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User's Manual

FreeZone[®] Clear Stoppering Chambers

Models

7868020
7868030

To receive important product updates,
complete your product registration card
online at register.labconco.com

Please read the User's Manual before operating the equipment.

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Warranty

Labconco Corporation provides a warranty to the original buyer for the repair or replacement of parts and reasonable labor as a result of normal and proper use of the equipment with compatible chemicals. Broken glassware and maintenance items, such as filters, gaskets, light bulbs, finishes and lubrication are not warranted. Excluded from warranty are products with improper installation, erratic electrical or utility supply, unauthorized repair and products used with incompatible chemicals.

The warranty for FreeZone® Clear Stoppering Chambers will expire one year from date of installation or two years from date of shipment from Labconco, whichever is sooner. Warranty is non-transferable and only applies to the owner (organization) of record.

Buyer is exclusively responsible for the set-up, installation, verification, decontamination or calibration of equipment. This limited warranty covers parts and labor, but not transportation and insurance charges. If the failure is determined to be covered under this warranty, the dealer or Labconco Corporation will authorize repair or replacement of all defective parts to restore the unit to operation. Repairs may be completed by 3rd party service agents approved by Labconco Corporation. Labconco Corporation reserves the rights to limit this warranty based on a service agent's travel, working hours, the site's entry restrictions and unobstructed access to serviceable components of the product.

Under no circumstances shall Labconco Corporation be liable for indirect, consequential, or special damages of any kind. This warranty is exclusive and in lieu of all other warranties whether oral, or implied.

Returned or Damaged Goods

Do not return goods without the prior authorization from Labconco. Unauthorized returns will not be accepted. If your shipment was damaged in transit, you must file a claim directly with the freight carrier. Labconco Corporation and its dealers are not responsible for shipping damages.

The United States Interstate Commerce Commission rules require that claims be filed with the delivery carrier within fifteen (15) days of delivery.

Limitation of Liability

The disposal and/or emission of substances used in connection with this equipment may be governed by various federal, state, or local regulations. All users of this equipment are required 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. Labconco Corporation is held harmless with respect to user's compliance with such regulations.

Contacting Labconco Corporation

If you have questions that are not addressed in this manual, or if you need technical assistance, contact Labconco's Customer Service Department or Labconco's Product Service Department at 1-800-821-5525 or 1-816-333-8811, between the hours of 7:30 a.m. and 5:30 p.m., Central Standard Time.

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CHAPTER 1

INTRODUCTION

Congratulations on your purchase of a Labconco FreeZone® Clear Stopping Chamber, which is designed for laboratory lyophilization procedures. The unit is easy to install and maintain. Proper care and maintenance of this product will result in many years of dependable service.

Freeze Dry Process

Freeze drying is an important process in sample preparation and for the preservation and storage of biologicals, pharmaceuticals and foods. Of the various methods of dehydration, freeze drying (lyophilization) is especially suited for substances that are heat sensitive. Other than food processing (e.g., coffee, whole dinners), freeze drying has been extensively used in the development of pharmaceuticals (e.g., antibiotics) and preservation of biologicals (e.g., proteins, plasma, viruses and cell lines). The nondestructive nature of this process has been demonstrated by the retention of viability in freeze dried viruses and microorganisms.

Freeze drying is a process whereby water or other solvent is removed from frozen material by converting the frozen water directly into vapor without the intermediate formation of liquid water. The basis for this sublimation process involves the absorption of heat by the frozen sample in order to vaporize the ice; the use of a vacuum pump to enhance the removal of water vapor from the surface of the sample; the transfer of water vapor to a collector; and the removal of heat by the collector in order to condense the water vapor. In essence, the freeze dry process is a balance between the heat absorbed by the sample to vaporize the ice and the heat removed from the collector to convert the water vapor into ice.

Freeze Dry Rates

The efficiency of the freeze drying process is dependent upon the surface area and the thickness of the sample, the collector temperature and vacuum obtained, the eutectic point and solute concentration of the sample. It is important to remember these factors when trying to obtain efficient utilization of your freeze dry system. A listing of selected materials and their approximate drying times are shown in Table 1 for your reference.

Table 1

SAFE TEMPERATURE AND DRYING TIMES FOR SELECTED MATERIALS			
Material 10mm Thick	Safe Temperature °C	Collector Temperature °C	Hours (Approx.)
Milk	-5	-40	10
Urea	-7	-40	10
Blood Plasma	-10 to -25	-40	16
Serum	-25	-40	18
Vaccinia	-30 to -40	-50	22
Influenza Vaccine	-30	-50	24
Human Tissue	-30 to -40	-50	48
Vegetable Tissue	-50	-80	60

*Total sample quantities are contingent on various freeze dryer capacities.

