



Operation Manual

LABS-Series Cryogenic Storage Systems - CryoCE LABS 20K, CryoCE LABS 38K, CryoCE LABS 40K, CryoCE LABS 80K, CryoCE LABS 94K

This is a class IIa Medical Device according to 93/42/EEC Annex VIII.
Review and understand all safety procedures before attempting to install, operate
or perform maintenance on this cryo-storage system. Do not attempt to use or
maintain this unit you read and understand these instructions.

The vessels are not intended for applications in direct contact with patients.
Do not permit untrained persons to use or maintain this unit. If you do not fully
understand these instructions contact your supplier for further information.

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For the MDD products exists EC declaration of conformity no. 44 236 090637.

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1. Symbols



Hazard
Fire and Explosions hazard



Hazard
This symbol is used to show possible risk of injury or mortal danger for users



Information
This symbol marks additional information or application details



Instruction
Wear face shield



Instruction
Wear protection gloves (Cryogenic specific is preferred)



Note
Inert gas, Nitrogen, UN Number 1977



Asphyxiation hazard
Special warning special risk of suffocation due to Oxygen depletion



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2. Safety Precautions

WARNING



The following safety precautions are for your protection. Before installing, operating, or maintaining this unit read and follow all safety precautions in this section and in reference publications. Failure to observe all safety precautions can result in property damage, personal injury, or death.

Safety Precautions for Liquid Nitrogen

Nitrogen is an inert, colourless, odourless, and tasteless gas making up 79% of the air breathed. Liquid nitrogen is obtained by cooling air until it becomes a liquid and then removing the oxygen. Air is roughly 21% oxygen. Under normal atmospheric pressure liquid nitrogen has a temperature of -196°C.



Extreme Cold - Cover Eyes and Exposed Skin

Accidental contact of liquid nitrogen or cold gas with the skin or eyes may cause a freezing injury similar to frostbite. Handle the liquid that splashing or spillage won't happen. Protect your eyes and cover the skin where the possibility of contact with the liquid, cold pipes, cold equipment, or cold gas exists. Safety goggles or a face shield should be worn when operating this equipment at all times. Insulated gloves that can be easily removed and long sleeves are recommended for arm protection. Trousers without cuffs should be worn outside boots or over the shoes to shed spilled liquid.



Keep Equipment Area Well Ventilated

Although nitrogen is non-toxic and non-flammable, it can cause asphyxiation in a confined area without adequate ventilation. Any area not containing enough oxygen for breathing can cause dizziness, unconsciousness, or even death. Nitrogen, a colourless, odourless, and tasteless gas, cannot be detected by the human senses and inhaled normally as if it was air. Without adequate ventilation, the expanding nitrogen will displace the normal air resulting in a non-life-supporting atmosphere.

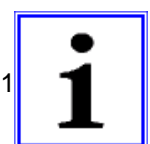


Liquid Nitrogen System

The liquid nitrogen supply pressure at the inlet to the refrigerator should be in the range of 10 psig (0.7bar/69 kPa) to 20 psig (1,4bar/138 kPa) for optimum performance. Higher operating pressures will increase transfer losses and create excessive turbulence of the liquid in the refrigerator which can generate false signals to the liquid level controller causing the refrigerator to under-fill. In "liquid phase" storage applications, excessive turbulence can cause splashing which can result in personal injury and/or damage to the refrigerator. When installing piping or fill hose assemblies, make certain a suitable safety relief valve is installed in each section of plumbing between shut-off valves. Trapped liquefied gas will expand extremely as it warms and may burst hoses or piping causing damage or personal injury. A relief valve is installed in the refrigerator plumbing to protect the line between the customer supplied shut-off valve and the refrigerator solenoid valve.



CAUTION: When installing field fabricated piping, make certain a suitable safety valve is installed in each section of piping between shut-off valves.





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For more detailed information concerning safety precautions and safe practices to be observed when handling cryogenic liquids consult CGA pamphlet P-12 "Handling Cryogenic Liquids" available from the Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

Warning: Inlet pressure should not exceed 1.5 bar (22 psig /152 kPa). Higher pressures could result in damage to equipment.



