, provides heat control with 6 port manifold and RS232 output connection.
7806030	**Bulk Tray Dryer** 230V, 50/60 Hz, Three shelves, 630 square inches of area, provides heat control.
7806031	**Bulk Tray Dryer** 230V, 50/60 Hz, Three shelves, 630 square inches of area, provides heat control. With 6 port manifold.
7806032	**Bulk Tray Dryer** 230V, 50/60 Hz, Three shelves, 630 square inches of area, provides heat control. With RS232 output connection.
7806033	**Bulk Tray Dryer** 230V, 50/60 Hz, Three shelves, 630 square inches of area, provides heat control. With 6 port manifold and RS232 output connection.
7948020	**Stoppering Tray Dryer** 115V, 60 Hz, three shelves, 600 square inches of area, provides temperature control and stoppering under vacuum.
7948030	**Stoppering Tray Dryer** 230V, 50 Hz, three shelves, 600 square inches of area, provides temperature control and stoppering under vacuum.
7948040	**Stoppering Tray Dryer** 230V, 60 Hz, three shelves, 600 square inches of area, provides temperature control and stoppering under vacuum.
7726500	**6 Port Manifold for use with Stoppering Tray Dryer** Mounts between the Stoppering Tray Dryer and the base unit and provides 6 freeze dry valves.
7537800	**Cable** Connect the RS232 output from the Freeze Dryer (or Freeze Dryer/Tray Dryer combination) to an IBM compatible computer with a 9-pin serial data port.
7537801	**Cable** Connects the RS232 output from the Freeze Dryer (or Freeze Dryer/Tray Dryer combination) to an IBM compatible computer with a 25-pin serial data port.
7761500	**Isolation Valve** Mounts between the Stoppering Tray Dryer and the base unit which provides a way to isolate the base unit vacuum system from the Stoppering Tray Dryer vacuum system.
7390702	**Baffle** Mounts in the collector chamber to increase ice holding capacity when operating with the vacuum control.

Fast-Freeze® Flasks

Fast-Freeze Flasks are specially designed to be easier to handle, faster to load and more convenient to use than other freeze dry glassware now in your laboratory. Compatible with all major brands of laboratory freeze dry equipment, Fast-Freeze Flasks eliminate the risk of contamination from vacuum grease, reduce spillage of valuable samples and require no washers, gaskets or retainers.

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F D S

Select Fast-Freeze Flasks based on your sample sizes. Flasks should be filled 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.

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

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.

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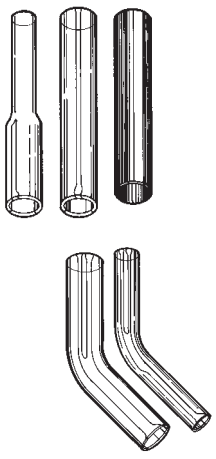
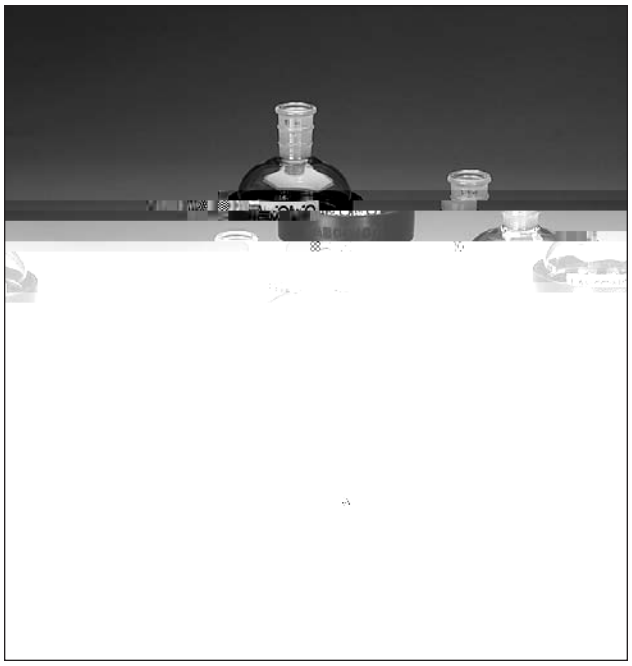
Add the Adapters for connecting the Fast-Freeze Flasks to the valve ports on your drying chamber or manifold. Choose borosilicate glass or stainless steel adapters in 1/2" and 3/4" diameters.