Up to the point of overloading the system, the greater the surface area of the sample, the faster the rate of freeze drying. By contrast, for a given surface area, the thicker the sample the slower the rate of freeze drying. This is based on the fact that the heat of sublimation is usually absorbed on one side of the frozen sample and must travel through the frozen layer to vaporize water at the other surface. In addition, as the sample is freeze dried, the water vapor must travel through the layer of dried material. The thicker the sample, the greater the chance that the dried layer may collapse which would cause an additional decrease in the rate of freeze drying.

The surface area and thickness of the sample can usually be ignored when each sample contains only a few milliliters. However, for larger volumes, the samples should be shell frozen to maximize the surface area and minimize the thickness of the sample. The volume of the freeze dry flask should be two to three times the volume of the sample.

In order for lyophilization to occur, ice must be removed from the frozen sample via sublimation. This is accomplished by the collector and the vacuum pump. The collector, which should be at least 15 to 20°C colder than the eutectic temperature (melting temperature) of the sample, traps vapor as ice. Since the vapor pressure at the collector is lower than that of the sample, the flow of water vapor is from the sample to the collector. Since this vapor diffusion process occurs very slowly under normal atmospheric conditions, a good vacuum is essential to maintain an efficient rate. In many applications, the maintenance of a vacuum of 0.133 mBar or less is recommended.

The rate of freeze drying is directly proportional to the vapor pressure and the vapor pressure is dependent upon both eutectic temperature and solute concentration of the sample. For example, a solution of sodium chloride and water would freeze dry at a slower rate than pure water. The eutectic temperature of a sodium chloride solution is about -21°C and at this temperature the vapor pressure

is about 1/16 that of water at 0°C. Although the eutectic temperature is not dependent upon the concentration of sodium chloride, the vapor pressure of the water would decrease as the concentration of sodium chloride increased. This is due to the fact that as the solute concentration increases, less of the surface area of the frozen sample is occupied by water. In general, most solutions or biological samples will have a eutectic temperature of -10° to -25°C. However, if the sample contains a simple sugar such as glucose or if the sample is animal or plant tissue, the eutectic temperature may be as low as -30° to -50°C.

Freeze Dry Capacity

The volume of a sample that can be freeze dried at one time is related to factors discussed previously and the size and design of the freeze dry system. With any given instrument, the capacity is based on the surface area of the sample, the eutectic temperature and concentration of the sample and the rate and amount of heat transferred to the frozen sample. Of these factors, the eutectic temperature is the most important factor in determining the amount of sample that can be freeze dried at one time, particularly when flasks are used. This is because as the eutectic temperature decreases, the vapor pressure decreases but the rate of heat absorption by the sample does not change. This tends to promote melting of the sample, which leads to a marked increase in vapor pressure and ultimately overloads the collector and vacuum pump.

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 may 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 Clear Stoppering Chamber.

Chapter 1: Introduction provides a brief overview of the freeze dry process, 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 Clear Stoppering Chamber. Electrical requirements are discussed.

Chapter 3: Getting Started contains the information you need to properly unpack, inspect and install your Clear Stoppering Chamber.

Chapter 4: Using Your Clear Stoppering Chamber discusses the basic operation of your Clear Stoppering Chamber. Information on how to load samples and run the Clear Stoppering Chamber is included.

Chapter 5: Maintaining Your Clear Stoppering Chamber explains how to perform routine maintenance on your Clear Stoppering Chamber.

Appendix A: Clear Stoppering Chamber Components contains labeled diagrams of the components of the Clear Stoppering Chamber.

Appendix B: Clear Stoppering Chamber Dimensions contains comprehensive diagrams showing the dimensions for the Clear Stoppering Chamber.

Appendix C: Clear Stoppering Chamber Specifications contains product specifications.

Appendix D: Clear Stoppering Chamber Accessories lists the part numbers and descriptions of all of the accessories available for your Clear Stoppering Chamber.

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.



CHAPTER 2

PREREQUISITES

Before you install your Clear Stoppering Chamber, you need to prepare your site for installation. The Clear Stoppering Chamber will mount on top of a FreeZone 6, 12 or 18 liter Freeze Dry System. This could be either a benchtop or console model. Carefully examine the location where you intend to install your Clear Stoppering Chamber. You must be certain that the area is level and of solid construction. An electrical source must be located near the installation site.

Carefully read this chapter to learn:

- the electrical supply requirements.
- the vacuum pump requirements.

Refer to *Appendix C: Clear Stoppering Chamber Specifications* for complete Clear Stoppering Chamber electrical and environmental conditions, specifications and requirements.

