

# USER MANUAL

## Cryogenic Rack Freezer (CRF) Series



phasetwo®

















## Safety



This Operator Manual contains important warnings and safety instructions. Review the entire manual before using the device.

A replacement manual can be downloaded from the website or ordered from your supplier as needed at any point in time.

## SYMBOLS GLOSSARY

	<p>This User Manual contains important warnings and safety instructions.</p>		<p>General information.</p>
	<p>Wear face shield</p>		<p>Liquid nitrogen disposal.</p>
	<p>Wear safety gloves</p>		<p>Asphyxiating atmosphere</p>
	<p>General warning sign.</p>		<p>Use in well-ventilated areas.</p>
	<p>Low temperature warning. Exposure of skin or eyes to liquid or gaseous nitrogen or cold parts may result in frostbite.</p>		<p>Avoid pressure increase due to ice buildup or incorrect lid.</p>
	<p>Air humidity levels at which the freezer can operate without risk</p>		<p>Temperature range at which the freezer can be exposed without risk.</p>
	<p>Device Disposal</p>		<p>Name and Address of manufacturer Date of manufacture</p>



**WARNING:** Liquid nitrogen is extremely cold. To avoid injury from frostbite, take extreme care whenever handling liquid nitrogen, liquid nitrogen storage or transfer vessels, or any objects which have come in contact with liquid nitrogen.



- Leave no area of skin exposed.
- Always wear proper PPE attire over clothing: face shield, cryogenic gloves, and cryogenic apron.
- Use extreme care to prevent spilling and splashing liquid nitrogen during transfer.
- Always keep freezer in the upright position. Do not tilt or lay the freezer on its side.
- Immediately remove any clothing or safety attire on which liquid nitrogen has spilled.
- Seek immediate medical attention for any frostbite injuries due to liquid nitrogen.



**WARNING:** The venting of nitrogen vapors may deplete oxygen in the air, possibly leading to asphyxiation or even death. Do not store or use containers in areas that are small and enclosed or have poor ventilation. The use of an oxygen monitoring system is recommended.



**WARNING:** Do not tightly seal liquid nitrogen container or prevent nitrogen gas from escaping. Also, excessive humidity levels or exposure to rainfall could result in freezing of the cap and possible failure.



**WARNING:** Never use a hollow tube to measure liquid nitrogen level. This could lead to personal injury.



Disposal of liquid nitrogen should only be done outdoors or in areas specifically designed for that purpose. Pour the liquid slowly on gravel or bare earth where it can evaporate without causing damage.



**CAUTION:** Handle the cryopreservation freezer with care.

- Never overfill freezers with liquid nitrogen. Overfilling can cause personal injury or damage to the freezer, voiding the limited warranty. The liquid nitrogen level should always be below the bottom of the neck tube. Overfilling the tank may cause immediate or premature vacuum failure to occur
- Never ship Liquid Nitrogen Dewars or Freezers on their side or upside down. This can lead to vacuum failure and loss of contents
- Remove and insert canisters carefully. Do not scratch neck tube area, scratches can cause premature vacuum failure and loss of contents
- Tampering with or removing the vacuum port will destroy vacuum and void warranty
- Never drop, hit, or strike the unit
- Never spill liquid nitrogen on or near vacuum port

- Never leave the vessel outdoors
- Keep the bottom of dewar clean and away from chemicals, fertilizers, soil, and moisture
- Do not use phasetwo Liquid Nitrogen Dewars or Freezers for transportation
- All performance data published for these products is based on static conditions only



**CAUTION:** Not for liquid oxygen use.



**CAUTION:** Never ingest liquid nitrogen, serious harm or death may occur.



**CAUTION:** If cross-contamination of samples is a concern, vapor storage should be used.



**CAUTION:** In the event there is a serious incident occurring with this device, 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 re-occurrence of the incident.



**CAUTION:** Only use liquid nitrogen rated vials, bags, etc for sample containers. Seal them according to their manufacturer's instructions. Otherwise, liquid nitrogen can leak into them and expand upon sample retrieval.

