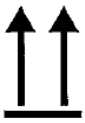
ICBiomedical

User Manual

Cryogenic Storage and Liquid Dewars

Ref: MNL001, Rev D 01/2024

Symbols Glossary

	Name and address of manufacturer.		Pressure range to which the Cryogenic Dewar can be exposed without risk
	Transport and move the Cryogenic Dewar in an upright position		Do not dispose of the Cryogenic Dewar or its components with unsorted, non-recyclable residual waste
	Stacking limit by number		Packaging materials are recyclable Do not dispose of packaging materials with household waste Dispose of packaging in waste collection or waste recycling, if available
	Fragile – handle the Cryogenic Dewar with care		General Warning Sign
	Keep the Cryogenic Dewar away from direct sunlight and heat		Frostbite may occur on contact with cold liquid or gaseous nitrogen, or frosted parts. Warning low temperature. To warn of low temperature or freezing conditions.
	Store the Cryogenic Dewar in a dry location		This Operator Manual contains important warnings and safety instructions
	Temperature range to which the Cryogenic Dewar can be exposed without risk		Wear safety gloves
	Air humidity range to which the Cryogenic Dewar can be exposed without risk		Wear safety goggles

Warning Information

IMPORTANT: READ THIS OPERATOR MANUAL!

Non-compliance with the instructions in this manual may result in personal injury, damage or poor performance of the Dewar!

<table>
<tr><td>  </td><td>The safety instructions in this Operator Manual are designed for your protection:

Please familiarise yourself with the warning and safety instructions before commissioning or maintenance.

The company operating the equipment is solely responsible for ensuring refresher courses are delivered.

Ensure that all necessary precautions have been taken before commissioning a Cryogenic Dewar.</td><td>  </td><td>Only use approved accessories and spare parts:

Cryogenic Storage and Liquid Dewars are supplied with accessories and spare parts approved by IC Biomedical.

Only use the necktube plug supplied with the device. A tight-fitting plug or stopper will cause a pressure increase in the container which may damage the container and/or cause personal injury</td></tr>
<tr><td></td><td></td><td>  </td><td>In the event there is a serious incident occurring with this Cryogenic Dewar, the user should immediately report the incident to the provider and/or the manufacturer. A serious incident is defined as an injury, death, or potential to cause injury/death should there be a reoccurrence of the incident.</td></tr>
<tr><td>  </td><td>All damage may lead to malfunctions:

Check the Dewar before use for defects and damage.

In the event of a suspected malfunction with the Dewar, stop using the device and consult the relevant warning instructions to ensure the Dewar is not used until the necessary repairs have been carried out.</td><td rowspan="2">  </td><td rowspan="2">Ensure there is adequate ventilation:

Inadequate ventilation in a confined area can produce an atmosphere containing insufficient oxygen for breathing and which may cause choking, dizziness, loss of consciousness or even death.

Although nitrogen is non-toxic and non-flammable, it is a colourless, odourless and tasteless gas which is not perceived by human senses and therefore can be inhaled in the air.

Therefore, ensure that the area where the Cryogenic Storage and Liquid Dewar is being used is well ventilated and store the supply container for the liquid cryogenic agent in a well-ventilated area only.

In the event first aid is required: Call the emergency ambulance service immediately and asphyxiation victims must never be left alone.</td></tr>
<tr><td>  </td><td>Do not proceed with any modifications:

Repair and maintenance work on Cryogenic Storage and Liquid Dewars may only be carried out by personnel who have been trained and authorised by IC Biomedical.</td></tr>
<tr><td>  </td><td>When utilizing liquid phase storage, use sample containers designed for immersion in Liquid Nitrogen (LN2).

If not properly sealed, liquid nitrogen can leak into the cryogenic vial over time. During retrieval, liquid nitrogen in the vial or container will evaporate. This will result in expansion of the liquid nitrogen and can result in over pressurized that can rupture the container and cause injury. Always follow the manufacturer's instructions for properly sealing sample containers.</td><td>  </td><td>Sample cross contamination is possible when infectious agents are present and samples are not protected by a properly sealed container.

To reduce the risk of cross contamination, vapor phase storage is recommended when samples can be stored in temperatures from -100C to -196C.</td></tr>
</table>

Extremely cold cryogenic agent can cause freezing injuries:

Cryogenic Storage and Liquid Dewars use liquid nitrogen, an extremely cold cryogenic liquid which reaches a temperature of -196 °C at normal pressure.

Inadvertent contact with liquid or gaseous nitrogen and skin or eyes can cause freezing injuries which are similar to frostbite. Ensure your bare skin does not come into contact with liquids or cold metal surfaces.

Wear eye protection and skin-covering clothing when handling stored samples or carrying liquid nitrogen or in all other cases where contact with cryogenic liquid, cold pipes and cold gas is possible.