Refer to the User's Manual for the FreeZone Freeze Dry System for complete electrical and environmental conditions, specifications and requirements.

Electrical Requirements

The Clear Stoppering Chamber requires a dedicated electrical outlet. This outlet requires a 15 Amp circuit breaker or fuse for models rated at 115V (50/60 Hz). An outlet equipped with a 8 Amp circuit breaker or fuse is required for models rated at 230V (50/60 Hz). The power cord on 115V models is equipped with a 15 Amp NEMA 5-15P plug. The power cord on 230V models is equipped with a CEE 7/7 plug. If this does not match with the available receptacle, remove this plug and replace it with an approved plug of the suitable style.

Location Requirements

The Freeze Dryer should be located in an area that provides an unobstructed flow of air around the cabinet. This air cools the refrigeration system. A minimum of 3" must be allowed between the rear and both sides of the Freeze Dryer and adjacent wall surfaces. Restriction of airflow during operation could adversely affect performance.

Refer to *Appendix B: Clear Stoppering Chamber Dimensions* for dimensional drawings of the Clear Stoppering Chamber.

Vacuum Pump Requirements

A vacuum pump must be provided by the user. A vacuum pump with a displacement of 144 liters per minute and 0.0002 mBar ultimate pressure is adequate for most samples. The inlet fitting on the vacuum pump must be suitable for 3/4" ID vacuum hose, which is provided with the FreeZone Freeze Dry System. It is recommended that the vacuum pump is equipped with an exhaust filter to minimize oil mist exhausting from the vacuum pump. The operating vacuum level may be set on the freeze dryer system. The higher the pressure is set, the more likely it is that oil mist will be exhausted.

Vacuum pumps used with 115V models should be equipped with an 115V, 15 Amp NEMA 5-15P plug. Vacuum pumps used with 230V models should be equipped with a reverse IEC plug. This plug is included with 230V FreeZone Freeze Dry Systems. This will allow the vacuum pump to be plugged into the receptacle on the back panel of the Freeze Dry System. Refer to the User's Manual for the FreeZone Freeze Dry System for vacuum pumps available from Labconco.

CHAPTER 3

GETTING STARTED

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

- Unpack and move your Clear Stoppering Chamber.
- Set up your Clear Stoppering Chamber.
- Connect the electrical supply source to your Clear Stoppering Chamber.
- Safely use solvents with your Clear Stoppering Chamber.

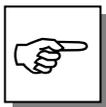
Unpacking Your Clear Stoppering Chamber

The United States Interstate Commerce Commission rules require that claims be filed with the delivery carrier within fifteen (15) days of delivery.

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



DO NOT RETURN GOODS WITHOUT THE PRIOR AUTHORIZATION OF LABCONCO. UNAUTHORIZED RETURNS WILL NOT BE ACCEPTED.



IF YOUR CLEAR STOPPERING CHAMBER WAS DAMAGED IN TRANSIT, YOU MUST FILE A CLAIM DIRECTLY WITH THE FREIGHT CARRIER. LABCONCO CORPORATION AND ITS DEALERS ARE NOT RESPONSIBLE FOR SHIPPING DAMAGE.



DO NOT DISCARD THE CARTON OR PACKING MATERIAL FOR YOUR CLEAR STOPPERING CHAMBER UNTIL YOU HAVE CHECKED ALL OF THE COMPONENTS AND INSTALLED AND TESTED THE CLEAR STOPPERING CHAMBER.

Clear Stoppering Chamber Components

Locate the model of Clear Stoppering Chamber you received in the following table. Verify that the components listed are present and undamaged.

Catalog #	Product Description
7868020	Clear Stoppering Chamber 115V 50/60 Hz
7392700	Chamber
7958300	Power Supply
7607300	Gasket
7392907	Manual
1334500	Power Cord

Catalog #	Product Description
7868030	Clear Stoppering Chamber 230V 50/60 Hz
7392700	Chamber
7958301	Power Supply
7607300	Gasket
7392907	Manual
1336100	Power Cord

If you did not receive one or more of the components listed for your Clear Stoppering Chamber, or if any of the components are damaged, contact Labconco Corporation immediately for further instructions.

Setting Up Your Clear Stoppering Chamber

After you verify receipt of the proper components, move your Clear Stoppering Chamber to the location where you want to install it. Then, follow the steps listed below.