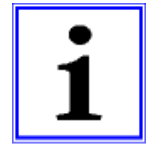
Dispose of Waste Liquid Nitrogen Safely

Dispose of waste liquid nitrogen out-doors where the cold temperature cannot damage floors or driveways and where it will evaporate rapidly. An outdoor pit filled with clean sand or gravel will evaporate liquid nitrogen safely and quickly.

Electrical

Electrical Shock Can Kill – the liquid level controllers used with these refrigerators operate at 24VAC. However, the external transformer does have a 230VAC primary. Do not attempt any service on these units without disconnecting the electrical power cord.
Please pay attention to the instruction manuals of our controller supplier Mowden Controls Ltd.

Note: Units are supplied with Taylor-Wharton approved controllers. If other liquid level controllers are used, please contact Taylor-Wharton before putting the refrigerator into service.



Freight Damage Precautions

Any Freight damage claims are your responsibility. Cryostorage systems are delivered to your carrier from Taylor-Wharton's dock in new condition. When you receive our product you may expect it to be in that same condition. For your own protection, take time to visually inspect each shipment in the presence of the carrier's agent before you accept delivery. If any damage is observed, make an appropriate notation on the freight bill. Then ask the driver to sign the notation before you receive the equipment. You should decline to accept containers that show damage, which might affect serviceability.

Spare Parts Please use only Taylor Wharton approved spare parts for maintenance work.



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3. GENERAL INFORMATION

The Taylor Wharton Cryostorage systems LABS20K, LABS40K and LABS80K are vacuum insulated (double wall) stainless steel freezers and are designed for efficient long-term storage of larger volumes of specimens. The range offer a capacity of up to 80.000 vials (2ml), a storage temperature virtually at the level of liquid nitrogen temperature and low nitrogen consumption. The units are primarily designed for vapour phase storage but liquid phase storage is also possible. The Freezers are open to atmosphere and therefore do **not** fall under the European Pressure Equipment Directive 97/23 EC.

The LABS20K, LABS40K and LABS80K refrigerators covered by this publication are designed for, but not limited to, the laboratory environment. The units feature a cylindrical stainless steel design with a small lid opening for low evaporation. The turntable with aluminium dividers is easy to rotate and allows for quick access to the desired (colour coded) storage compartment. The lid is hinged and can be opened by the two handles. It can be locked by a pad lock (not belonging to the unit). A folding step permits convenient access to the inventory control system. The flat stainless steel table top makes a convenient working surface.

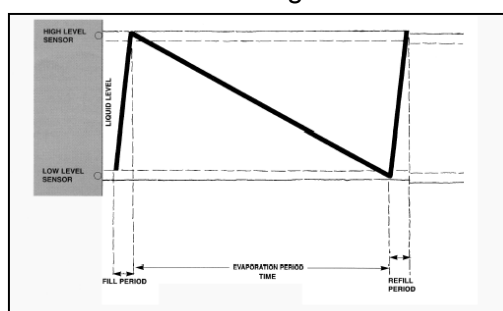
All of the models will accommodate inventory control systems or provide unobstructed storage area for larger product. All models are supplied with casters to enable limited mobility for cleaning purposes.

The addition of a liquid level controller, a liquid nitrogen supply source, like the Taylor-Wharton Liquid Cylinder product XL line, and inventory control racks for systematic retrieval of stored product complete the total Cryostorage system.

Operation

The cryogenic temperatures required for long term storage of biological samples is achieved by constant evaporation of liquid nitrogen. Necessary evaporation heat is absorbed from the environment resulting in a lower temperature within the storage area.

As a result the liquid level in drops constantly. Regular refilling of required in order to maintain temperatures for the samples. Refill either by hand or more convenient automatic level controllers, e.g. CryoCon products. The Graph level characteristics.



cryogenic freezers liquid nitrogen is cryogenic storage can be done and safely with Taylor Wharton shows resulting

In order to avoid LIN losses and ice built up around the lid area, inlet pressure shall not exceed 1.5 bar. LIN needs to be saturated at 0.7 bar – 1.4 bar. Higher pressures could result in damage of equipment and / or sufficient depletion of oxygen, see safety precautions above.