75448-10 Replacement Filter Paper
1000 (10 packages of 100). 1" diameter (28mm). Pore size 17 microns. Shipping weight 0.5 lb.

*V a , , c a b a a ca a aa b 1/2 a 3/4" . S a , c a a L abc c - a .



Lyph-Lock Flasks simplify your lyophilization procedures because they have only three pieces per flask — a high strength borosilicate glass top and bottom with a silicone rubber ring seal. The unique wide-mouth design helps you load samples easily and lyophilize efficiently.

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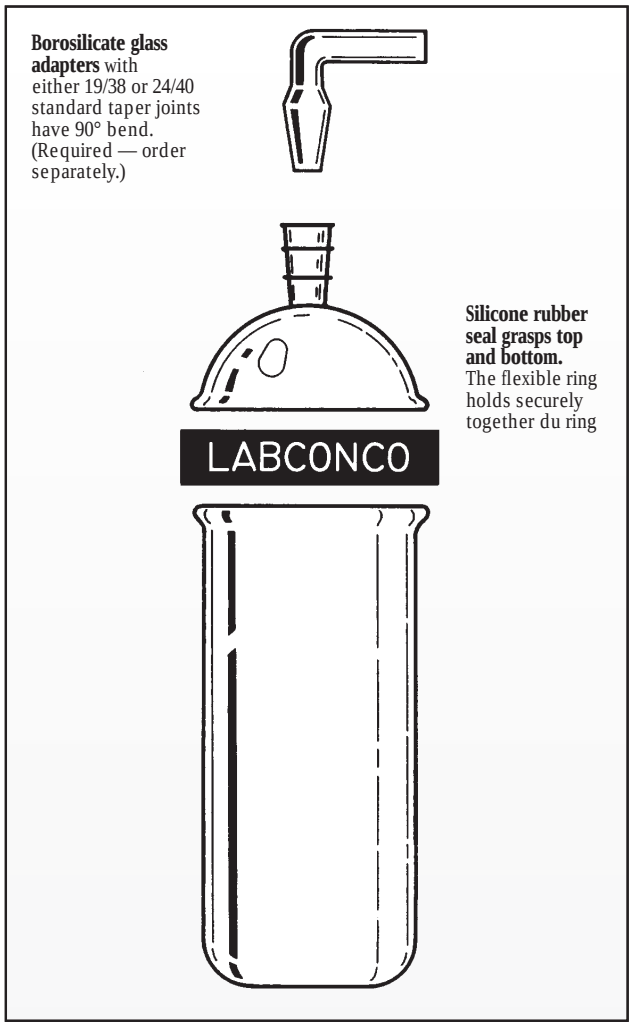
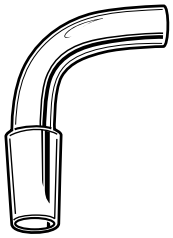
Select the Lyph-Lock Flasks based on your sample sizes. Flasks should be filled to no more than one-third of their volume so that maximum surface area is achieved and efficient lyophilization is ensured. A complete Lyph-Lock Flask includes a glass top and bottom and a rubber ring seal. Tops, bottoms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





90° Bend Adapter	Description
7568000	Connects 19/38 STJ Flask Top to 1/2" valve*
7568200	Connects 19/38 STJ Flask Top to 3/4" valve*
7568400	Connects 24/40 STJ Flask Top to 1/2" valve*
7568600	Connects 24/40 STJ Flask Top to 3/4" valve*

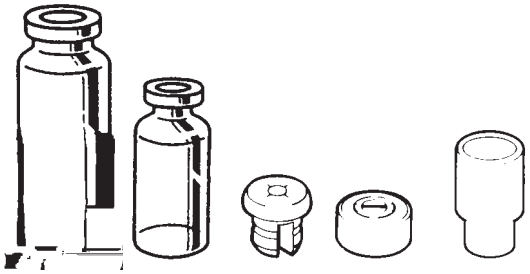
*Va , c a b a a ca a a a b 1/2 a 3/4" . S a c a a Labc c a .