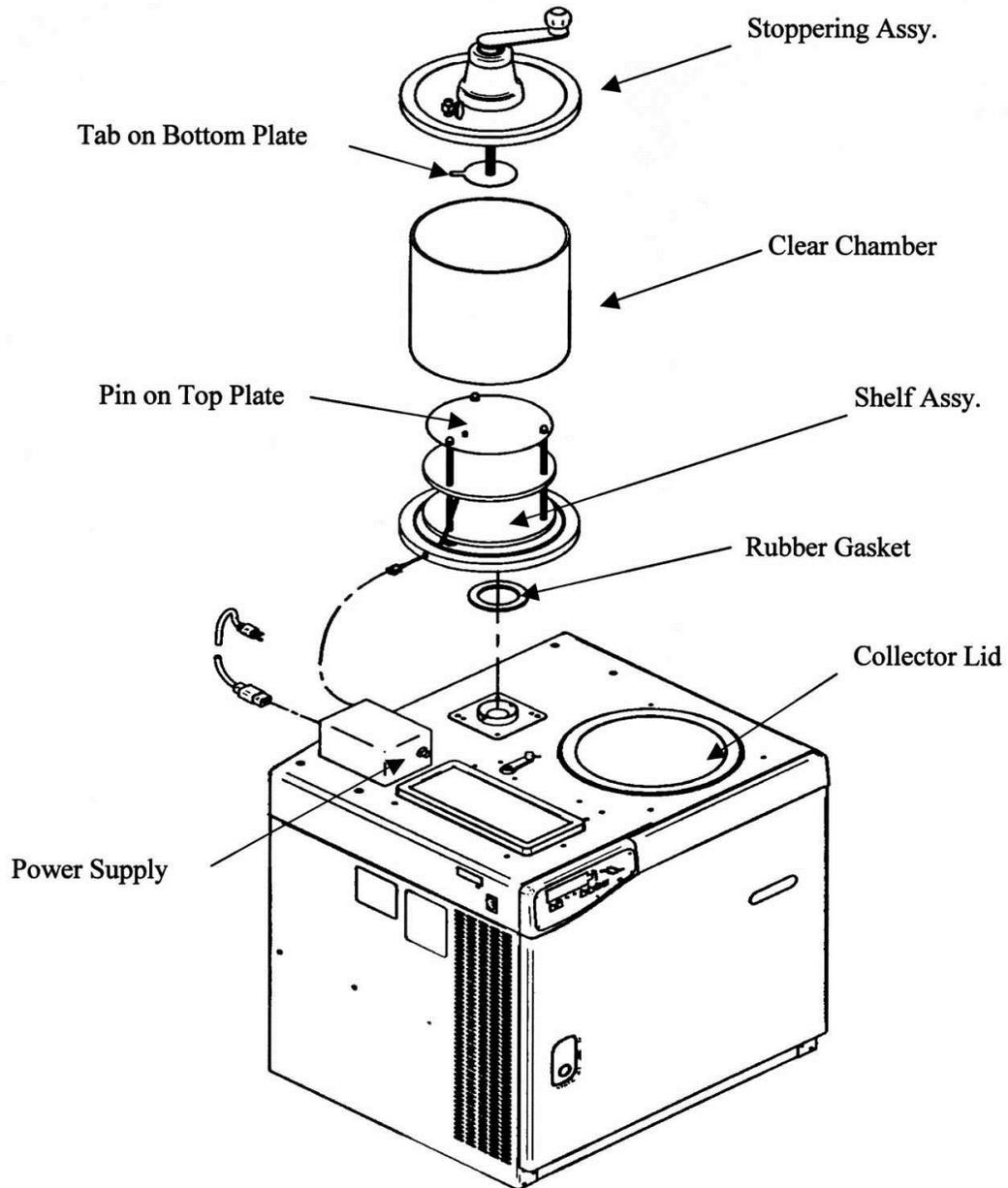
Installing the Clear Stoppering Chamber on the Freeze Dry System

1. Place the rubber gasket over the 3" port on the top of the Freeze Dry System.
2. Position the Shelf Assembly over the 3" port. Rotate the Shelf assembly so it clears the lid over the collector.
3. Place the clear chamber over the shelves.
4. Position the Stoppering Assembly on top of the chamber. Make sure the tab on the bottom plate is not positioned directly above the pin on the shelf assembly top plate.



Rotate the entire stoppering assembly clockwise until all 3 tabs with slots fully engage the 3 rods.

5. Position the Power Supply on the top of the Freeze Dry System and then connect the harness from the Shelf Assembly to the Power Supply.



The Clear Stoppering Chamber is now installed and must be tested to make certain the system is free of leaks. To test, turn on the Freeze Dry System refrigeration and allow the temperature to reach -40° or lower. Make sure the Vacuum Release control is in the “CLOSED” position. Start the vacuum pump and monitor the vacuum gauge. The vacuum on the Freeze Dry System should reach 0.133 mBar within 30 minutes and should achieve an ultimate vacuum of 0.040 mBar or lower within 18 hours.