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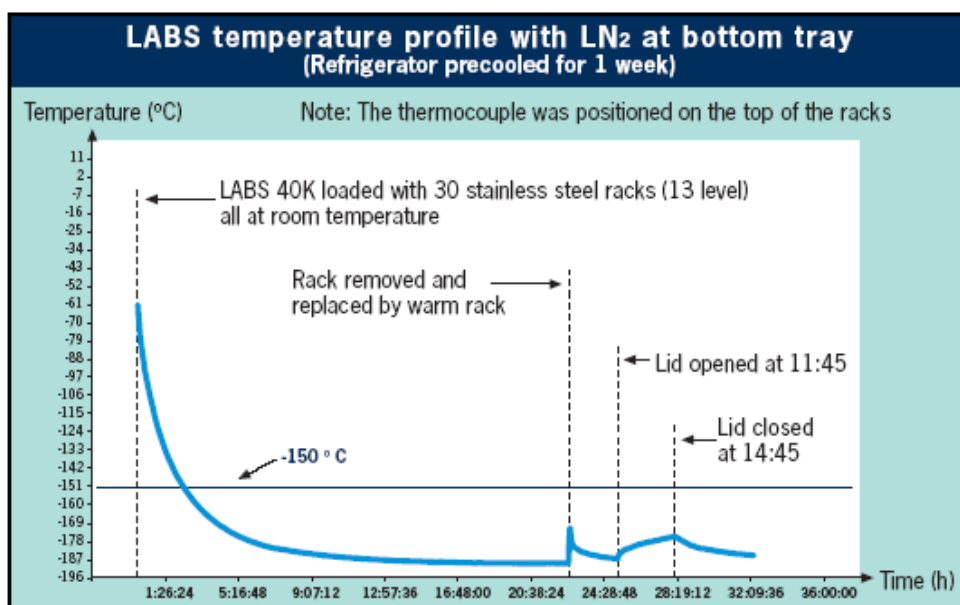
Taylor-Wharton cryogenic vessels are based on the principle of complete thermal insulation. They consist of an inner vessel and an outer body separated by a stable vacuum, which virtually precludes any transfer of heat from the ambient environment to the inner vessel. Any loss of vacuum pressure between the two parts will result in a massive increase of LIN consumption and without any increase of feed this can cause damage to the stored samples. Beside this risk the high consumption of LIN results in substantial amounts of gas, resulting in considerable depletion of oxygen, see safety precautions above.



4. Specifications

LABS	20K	38K	40K	80K	94K
Diameter (mm)	864	1067	1143	1511	1511
Overall height (mm)	1455	1530	1455	1455	1710
Working height from step to lid opening (mm)	1080	1130	1080	1080	1030
Usable height (mm)	762	762	762	762	908
LN2 value below the base plate (l)	46	72	76	150	300
Weight, empty (kg)	295	422	417	703	771
Weight, full without ICS* (kg)	624	930	907	1794	2086
Neck opening (mm)	330	457	457	622	622
Evaporation rate ** (l/day)	7,0	8,8	8,8	11,0	10,8

- *ICS – Inventory Control System. ** Evaporation rate and static holding time are nominal. Actual rate may be affected by the nature of the contents, atmospheric conditions, container history and manufacturing tolerances. Our policy of continuing product improvement may cause changes in the specifications without prior notice.





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5. Transport and Installation

Unpacking and Inspection

Inspect received containers for external damage. All claims for damage (apparent or concealed) or partial loss of shipment must be made in writing within (5) days from receipt of goods. If damage or loss is apparent, please notify the shipping agent immediately.



five

Open the shipping containers; a packing list is included with the system to simplify checking that all components, cables, accessories, and manuals were received.

Installation

Please use the packing list to check off each item as the system is unpacked. Inspect for damage. Be sure to inventory all components supplied before discarding any shipping materials. If there is damage to the system during transit, be sure to file proper claims promptly with the carrier and insurance company. Please advise Taylor-Wharton of such filings. In case of parts or accessory shortages, advise Taylor-Wharton immediately. Taylor-Wharton cannot be responsible for any missing parts unless notified within 30 days of shipment.

