USER MANUAL

Vapor Shippers (VS) Series

phasetwo®

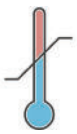
www.phasetwoCCS.com

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

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

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 nitro gen 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 freezer 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: 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

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

- LN2 is contained to ensure no spillage during transit
- 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

Technical specifications

VS-Series Model	Cryo-Courier	VS2-1	VS4-3	VS8-2	VS10-2
LN2 Capacity (L)	2.6	1.5	4.2	8	10
Outer Diameter (in/mm)	7.25 (184)	7.25 (184)	9.2(234)	16(406)	16(406)
Overall Height (in/mm)	16.2 (411)	13.5 (343)	18.38(467)	20.2(514)	23.5(597)
Neck Opening (in/mm)	1.4(36)	1.4(36)	2.78(71)	7(178)	8.5(216)
Canister Dims. (in/mm)	1.2x11 (30.5x279)	1.2x5 (30.5x127)	2.64x11 (67x279)	N/A	N/A
Weight Full (lbs/kg)	13.7(6.2)	9(4.1)	20.88(9.47)	43.2(19.6)	48.7(22.1)
Weight Empty (lbs/kg)	9(4.1)	6.4(2.9)	13.2(6)	28.9(13.1)	32.6(14.8)
Static Evaporation Rate (L/day)	0.15	0.15	0.21	0.5	0.7
Static Holding Time (days)	14	9	20	15	14
1.2 & 2ml Vials (6/cane)	18	N/A	102	200 (2 each 100-cellboxes)	500 (5 each 100-cellboxes)
1/2cc Straws (10/cane)	30	N/A	280	N/A	N/A

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

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

TECHNICAL DATA AND PERFORMANCE CHARACTERISTICS - Please refer to specific product specification sheet on 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 temperature monitoring equipment is recommended. Temeprature probes will decrease whole time by increasing the NER, plan accordingly.

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

Before filling the cryogenic vapor shipper for the first time, record the tare weight and serial number of each container. Recording the "as received" tare weight is without the inventory control system but with the neck plug.

Environmental Conditions

- Indoor use only
- Operating temperature: 0^0 deg C to 40^0 deg C
- Relative humidity: Non-condensing
- Storage temperature: -10^0 deg C. to $+50^0$ 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.

Charging Process

The charging of vapor shippers must be carried out by an approved member of the team.

Note: When receiving precharged shippers, to optimize hold time, it is recommended to recharge them following the below procedure excluding the 24 hour cooldown step mentioned in the last sentence of step 2.

Step 1. Be sure there is adequate ventilation.

Adding liquid nitrogen to a warm container may cause splashing and will generate a significant volume of nitrogen gas.

Note - Add liquid nitrogen slowly to minimize these effects. Keep your head clear of the heavy volume of nitrogen vapor that may be produced. It is extremely cold and could cause personal injury.

WARNING: DO NOT OVERFILL.
Over-filling may result in personal injury and damage to the shipper and facility 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.

Step 2. Place the unit on a scale and take the tare weight without the canister but with the neck plug. Continue topping off the dewar with liquid nitrogen until the liquid stops boiling and is at the bottom of the neck tube(green tube at the top entrance of the tank). The VS8-2 has a neck tube that continues into the sample area of the tank. The VS8-2 must be filled to a height between 8 & 9 inches from the bottom of the sample chamber, see the below figure-1. After each addition of liquid nitrogen replace the neck plug. If the dewar is not already cold from a previous shipment, allow the dewar to cool down for 24 hours to reach steady state before proceding to step 3.