If 0.040 mBar cannot be achieved, consult the troubleshooting section of this manual and of the manual supplied with the Freeze Dry System.

Venting the Vacuum Pump



If any materials will be placed in the Clear Stoppering Chamber that can liberate hazardous gases when heated, the vacuum pump exhaust must be vented to a fume hood or other ventilation device.

Electrical Connection

Plug the power cord into the receptacle on the back of the Clear Stoppering Chamber and plug the other end into a suitable power receptacle.



DO NOT ATTEMPT TO PLUG THE CLEAR STOPPERING CHAMBER INTO THE FREEZONE FREEZE DRY SYSTEM.

Chemical Resistance of Freeze Dryer Components

The FreeZone Freeze Dry System and Clear Stoppering Chamber are designed to be chemically resistant to most compounds that are commonly used in freeze drying processes. However, by necessity, the Freeze Dryer is comprised of a number of different materials, some of which may 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:

Component	Material	Acids			Buffers		Solvents							
		Acetic Acid 20%	Formic Acid	Trifluoroacetic Acid (TFA)	Calcium Chloride	Sodium Phosphate	Acetone	Acetonitrile	Carbon Tetrachloride	Cyclohexane	Dioxane	Methyl t-Butyl Ether (BTBE)	Pyridine	
Valve Stem	Acetal	C	D	D	D		D							
Clear Chamber Top & Bottom	Acrylic			D			D	D	D					
Hoses, Gaskets & Valve Bodies	Neoprene	C	D	D			C	C	D	D	D	C	D	
Flask Top	Silicon Rubber		C	D		D			D	D	D	C	D	
Chamber & Fittings	Stainless Steel				C									

* An accessory glass lid is available for the Freeze Dry System.

C – Moderate degradation; Limited use.

D – Severe degradation; infrequent use recommended; immediate thorough cleaning required.

- Most common compounds used in freeze drying processes, if allowed to enter the vacuum pump, will degrade the oil and cause damage to the vacuum pump.
- Sugars and proteins typically will have minimal negative effect on any of the materials of construction.

When using compounds in the Freeze Dryer that are hostile to the materials of construction, it is imperative the equipment is thoroughly cleaned after use.

- 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 Dry System 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 Dry System, contact Labconco Technical Service at 1-800-821-5525 or 816-333-8811 or e-mail: labconco@labconco.com.

Solvent Safety Precautions



Solvents used in the Clear Stoppering Chamber may be flammable or hazardous to your health. Use extreme caution and keep sources of ignition away from the solvents. When using flammable or hazardous solvents, the vacuum pump must be vented to a fume hood.

Hazardous materials such as strong acids or bases, radioactive substances and volatile organics must be handled carefully and promptly cleaned up if spilled. If a sample is spilled in the collector chamber it must immediately be cleaned up.

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 4

USING YOUR CLEAR STOPPERING CHAMBER

After your Clear Stoppering Chamber has been installed as detailed in *Chapter 3: Getting Started*, you are ready to begin using your Clear Stoppering Chamber. Read this chapter to learn how to:

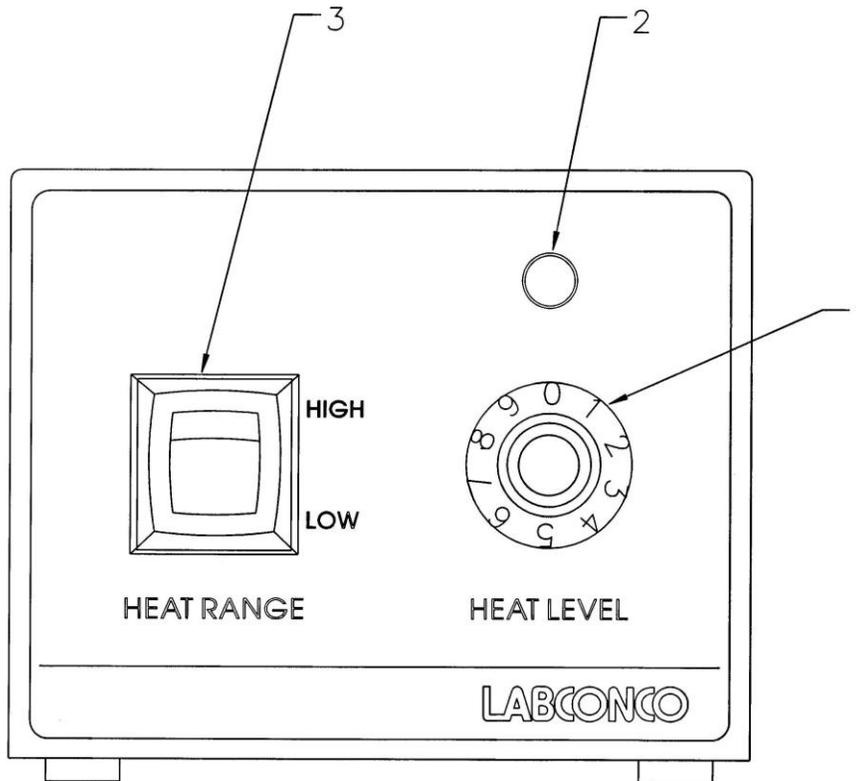
- Operate the controls.
- Add samples.