## Device Overview & Key Features

CRF Series freezers from phasetwo are state-of-the-art cryogenic storage systems and include the following key features:

- Can be used in either liquid phase storage or vapor phase storage
- Uses liquid nitrogen as the cryogenic agent that is non-toxic and non-flammable
- Aluminum vacuum vessel with exceptional vacuum performance

## Unpacking And Inspection

phasetwo Aluminum Liquid Nitrogen Dewars and Freezers are supplied in new condition. Check for any external damage upon delivery.

- Open the shipping box
- Use the packing list to check that all items are present while the unit is being unpacked

- Check the delivery for any damage
- Record all components on the packing list before disposing of any transportation material
- Contact your carrier and report any shipping damage promptly

## Intended Use:

phasetwo’s Aluminum and Stainless Steel Dewar families are designed for long term cryogenic storage and shipment of biospecimens contained in bags, vials, and similar containers. Biospecimens may be intended for research purposes or for possible re-introduction into humans.

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

phasetwo cannot be held liable in the event, the use of the device does not comply with this Operator Manual.

## Intended Location & User Groups

phasetwo Aluminum Dewars and Freezers are intended for use in professional research environments by trained personnel, i.e. clinicians, medical and laboratory technicians, medical and laboratory assistants and other specialist healthcare personnel who have been trained to work with cryogenic liquids and devices.

Optional Accessories and common Replacement Parts can be found on our website: [www.phasetwoCCS.com](http://www.phasetwoCCS.com)



## Technical specifications

CRF-Series Model	CRF-750	CRF-3000	CRF-4800	CRF-6000
Number of Racks	6	6	6	6
Number of 2ml Vials	750	3000	4800	6000
Boxes per Rack	5	5	8	10
LN2 Capacity (L)	35	91	140	175
Outer Diameter (Ins/mm)	18.8 (478)	26.5 (673)	26.5 (673)	26.5 (673)
Overall Height (Ins/mm)	26.3 (668)	27.9 (709)	33.9 (861)	37.9 (963)
Neck Opening (Ins/mm)	4.7 (119)	8.5 (216)	8.5 (216)	8.5 (216)
Evaporation Rate (L/day)	0.27	0.98	0.98	0.98
Static Holding Time (days)	130	93	143	173

Actual evaporation rate and static holding time will be affected by application, atmospheric conditions, and manufacturing tolerances.

*Note: For guidance regarding NER, please contact technical support or your supplier.*

TECHNICAL DATA AND PERFORMANCE CHARACTERISTICS - Please refer to specific product specification sheet on [www.phasetwoCCS.com](http://www.phasetwoCCS.com) or contact phasetwo for additional information.



## Operations



**CAUTION:** Consider the value of stored samples when choosing freezers and distribution of samples among different freezers.



**CAUTION:** Appropriate liquid level and temperature monitoring equipment is recommended.



**CAUTION:** Failure to follow phasetwo's best operating practices as set forth in this manual can result in loss of contents.

## Environmental Conditions

- Indoor use only
- Operating temperature: 0<sup>o</sup> deg C to 40<sup>o</sup> deg C
- Relative humidity: Non-condensing
- Storage temperature: -10<sup>o</sup> deg C. to +50<sup>o</sup> deg C.
- Storage relative humidity: 10% to 90%, non-condensing
- Atmospheric Pressure: 700 hPa to 1060 hPa
- Altitude: up to 2000m



**CAUTION:** Liquid nitrogen is extremely cold. Make sure to wear proper PPE before operation. Avoid spilling liquid nitrogen over the vacuum port as this can shrink the seal and allow air to leak into the vacuum space causing premature vacuum failure.



To ensure maximum performance from your phasetwo Liquid Nitrogen Dewar or Freezer follow the steps below:

1. Remove the freezer from the factory packaging. Remove the cap and any accessories. Lift the cap straight up (do not twist).