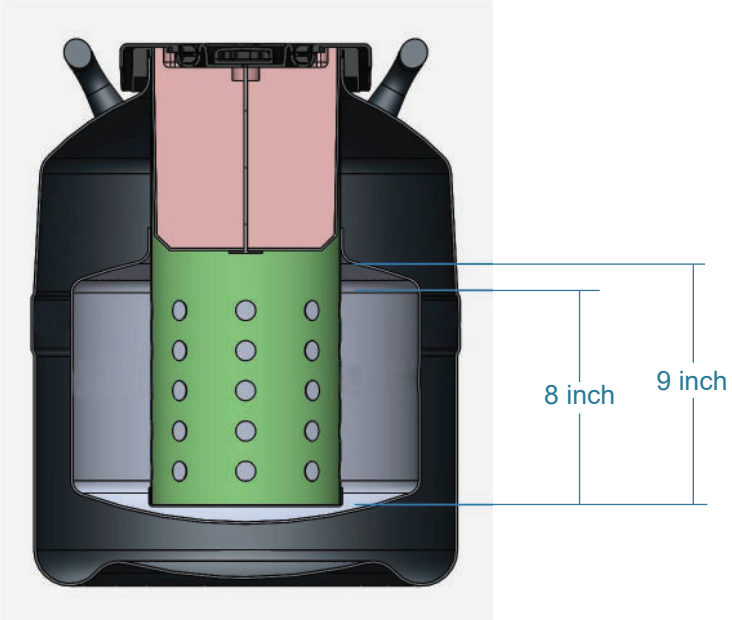


Figure-1

CAUTION: Units must be pre-cooled before charging. Failure to do this may result in reduced hold times.

Step 3. Allow the unit to charge for 2 hours, add liquid nitrogen as needed to maintain the original liquid level.

Step 4. a. Pour out the remaining liquid nitrogen by tipping the dewar to a 45 degree angle for 10 seconds.

b. After a waiting a period of 5 minutes, pour off the residual liquid for 5 seconds at a 45 degree angle.

Step 5. In order to ensure a proper charge, weigh the unit. A VS2-1 should increase by 2.67lbs(1.25kg). A VS4-3 should increase by 7.66lbs(3.5kg). A cryocourrier should increase by 2.7lbs(1.22kg). A VS8-2 should increase by 14.3lbs(6.49kg). A VS10-3 should increase by 17.8lbs(8.07kg).

Note: This number can vary and one should not assume the dewar was not poured off correctly if it is heavier than anticipated.

CAUTION: Failure to charge the shipper properly could result in unsatisfactory hold times.

The material to be stored in the refrigerator/shipper, as well as the canister should be pre-cooled before being placed inside the shipper.

Pre-cool the material and inventory control system to liquid nitrogen temperature and place it in into the necktube. Install the necktube core and cap to hold the canister in place.

CAUTION: Shipper must be kept upright when in use. The holding time will be drastically reduced when the unit is on its side. Liquid nitrogen spills can be avoided by following the above-mentioned filling process.

For critical operations phasetwo recommends IQ/OQ be completed on each shipper.

Inserting or Removing Canisters/Racks

The neck plug should remain on the container when the stored or shipped material is not being accessed to prevent unnecessary loss of liquid nitrogen and accumulation of ice.

When removing material from the canister/rack, withdraw the canister/rack just far enough to remove contents, and do so as quickly as possible. Completely withdrawing the canister/rack will expose the stored material to room temperature conditions.

When room temperature product is added, slowly lower the canister/rack into the shipper to reduce the boiling of liquid nitrogen and the surge of cold nitrogen gas. When inserting the canister/rack, tilt the bottom of the canister/rack in the direction of the index ring notch.

Care & Maintenance

Normal Evaporation Rate (NER) 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] NER = (First Weight – Second Weight) x 13.468/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. Factors such as age of unit, quantity of inventory, ambient environment, shipping condition, and use of accessories, etc. can negatively affect unit NER.

If these conditions persist, contact your supplier or phasetwo customer service department at +1 770.985.1313

E-mail us at customerservice@phasetwoccs.com for information on how to conduct a NER test.

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 avaiable.

Contact your supplier or call phasetwo’s Customer Service Department at +1 770.985.1313 or email us at customerservice@phasetwoccs.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.

The VS Series cryogenic dry shipping containers manufactured by phasetwo are compliant with the 54th Edition of the International Air Transport Association (IATA) Dangerous Goods Regulation PI202-Packing Instruction 202 for Open Cryogenic Receptacles.

Contact Us

United States	: + 1 770.985.1313
Sales Support / Order Placement	: customerservice@phasetwoCCS.com
Technical Services	: techservices@phasetwoCCS.com

Manufacturer

Phasetwo, A Div. of Tomco2 Systems Co
1110 Ridgeland Pkwy Ste. 110
Alpharetta, GA 30004 USA

Tel: + 1 770.985.1313
www.phasetwoCCS.com

Authorised representative

EC REP

MedEnvoy Global B.V.
Prinses Margrietplantsoen 33 - Sulte 123
2595 AM The Hague The Netherlands