Use safety goggles or a face mask, safety gloves and long-sleeved clothing, which is easy to take off.

Description

INTENDED USE

Cryogenic Storage Dewars from IC Biomedical are designed for cryogenic long-term storage and transportation of canisters or vials with biological specimens. Storage is at extremely low cryogenic temperatures using liquid nitrogen as a cryogenic agent which operates under normal atmospheric pressure.

Liquid Dewars from IC Biomedical are designed for storing and dispensing small amounts of liquid nitrogen.

Note: Any other use does not comply with manufacturer recommendations!

IC Biomedical cannot be held liable in the event the use of the device does not comply with this Operator Manual. It is also important that device use is validated to ensure safety to the biological specimens prior to use, see Filling section of this manual.

Note: Untrained personnel must not use Cryogenic Storage and Liquid Dewars!

IC Biomedical cannot be held liable if the device is used by personnel who have not received sufficient training, are not familiar with this Operator Manual and all relevant points on proper use and all relevant safety instructions and if no inspection has been carried out before use and if no regular maintenance has been carried out.

DEVICE OVERVIEW AND KEY FEATURES

Cryogenic Storage and Liquid Dewars from IC Biomedical are state-of-the-art cryogenic storage systems and come with the following key features:

- Ribbed high strength aluminium body
- Durable paint system
- Magneformed necktube design
- Superior vacuum performance with super insulation provides maximum holding times
- uses non-toxic and non-flammable liquid nitrogen as cryogenic agent
- lockable lid

TECHNICAL DATA AND PERFORMANCE CHARACTERISTICS

Refer to specific product specification sheet on www.icbiomedical.com or contact IC Biomedical for further information.

UNPACKING AND INSPECTION

Cryogenic Storage and Liquid Dewars from IC Biomedical are supplied in new condition. For your own protection, schedule enough time to check for any external damage on each delivery.

- Open the freight container
- Use the delivery note to check all items are present while the unit is being unpacked
- Check the delivery for any damage
- Record all components on the inventory list before disposing of any transport material
- **See Filling Instructions**

Note: Any claims due to damage (visible or hidden) or incomplete delivery must be made in writing within 10 (ten) days from receipt of delivery.

In the event of any visual damage or incomplete delivery, please contact the transport company immediately.

In the event of a shortage of spare parts or accessories, please contact IC Biomedical immediately.

IC Biomedical cannot be held responsible for missing components which have not been reported missing within 10 (ten) days from receipt of delivery.

CONDITIONS FOR OPERATION AND STORAGE

Cryogenic Storage and Liquid Dewars from IC Biomedical are developed for operation under the following conditions:

Temperature during operation:	0 °C to +40 °C
Temperature during transport and storage:	-10 °C to +50 °C
Relative humidity during operation:	20% to 80%, non-condensing
Relative humidity during transport and storage:	10 % to 90 %, non-condensing
Atmospheric pressure:	700 hPa to 1060 hPa
Altitude:	up to 2000 m

Note: Do not operate Cryogenic Storage and Liquid Dewars in areas low in oxygen or where there is a fire risk.

Install the Cryogenic Storage and Liquid Dewars in a level, well-ventilated location indoors, free from vibrations and excessive dust and do not install it in direct sunlight, near a heater or other sources of heat.

Leave enough room to fully open the lid.

Ensure there is sufficient ventilation to prevent condensate deposits.

Note: Deviations from admissible environmental conditions may lead to Cryostorage Unit malfunction!

Note: The Cryogenic Storage and Liquid Dewars do not contain any functions which give off any intended radiation and do not use or receive any radiation energy for operation.

DEVICE OPERATION

STORAGE SYSTEM

In order to prevent any unnecessary loss of liquid nitrogen and the formation of ice, the necktube core (stopper) should remain in the container when the stored material is not accessed. When accessing the stored material, the necktube core should not be removed for longer than necessary. When removing material from the canister, pull the canister out sufficiently so that the content can be removed. When the canister is fully extended, the stored material warms up when exposed to room temperature conditions.

Figure 1: ***Inserting or removing canisters***

Some canisters have liquid discharge openings and others do not. If canisters are completely removed from the container, liquid nitrogen may remain in the canister or leak from the base. When removing canisters, briefly hold the necktube to enable the liquid to drain completely and then handle the canister carefully to prevent injury. Avoid direct contact between the canister and bare skin. Appropriate personal protective equipment (cryogenic gloves, face protection and gown) should be worn to protect against splashes.

Note: When the product is added at room temperature, slowly lower the canister into the container to reduce cryogenic agent boiling and cold shock.

FILLING

1. Remove Necktube core.
2. Remove any racks or canisters used for sample storage.
3. Fill the vessel with liquid to desired level.