2. Fill the unit to desired level. The Liquid level should never be above the bottom of the neck tube (the green tube at the top entrance of tank).
  - a. If you are working with a warm dewar, it is phasetwo's recommendation to slowly add a small amount of liquid to the bottom of the unit and allow it to sit until the liquid nitrogen stops rapidly boiling. Position the vacuum port facing away from the operator or other personnel.
  - b. Follow established safety practices and procedures for transferring LN2.
  - c. Fill the vessel with a funnel or transfer hose when possible. Transfer using the LN2 hose with phase separator or pour LN2 into the freezer using a funnel.
  - d. If you are filling your vessel from a pressurized source, make sure it is a low-pressure source (22 psi / 1.5bar / 150kPa or below).
3. Replace the cap and allow the unit to cool.
  - a. If there is excessive frost or sweating after the first few hours, it would indicate a weak vacuum. Examine the unit carefully.



**CAUTION:** Observe the container for the first 48hrs after the first fill for signs of vacuum failure. Vacuum failure signs are excessive frost or sweating on the outside of the freezer.



**CAUTION:** Use extreme caution when removing canisters. Residual liquid nitrogen may be contained in the canister and leak onto you or your environment.

## Shipping Instructions

phasetwo Liquid Nitrogen Dewars and Freezers are primarily designed to be storage containers. Using them for transport purposes could cause permanent damage to the unit. If you need to transport your inventory at cryogenic temperature, please consider using a phasetwo Vapor Shipper. When transferring empty units to a location, ensure the containers are kept upright. Shipping units in any orientation other than upright can cause permanent damage to the tank causing loss of vacuum.

## General Cleaning

*Do not use any petroleum-based cleaning solutions.*

Inside the vessel: Any cleaning solution that does not react with aluminum, stainless steel, or G10 composite can be used in the sanitation process of a phasetwo Dewar or Freezer. In most cases, any household detergent or mild soap solution is suitable. Other cleaners and disinfectants that can be used safely include hydrogen peroxide, a chlorine/water mixture, and denatured alcohol. The generally accepted practice of using 10% chlorine bleach with 90% water solution is the best method for decontamination of aluminum freezers. It is important that all surfaces being sanitized are thoroughly rinsed and that all cleaner solution residues are removed after cleaning.



Allow the unit to dry completely before putting it into service. It is suggested that the unit is inverted to drain and dry completely.

Outside the vessel: Use a lightly dampened cloth with a mild soap solution.

## Measuring Liquid Nitrogen Level

1. Always wear proper safety attire - face shield, cryogenic gloves, and cryogenic apron.
2. Use a plastic measuring rod for liquid level measurement inside a unit. Using a hollow tube can cause liquid nitrogen to flash through the tube and result in personal injury.
3. Carefully insert the dipstick in the tank as far as possible for 5-10 seconds. Wave the dipstick in the air and the level will be indicated by a frost line. The frost line will be U-shaped; read the level at the bottom of the U.

*Note: A dipstick must return to room temperature before being used again to measure the level.*



**CAUTION:** It is imperative the liquid level is accurately determined. A minimum liquid level of 10% is recommended to maintain temperatures below -150 degrees C.



**WARNING:** DO NOT OVERFILL.

Over-filling may result in personal injury due to liquid nitrogen spillage.

**CAUTION:** When filling the unit, avoid liquid nitrogen coming in contact with the vacuum port. Do not pour the liquid nitrogen on the same side of the vacuum port.

## Operating Guidelines for Critical Storage

1. Written procedures should be maintained for monitoring and maintaining adequate liquid nitrogen levels and temperature for all critical storage.
2. Monitoring process must ensure the liquid level is never below 10% or the established minimum level.
3. Tanks should be filled at least weekly.
4. IQ/OQ is completed on all new tanks.
5. Tank liquid levels, temperatures, and visual inspections for vacuum failure should be checked a minimum of 3 times a week.
6. A spare tank and enough liquid nitrogen to fill it should be maintained at all times.

## Temperature and Level Monitoring Accessories

phasetwo offers a low level and temperature monitor for these devices. Consult the product catalog for the appropriate part number.