Do not use the Clear Stoppering Chamber in a manner not specified by the manufacturer (refer to *Appendix C: Clear Stoppering Chamber Specifications*). The electrical protection properties of the Clear Stoppering Chamber may be impaired if the Clear Stoppering Chamber is used inappropriately.

Clear Stoppering Chamber Controls

The control panel for the Clear Stoppering Chamber is shown below with a description about its function.



1. Heat Level Switch – Varies the duty cycle of the electrical power supplied to the shelves.
2. Indicator Light – Illuminates when the heat level switch is in any position other than “O”.
3. Heat Range Switch – Changes the voltage supplies to the shelves.

Operation Checklist

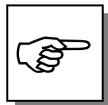
The following checklist should be followed prior to each use of your Clear Stoppering Chamber.

1. Wipe the interior of the chamber with a soft cloth or paper towel to remove any accumulated moisture.
2. Wipe the upper and lower gasket surfaces with a soft, lint-free cloth or paper towel to remove any dirt or contaminants that could cause a vacuum leak. Vacuum grease is not required on the gaskets to obtain a proper vacuum seal.
3. Make sure that the vacuum break valve is closed.

Operating the Clear Stoppering Chamber

Freeze Drying

1. Prepare the Freeze Dry System for operation in accordance to its instruction manual.
2. Turn on the Freeze Dry System.
3. Freeze samples in vials and partially stopper the vials.
4. After the Freeze Dry System reaches -40°C , frozen samples may be loaded onto the shelves. If samples vials are to be stoppered, the vials must be loaded symmetrically onto the shelves. There should be at least three vials on each shelf and all vials on a shelf must be the same size. After loading the shelves with samples, carefully install the Clear Chamber and Stoppering Assembly.



Rotate the stoppering assembly clockwise until all 3 tabs with slots fully engage the 3 rods.

5. Turn on the vacuum pump.
6. When the desired vacuum level is reached (typically around 133×10^{-3} mBar) the shelf heaters may be turned on. The freeze drying process is now taking place.

Setting the Shelf Temperature

A specific temperature cannot be selected and set. The voltage and duty cycle of the heater is determined by the Heat Range Switch and Heat Level Switch. When the Heat Range Switch is positioned to HIGH, the voltage to the heaters is twice as high as when the switch is in the LOW position. The Heat Level Switch varies the heater on duty cycle from about 20% when the dial is set at the 1 position to 100% when the dial is set at 9. A temperature thermostat built into the heater limits the high temperature to about 46° C (115° F).

The actual temperature of the shelf/sample is dependent on the sample material and quantity, the vacuum level in the system, as well as the settings of the Heat Range and Heat Level controls. The samples must be observed during the freeze drying process to confirm that they did not melt during the process.

Stoppering

When the samples are dry they may be stoppered while still under vacuum.

1. Turn off the shelf heater.
2. Turn the shelf stoppering crank counterclockwise to lower the stoppering plate.
3. When stoppering is complete turn the crank clockwise to raise the stoppering plate to its original position.
4. Slowly open the vent valve on the top to allow air to bleed into the chamber.
5. Turn off the vacuum pump.
6. Rotate the stoppering assembly counterclockwise and then remove it. Remove the clear chamber.



CHAPTER 5

MAINTAINING YOUR CLEAR STOPPERING CHAMBER

Under normal operation, the Clear Stoppering Chamber requires little maintenance. The following maintenance schedule is recommended:

As needed:

1. The user has the responsibility for carrying out appropriate decontamination if hazardous material is spilled on or inside the equipment. This may be done by wiping the contaminated surfaces with a soft cloth dampened with alcohol. Alcohol may craze the acrylic parts. Before using any cleaning or decontamination method except those recommended by Labconco, users should check with Labconco that the proposed method will not damage the equipment.
2. Clean up all spills; remove liquids from the chamber.
3. Check oil level of the vacuum pump. It should be between MIN and MAX. If the oil level is less than an inch (25.4 mm) above MIN, add oil to proper level.
4. If oil shows cloudiness, particles or discoloration, drain the pump and replace with fresh oil.
5. Utilization of acids requires immediate cleaning and neutralization after a run or physical damage will result.