Repackaging for Shipment

If it is necessary to return any part of the system for repair or replacement, a Material Return Authorization (MRA) number must be obtained from an authorized factory representative before returning the instrument to our service department. Contact your distributor for return authorization.



When returning an instrument for service, the following information must be provided before obtaining an MRA:

- A. System model and serial number and controller serial number
- B. User's name, company, address, and phone number
- C. Malfunction symptoms
- D. Description of system
- E. Material Return Authorization (MRA) number

If possible, the original packing material should be retained for reshipment. If not available, consult Taylor-Wharton for shipping and packing instructions. It is the responsibility of the shipper to assure that the goods are adequately packaged for return to the factory.



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Liquid Nitrogen Supply Connection

The package included with the refrigerator includes a filter and an elbow. The liquid fill hose (not included) from a low pressure source of liquid nitrogen must be connected to the inlet through the filter and elbow. This liquid nitrogen source must have a shut-off valve, and may be a portable liquid cylinder or a bulk supply. The liquid nitrogen supply pressure at the inlet to the refrigerator should be in the range of 10 psig (0.7 bar/69 kPa) to 20 psig (1.4 bar/38 kPa) for optimum performance. Higher operating pressures will increase transfer losses and create excessive turbulence of the liquid in the refrigerator which can generate false signals to the liquid level controller causing the refrigerator to under fill. In "liquid phase" storage applications, excessive turbulence can cause splashing which could result in person injury and/or damage to the refrigerator.



6. Set Up

The units can be used in two different fill modes:

Manual

LIN supply should be connected via suitable transfer hose and a standard pipe connection 3/8" NPT female thread or filled through the open lid. To fill through the lid the transfer hose should be equipped with a phase separator. Manual fill requires strict routines for liquid level check and to show LIN is at the required level.

With respect to the valuable stored contents it is recommended to install automatic level control devices, e.g. Taylor Wharton CryoCon models.



Automatic

The CryoCon level control systems are designed to provide simple, reliable level control in your LN2 freezer. LIN supply system has to be connected via transfer hose; the connection is made by a 3/8" NPT female thread.

The CryoCon systems maintain the LIN level between the low and high sensor. Extra low and extra high sensors are used for alarms and safety features. For further details please check the relevant controller manual.

Maximum LIN level must be set at minimum 2,5 cm below the booted Lid. The Lid should not be permanent immersed in LIN. Overfilling must be avoided and may damage the freezer, control system or the floor and excess amounts of gaseous nitrogen could displace breathable air.





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Initial Fill or Restart after Unit was out of Service

Once the unit is positioned at the final location the rod which secures the turn table has to be removed from the centre axle of the turntable. This rod is only needed when the vessel has to be transported. It should be stored in the lab or could be attached to the vessel via some straps so it does not get lost.

Before starting filling the unit with liquid nitrogen the Inventory Controls System should be placed inside the vessel. The refrigerator can now be filled according to the required level. If an automatic level controller is installed the liquid nitrogen source needs to be connected to the inlet connection of the vessel and the controller must be turned on.

Cooling down a warm container (at room temperature) will cause excessive amount of cold gas. It is important to allow for adequate ventilation. The temperature of the material will change for more than 200°K. All safety procedures must be taken to avoid any **Asphyxiation hazard** for people involved with installation, set-up or testing the unit.

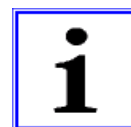


We recommend storing samples only after the unit has been cooled down and after a test run of min. 48 hours.

In case the filling process does not stop when the HIGH level is reached the manual valve in the supply line of the LN2 source must be closed immediately. In case of an overflow situation an excessive amount of cold nitrogen gas will be created through evaporation and cause an **Asphyxiation hazard**.

The reason for the overflow can be a blocked solenoid valve. This can be caused by ice build-up or by contamination of dirt inside the solenoid valve. After closing the LN2 supply the ice will thaw by itself after some period of time, no disassembly of the valve is needed. If the valve is blocked by dirt this might be removed through the flow of gas by switching the valve on and off for a few times. If the valve continuously stays open the solenoid valve needs to be cleaned or replaced through the technical service.

In general the supply hoses should not be disconnected when cold. After disconnecting the hose from the supply tank (like XL-vessel) the open hose connection must be positioned with the opening downward in order to avoid that moisture enters the hose.