## Care & Maintenance

### Normal Evaporation Rate Test:

1. Fill the unit to approximately half full. Refer to OPERATION section step 1, 2 & 3 for details.
2. Allow the unit to stand for a minimum of 24 hours.
3. Weigh unit and record as First Weight [lb.].
4. Allow filled unit to sit undisturbed for another 24 (+/-0.25) hours.
  - a. Consider the accuracy and resolution of your scale to determine if additional days are required between the first and second weights to obtain an accurate NER. Make sure to record the number of hours between the first and second weights.
5. Weigh a second time and record as Second Weight, [lb.].
6. Calculate evaporation rate by using equation below. The difference between the first weight and the second weight is the daily evaporation rate in lbs. This figure roughly signifies the normal evaporation rate, or N.E.R. [Liter/Day]  
$$\text{NER} = (\text{First Weight} - \text{Second Weight}) \times 13.468 / \text{Number of Hours}$$

If there is major frost or condensation on the outside of the container during this time, it would indicate either a weak or bad vacuum. Refer to the static NER specifications on the applicable specification sheet for your model of tank on our website: [www.phasetwoCCS.com](http://www.phasetwoCCS.com). Factors such as age of unit, quantity of inventory, ambient environment, shipping condition, and use of accessories, etc. can negatively affect unit NER.



## Device Disposal

Cryogenic Storage and Liquid Dewars from phasetwo 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, fiberglass tubes, insulator paper and the molecular sieve must be disposed of with industrial waste or be burnt.

*Note: Dispose of this device and rejected samples in accordance with local regulations*



## Warranty

phasetwo warrants to the first end user purchaser that all products will be free of defects in materials and workmanship and will perform in accordance with phasetwo published specifications under normal conditions of installation and use. All warranty coverage periods run from the date of shipment of the goods to the original purchaser.

Cryogenic Dewars & Freezers are warranted for a period of two (2) years, except for vacuum failure which is warranted for a period of five (5) years.



## Returns

Limited warranty: Manufacturing defects are covered under the containers limited warranty.

Evidence of mishandling, such as dents on the outer vessel or misalignment of the inner vessel are not considered manufacturing defects.

If you would like to return goods to phasetwo for any reason, you must first obtain a Material Return Authorization (MRA) number for tracking purposes.

Please have the unit serial number and symptoms available.

Contact your supplier or call phasetwo's Customer Service Department at +1 770.985.1313 or email us at [customerservice@phasetwoocs.com](mailto:customerservice@phasetwoocs.com)



## Accessories & Replacement parts

Ordering Information: Order replacement parts and accessories from your local distributor.

For more information or the name of your local distributor, contact phasetwo at the phone number or email listed on the next page.

CRF Accessories & Replacements		
<b>Boxes</b>		
CRF750	P2-2017549	Polycarb, 25 Cell, 2"(51 mm), Case of 48, 1 Case Required
CRF3000, CRF4800, CRF6000	P2-2017547	Polycarb, 100 Cell, 2"(51 mm), Case of 24, 2 Cases Required
<b>Roller Bases</b>		
CRF750	P2-2015325	Roller Base 18.7" (475 mm)
CRF3000, CRF4800, CRF6000	P2-2015327	Roller Base 27.1" (688 mm)
<b>Low Level Temperature Alarm</b>		
Sensor Guide, LLTA		
CRF750	P2-2023544	Guide, Temperature, & Level
CRF3000	P2-2024231	Guide, Temperature, & Level
CRF4800	P2-2024232	Guide, Temperature, & Level
CRF6000	P2-2024233	Guide, Temperature, & Level

## CCF Accessories & Replacements

Racks		
CRF750,	P2-2023779	Rack 5/2, for 2" (51 mm) high 25 cells box
CRF3000	P2-2023779	Rack 5/2, for 2" (51 mm) high 100/81 cell boxes
CRF4800	P2-2023780	Rack 10/2, for 2" (51 mm) high 100/81 cell boxes
CRF6000	P2-2023781	Rack 10/2, for 2" (51 mm) high 100/81 cell boxes
Lid Assembly		
CRF750	P2-2020335	Lid Assembly with Sensor Slot
CRF3000	P2-2023783	Lid Assembly with Sensor Slot
CRF4800	P2-2023784	Lid Assembly with Sensor Slot
CRF6000	P2-2023785	Lid Assembly with Sensor Slot



## Contact Us

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