Serum Bottles and Vials

Perfect for long term storage of freeze dried samples. Labconco Serum Bottles and Threaded Vials are specifically designed for lyophilization applications. Their uniform thin wall construction ensures even freezing and drying. Bottles and vials are ideal containers for use in the FreeZone Stoppering Tray Dryer. Serum bottles also connect to valve ports on drying chambers and manifolds.

S B

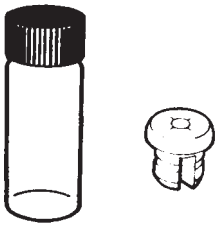
Serum Bottles, Stoppers and Seals are supplied in packages of 100.



Size	20 mm Corkage	13 mm Corkage	Split Stoppers	Aluminum Seals	Sleeve-Type Stoppers
2 ml		7575010	7576010	7577010	
3 ml		7575210	7576010	7577010	
5 ml	7573010		7576210	7577110	7577510
10 ml	7573210		7576210	7577110	7577510
20 ml	7573410		7576210	7577110	7577510
30 ml	7573610		7576210	7577110	7577510
50 ml	7573810		7576210	7577110	7577510
100 ml	7574010		7576210	7577110	7577510
125 ml	7574210		7576210	7577110	7577510

T a V a

Stoppers and Threaded Vials with Screw Caps are supplied in packages of 200.



Size	Vials with Screw Caps	Stoppers
5 ml	7762300	7762200
10 ml	7762600	7762200

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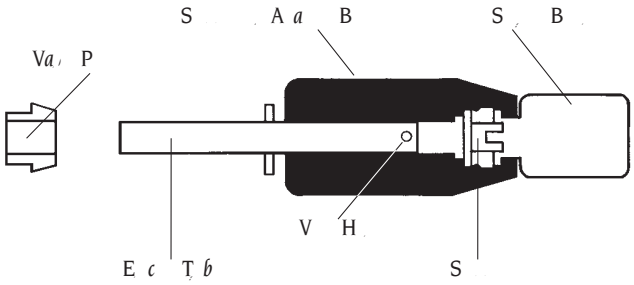
S a C

Secures tear-away Aluminum Seals.

7578000 Seal Crimper for 13 mm corkage.
Shipping weight 3 lbs. (1.4 kg).
7578100 Seal Crimper for 20 mm corkage.
Shipping weight 3 lbs. (1.4 kg).

Va S A a

7593000 Adapter connects to valve ports for manual stoppering of 20 mm corkage serum bottles 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).



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O /Na a Ga S a T

7578500 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).

DECLARATION OF CONFORMITY

Application Council Directive(s): 73/23/EEC, 89/336/EEC

Standard(s) to which conformity is declared: EN61010, EN55022, EN50082-1

Manufacturer's Name:	Labconco Corporation
Manufacturer's Address:	8811 Prospect Avenue Kansas City, MO 64132 USA
Importer's Name:	See Shipping/Customs Documents*
Importer's Address:	See Shipping/Customs Documents for your equipment
Type of Equipment:	Laboratory Equipment – Freeze Dryer
Model No.:	775 followed by two digit number based on model size; followed by another two digit number based on options. 77400 followed by two digit number based on options. 79340 followed by two digit number based on options. 767 followed by two digit number based on model size; followed by another two digit number based on options. 79600 followed by two digit number based on options. 74200 followed by two digit number based on options.
Serial No.:	Various – See Individual Declaration
Year of Manufacture:	1995 and Subsequent

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

See individual Declaration of Conformity which will be signed by the importer for your country.

Place: _____

(Signature)

Date: _____

(Full Name)

_____

(Position)