Monthly:

1. The rubber components on the Clear Stoppering Chamber 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.
3. Using a soft cloth, sponge, or chamois and a mild, non-abrasive soap or detergent, clean the exterior surfaces of the unit.

Decontamination:

When freeze drying biological substances, it may be necessary to decontaminate the system. A surface decontaminant should be used to clean the accessible surfaces. The use of ethylene oxide is not recommended because of its hazardous and corrosive nature. Contact Labconco for additional information.

APPENDIX A

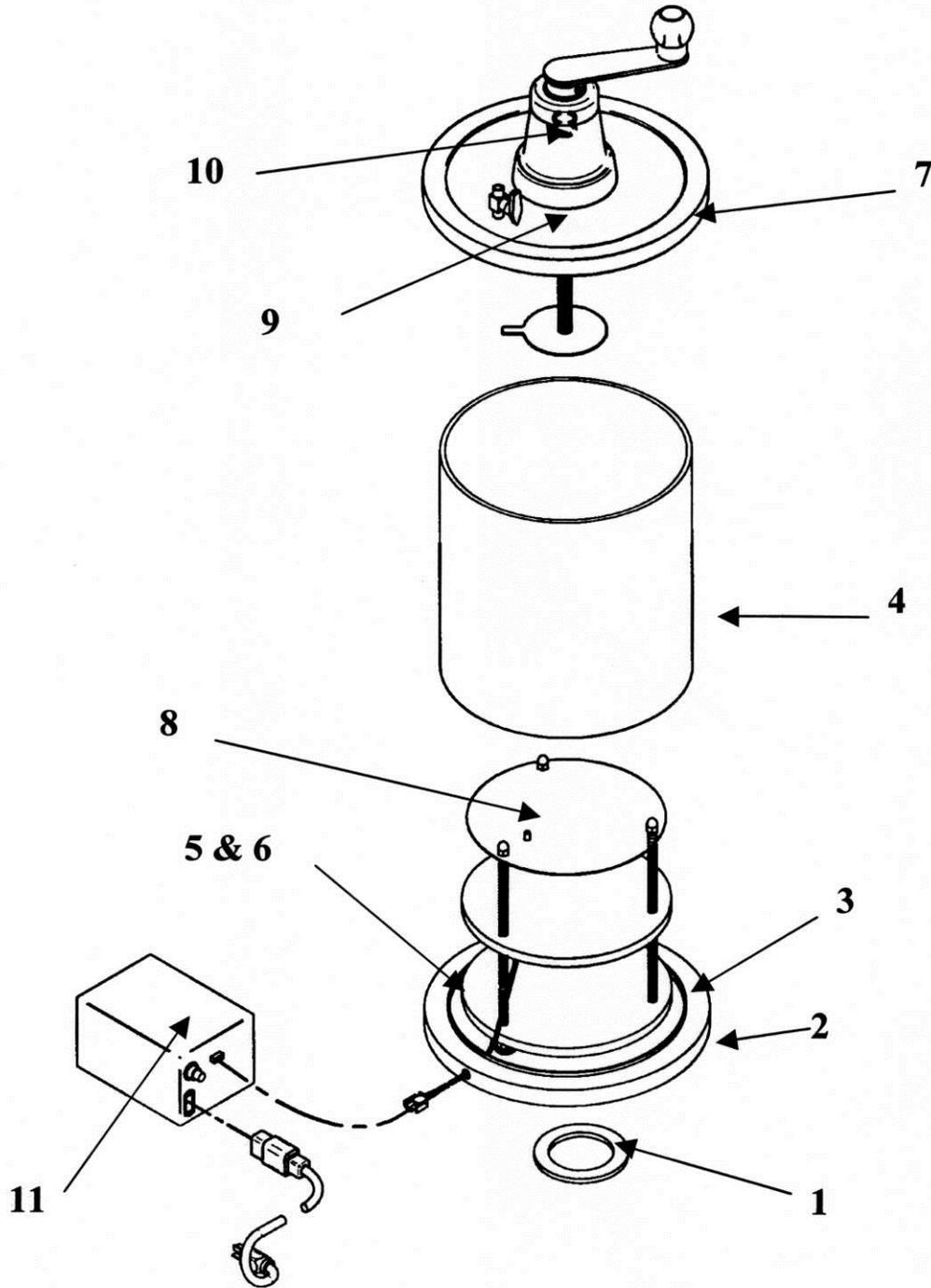
CLEAR STOPPERING

CHAMBER COMPONENTS

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

Replacements Parts

Item	Qty	Part No.	Description
1	1	7607300	Gasket
2	1	7392904	Gasket Lower
3	1	7392809	Bottom
4	1	7390703	Chamber
5	2	7392807	Tray Assembly– Upper Half
6	2	7392707	Tray Assembly – Lower Half
7	1	7690800	Gasket – Upper
8	1	7392708	Stoppering Plate
9	1	7392701	Lid
10	2	1646600	O-Ring
11	1	7958300	Power Supply 115V or
		7398301	Power Supply 230V