   Adding liquid nitrogen to a warm container can cause spraying and generates considerable volumes of nitrogen gas, because the cold liquid comes into contact with the surfaces of the warm refrigerator. Slowly add liquid to minimise these effects.
4. Install the racks or canisters used for sample storage and necktube core and cap to hold the canisters in place.

	**Do not overfill!** Overfilling may cause injury through spilt liquids or damage the container.
	On receipt of a new vessel, it is imperative to verify the vacuum integrity of the unit before samples are stored as damage to the freezer can occur during transit. On first fill, add nitrogen to the vessel until a minimum of 12 inches of liquid is contained within the sample space. After 4 to 8 hours, fill the unit again and take a liquid level reading and allow to equilibrate overnight. After 10 to 12 hours of equilibration, recheck the level and ensure that the liquid consumption is not excessive (greater than 2 inches). A visual check for cold spots or surface icing on the outside of the freezer should also be carried out. If the liquid consumption appears excessive or if icing is observed on the surface of the freezer, do not add sample material to the freezer. Contact the distributor/service provider or the manufacturer for advice and resolution.

CARE AND MAINTENANCE OF THE DEVICE

DEFROSTING THE DEWAR

As with all liquid nitrogen storage systems, ice and frost build up over time on Cryogenic Storage and Liquid Dewars from IC Biomedical. Ice and frost can form on the lid if the lid is left open or if the liquid level gets too close to the underside of the lid.

Open the lid fully to defrost the lid. Remove ice and frost from the underside of the lid while waiting for defrosting to complete and then wipe down the relevant areas with a clean, lint-free cloth.

CLEANING AND DISINFECTING THE DEWAR

Cryogenic Storage and Liquid Dewars from IC Biomedical may require cleaning and disinfecting if the type of stored samples is modified or if the device is decommissioned.

Proceed as follows to clean and disinfect the Dewar:

- Remove all stored samples and components
- Leave any remaining liquid nitrogen to evaporate and allow the cryogenic container to reach ambient temperature
- Using a ventilator or fan to create an airflow can speed up evaporation
- Rinse the container with household bleach
- Wash the inner container with a water and detergent solution at a ratio of 40:1
- Thoroughly rinse and dry inside and out before reusing the container
- Remove all remaining water and dry the surface with a hand towel

Note: Always clean and disinfect Cryogenic Storage and Liquid Dewars regardless of the type of stored samples before returning it to IC Biomedical for repairs or maintenance. A decontamination form must be obtained from IC Biomedical customer service and returned with the device when completed.
Never use chlorine-based disinfectants or abrasive cleaning agents, steam pressure or high-pressure cleaners to clean the Cryogenic Storage and Liquid Dewars.

TESTING NORMAL EVAPORATION RATE

Nitrogen consumption results from a combination of evaporation through all components of the Cryogenic Storage and Liquid Dewars and evaporation brought about by the user.

If there is major frost or condensation on outside of container during this time, it would indicate either a weak or no vacuum.

Factors such as age of unit, quantity of inventory, ambient environment, shipping condition, and use of accessories, etc. can negatively affect unit NER.

If you believe a NER test is should be performed, contact IC Biomedical for instructions for your Dewar.

Note: IC Biomedical recommends the customer keeps a spare tank filled with liquid nitrogen on hand for emergency use should a tank in service become damaged or lose vacuum, thus being able to save valuable contents by transferring them into the spare tank.

DEVICE TRANSPORT

Although Cryogenic Storage and Liquid Dewars are robust, they can be damaged if not handled correctly. When moving or transporting the container, hold it upright. Take any necessary precautionary measures to prevent the device from slipping, tipping over, colliding with other objects or falling. Containers holding liquid nitrogen must never be transported in sealed spaces. Ventilation must be ensured in order to replenish the air and prevent any associated risk of asphyxiation.

DEVICE RETURN

In the event the Dewar needs to be returned for repair, maintenance, or replacement, contact IC Biomedical for a RMA number and shipping address to return the Dewar.

Note: Any Dewar returned to IC Biomedical without a RMA number will be returned to the sender's address.

You are responsible for ensuring that the goods are packed appropriately for return shipment.

If required, contact IC Biomedical for instructions on shipment and packaging.

All Dewars returned to IC Biomedical must be cleaned and disinfected before sending. A decontamination form must be obtained from IC Biomedical customer service and returned with the device when completed.

DEVICE DISPOSAL

Cryogenic Storage and Liquid Dewars from IC Biomedical are made of high-quality, recyclable materials and components.

Note: Do not dispose of Cryogenic Storage and Liquid Dewars with normal waste:

The assembled materials including aluminium and aluminium foil can be recycled. Plastics, epoxide pipes, glass paper and the molecular sieve must be disposed of with industrial waste or be burnt.

Dispose of this device and rejected samples in accordance with local regulations.

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