7. Operation

When operating a Taylor Wharton Cryostorage System the following should be avoided:

- Leaving the lid open for too long
- Inserting of several warm inventory racks in a short time
- High humidity in the storage room

These conditions may lead to an excessive ice build-up and accumulation of ice inside the vessel. A large amount of ice around the lid may cause difficulties when the lid has to be opened. Excessive ice can make it necessary to use force to open or close the lid which may damage the gasket and the lid.

During the fill process (through the fill pipe of the unit) cold nitrogen gas will leave the vessel through the vent port at the rear side of the unit. The area will cooled down which will lead snow build up. The snow will melt shortly after the filling has stopped.



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8. Spare Parts

LABS	20K	38K	40K	80K	94K
Description	Bestell-Nr.	Bestell-Nr.	Bestell-Nr.	Bestell-Nr.	Bestell-Nr.
Lid	LA20-9C85	LA40-9C85	LA40-9C85	LA80-9C85	LA80-9C85
Castor	7300-8040	7300-8040	7300-8040	7300-8040	7300-8040
Aluminium Rack for 10 x 10 Boxes, 13 levels	TKW 1SC	TKW 1SC	TKW 1SC	TKW 1SC	TKW 1SC
Aluminium Rack for 5 x 5 Boxes, 13 levels	TKW 2SC	TKW 2SC	TKW 2SC	TKW 2SC	TKW 2SC
Lid gasket, 7701-0089 Necessary m	1,2m	1,6m	1,6m	2,2m	2,2m

Options for automatic Level Controller:

Solenoid valve 24 AC	SCB26320	SCB26320	SCB26320	SCB26320	SCB26320
Lid Switch electro-magnetical	5140-1195	5140-1195	5140-1195	5140-1195	5140-1195

For controller spare parts please check the Mowden manuals.



9. Maintenance

Normally the refrigerators and controllers are maintenance free.

In general ice build-up is normal on all refrigerators. In order to avoid ice accumulation inside the storage compartment ice, snow or water should be removed from the lid / cabinet top area. The amount of ice and the frequency to remove this depend on the operating and ambient conditions the vessel. When removing the ice, avoid ice falling into the vessel because it will restrict refilling the inventory system.

Although all measures have been taken to avoid ice accumulation it may happen sooner or later the vessel has to be de-iced. For this action the vessel must be taken out of service and warmed up. The samples must be stored in another vessel during this time.

Retrofitting of an Automatic Level Controller

When a vessel which has been used and has not been filled (manually) via the integrated fill pipe, the fill tube could be clogged with ice (at the approximately fill level). The ice is built up by moisture entering from the atmosphere into the open pipe and then freezes once it comes in contact with the cryogenic temperature in the vessel. This must be checked before the controller is installed. In case of a clogged fill tube the vessel must be taken out of service, emptied and warmed up completely to room temperature until all ice and water is removed.



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It might be necessary to wipe the unit dry. Through the removable plate in the platform you also have access to the region below the turntable.

10. Cleaning, taking out of service

For cleaning and disinfection of the vessel suitable and approved solutions must be used. The selection of the right product is in the responsibility of the user. Because of the high number of applications and kinds of stored product Taylor-Wharton does not have the expertise to give a judgment about the effectivity of such solutions.



Spray the surfaces of the vessel with the selected solution. After 5 minutes the solution must be rinsed with 70% solution of alcohol and water. After 15 minutes all liquid must be removed from the container and the container must be wiped dry.

Discarded products have to be professional disposed of. The vessel must be mechanically broken down into its individual parts. All necessary materials from stainless steel, aluminium and aluminium foil can be reused as recyclable materials. All plastics, epoxy tube, glass paper and the molecular sieve must be disposed of as industrial waste or incinerated. Electronic components (controller / control unit) must be supplied to the hazardous waste. Your local authority will give all disposal information.

Important:

In case a vessel has to be returned to your supplier or to the manufacturer it must be cleaned and disinfected. A written statement must be confirmed by the sender (see attachment reclamation return receipt 082011). In case such document is missing the vessel will not be accepted and will be returned to the sender (freight unpaid).



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