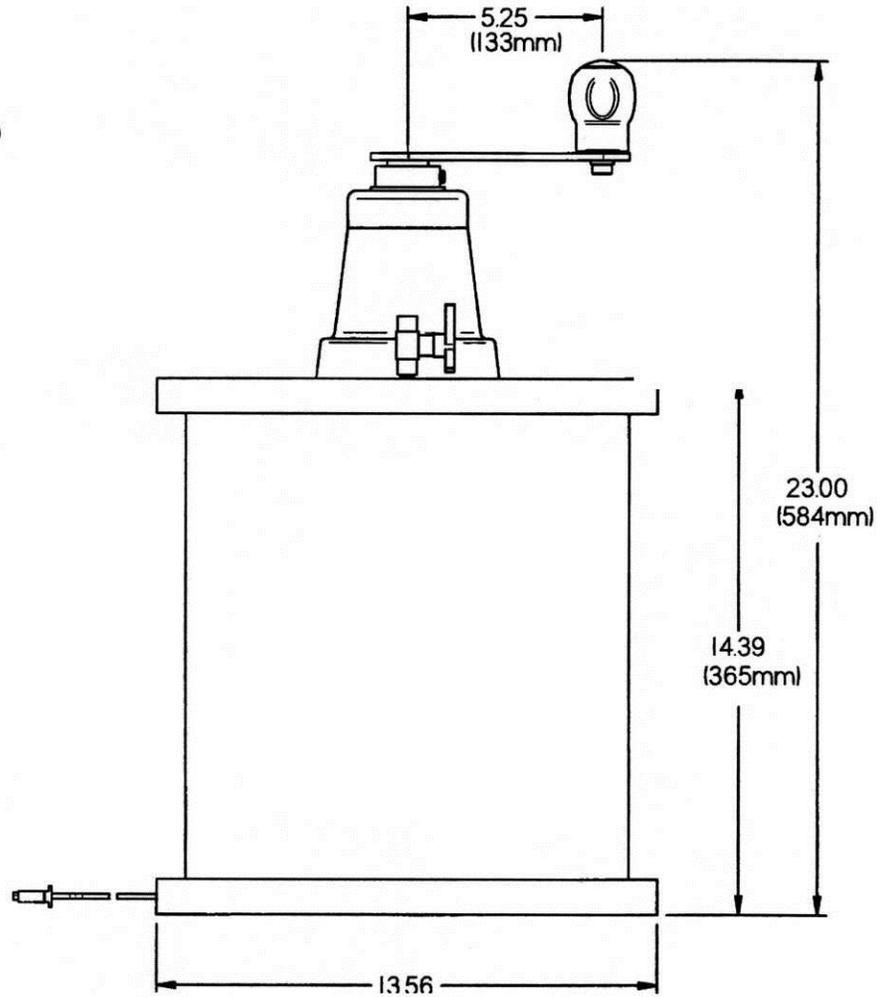


APPENDIX B

CLEAR STOPPERING

CHAMBER DIMENSIONS

Inches
(Millimeters)



APPENDIX C

CLEAR STOPPERING CHAMBER

SPECIFICATIONS

This Appendix contains technical information about the Clear Stoppering Chamber including electrical specifications and environmental operating.

Electrical Specifications

- Nominal amperage – Model: 7868020: 1A
- Nominal amperage – Model: 7868030: 0.5A
- Frequency: All Models 50/60 Hz
- Phase: Single

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 $\pm 10\%$ 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 2500V for 230V models are allowed.
- Used in an environment of Pollution degrees 2 (i.e., where normally only non-conductive atmospheres are present). Occasionally, however, a temporary conductivity caused by condensation must be expected, in accordance with IEC 664.

APPENDIX D

CLEAR STOPPERING CHAMBER

ACCESSORIES

The following Serum Bottles and Vials are available for the Clear Stoppering Chamber. 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.

Serum Bottles

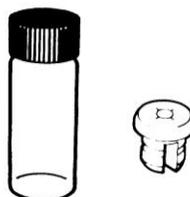
Serum Bottles, Stoppers and Seals are supplied in packages of 100.



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

Threaded Vials

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

Accessories



Seal Crimper

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).