MINI LYOTRAP
FREEZE-DRYING MACHINE
OPERATING INSTRUCTIONS

User Manual for Mini Lyotrap Freeze-Drying Machine

The precise answer to controlled environments

User Manual For
Mini Lyotrap
Freeze-Drying Machine

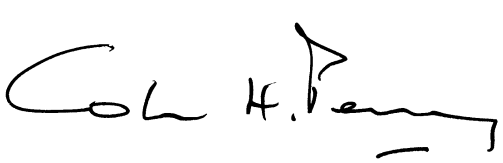
Manual Ref. No:	*UM0026*	**Issue No:**	*001*
Machine Serial No:	….....	**Software Ref:**	….....
Pressure Vessel Ref:	….....		

Description Of Any Options Fitted:

…..
.....
.....
.....
.....

Voltage: ☐ Power: ☐ Phase: ☐

It would be most helpful if you could have the above information available when requesting technical advice or after sales service.



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Confidentiality

CONTENTS

1. FREEZE DRYING

The products or items to be dried are placed in a drying chamber above the condenser chamber of the Lyotrap. The refrigeration is switched on to freeze the condenser chamber. Once the condenser chamber temperature is below –30°C the vacuum pump can be switched on.

As the vapour comes away from the products, it will be seen forming as frost on the sides of the condenser chamber.

When under vacuum, heat going into the products causes the ice to sublimate, or vaporise. All the ice in the products will eventually boil off, without actually melting. The dried product should have retained its chemical composition.

2. SETTING UP

To operate correctly, the machine needs to be level. The environment needs to be dust-free to avoid the refrigeration heat exchanger fins at the left hand side of the machine from becoming clogged. The Lyotrap needs clear space around it to allow adequate air circulation.

The rubber lid seals must be kept clean to achieve a good vacuum and periodic wiping with white spirit is of advantage. Always allow spirit to evaporate before closing the lid.

3. CONTROLS

POWER

The power LED will light up when the machine is connected to a power supply using the power supply lead and switched on. The machine must be isolated from the power supply when the machine is not in use or when any maintenance work is undertaken.

4. MACHINE OPERATION FOR FREEZE DRYING

It is advisable to run through this procedure the first time with machine empty.

1. Push the hose from the vacuum pump onto the stainless steel tube fitted to the left side of the condenser chamber.

2. Switch on the power switch to commence chamber refrigeration. Place the products to be dried on the shelves above the condenser chamber in the acrylic chamber making sure the rubber seals and lid are in place. When flask drying, push the flask adapters into the rubber quick-seal valves of the manifold lid. Start the process with the valves closed, and open them one by one after a good vacuum achieved.

3. When the chamber temperature reaches -30°C, the vacuum pump can be switched on.

4. At the end of the process, the refrigeration and vacuum pump can be switched off. Slowly turn the tap on the drain valve to the downward pointing position to allow air back into the chambers. The Defrost can be switched on to melt any ice in the condenser chamber. Place a container under the drain valve to collect the melting ice. The machine must be unplugged from the power supply when not in use.

5. The drain valve must be closed before the machine can be used again.

5. MACHINE OPERATION WHEN USED FOR VACUUM PUMP PROTECTION OR SOLVENT RECOVERY

1. Push the hose from the vacuum pump onto the stainless steel tube fitted to the left side of the condenser chamber.

2. Push the hose from the process onto the stainless steel tube on the Lyotrap lid.

3. Switch on the condenser chamber refrigeration and when the temperature is -30°C or below the vacuum pump can be started. Vapour coming from the process or any solvents will condense in the chamber. For efficient operation, do not let the ice become more than 50mm thick before defrosting.

4. To defrost the unit, switch off the vacuum pump and then the refrigeration. Open the rubber drain valve to allow air back into the system and to allow the melted ice to drain out.

6. GENERAL MAINTENANCE

- Oil mist and spillage around the vacuum pumps can occur and should be wiped clean as it attracts dust and dirt. If the surfaces around the pump are kept clean, abnormalities such as oil leaks are immediately apparent.
- The rubber seals should be kept clean, dirt is effectively removed with white spirit on a cloth.
- The refrigeration systems heat exchanger is at the back of the machine and is finned like a car radiator. This must be kept clean and away from anything that could restrict the airflow. The air must blow through to take the heat out of the refrigerant and cool the system. The fins should be blown out with compressed air occasionally to keep them clean.