

MVE XC Series

MVE XC Series tanks have capacities ranging from 700-5000 straws and 150-1000 vials. Manufactured to a world class level of excellence and backed by a 5 year vacuum warranty, these durable, lightweight units can be relied on to perform in the most demanding of environments. The XC Series is designed for the user who requires large capacity storage and low liquid nitrogen consumption in a convenient lightweight package.



Product Specifications

MODEL	XC Millennium 20	XC 21/6	XC 22/5	XC 32/8
MAX. STORAGE CAPACITY				
Number of canisters	6	9	6	9
No. of 1/2 cc straws 10/cane	720	-	2400	2520
No. of 1/2 cc straws 1 Level Bulk	1122	3870	3666	3960
No. of 1.2 & 2.0 ml vials 5/cane	210	-	810	855
No. of 1.2 & 2.0 ml vials 25/box	-	-	-	-
PERFORMANCE				
Liquid nitrogen capacity L	20.5	21	22.4	32
Static evaporation rate L/day*	0.095	0.35	0.35	0.35
Normal Working Duration days**	140	38	40	57
UNIT DIMENSION				
Neck opening in (mm)	2.18 (55.4)	3.5 (89)	3.81 (97)	3.81 (97)
Overall height in (mm)	25.7 (652)	17.2 (438)	22 (559)	21.5 (546)
Outside diameter in (mm)	14.5 (368)	18.2 (464)	14.5 (368)	18.2 (464)
Canister height in (mm)	11 (279)	5 (127)	11 (279)	11 (279)
Canister diameter in (mm)	1.65 (41.9)	2.75 (70)	3.09 (79)	2.62 (67)
Weight empty lb. (kg)	23 (10.5)	30 (13.6)	26 (11.8)	30 (13.6)
Weight full lb. (kg)	59.5 (27)	62.5 (28.3)	66 (30)	87 (39.5)

FIVE Year Vacuum Warranty

Conforms to MDD 93/42/EEC, the Medical Device Directive for the EU.



Cryo Sleeves



Canes



Measuring Stick



Roller Base



Cork



XC 33/22	XC 34/18	XC 43/28	XC 47/11-6SQ	XC 47/11-6	XC 47/11-10
6	6	6	6 sq.	6	10
1260	2100	1260	-	4500	3500
1764	3000	1764	-	6216	5000
360	630	360	-	1320	1050
-	-	-	750	-	-
33.4	34.8	42.2	47.4	47.4	47.4
0.14	0.18	0.14	0.39	0.39	0.39
154	123	193	76	76	76
2.75 (70)	3.5 (89)	2.75 (70)	5 (127)	5 (127)	5 (127)
26 (660)	26.6 (675)	26.4 (670)	26.5 (673)	26.5 (673)	26.5 (673)
18.2 (464)	18.2 (464)	20 (508)	20 (508)	20 (508)	20 (508)
11 (279)	11 (279)	11 (279)	-	11 (279)	11 (279)
2.22 (56)	2.81 (71)	2.22 (56)	-	4 (102)	2.81 (71)
34 (15.4)	34 (15.4)	36 (16.4)	42 (19)	42 (19)	42 (19)
94 (42.5)	96 (43.5)	111 (50.5)	120.4 (54.6)	120.4 (54.6)	120.4 (54.6)

* Static evaporation rate and static holding time are nominal. Actual rate and holding time will be affected by the nature of container use, atmospheric conditions, and manufacturing tolerances.

** Normal Working Duration is an arbitrary reference, to estimate container performance under normal operating conditions. Actual working time may vary due to current atmospheric conditions, container history, manufacturing tolerances and any individual patterns of use.



Phase Separators



Gloves



Vapor Inserts



25 Vial Boxes



Cryopreservation

All biological materials deteriorate over time—this is an unavoidable physical phenomenon. When the need to study and/or store biological materials arises, a long-term reliable storage solution is needed; cryopreservation is the answer. When exploring cryopreservation as a storage solution, many factors must be considered, including, but not limited to: Critical Temperature, Storage Phase, and Capacity. MVE offers a complete line of storage solutions in liquid or vapor, with temperatures ranging from -125°C to -190°C.

Understanding the materials to be stored is vital to determining the critical temperature. Most biological materials must be stored below the Glass Transition of Water (T_g) before long term degradation is minimized. The value of T_g is most commonly agreed to be between -130°C and -135°C. Storage above this temperature will result in poor long term viability of samples. Storage conditions that transition above and below this value will accelerate degradation of samples. Knowing this, one can make the conclusion that colder is better. All MVE freezers are created to maintain the coldest and most consistent temperature in their designed operating ranges. Many models can maintain near liquid nitrogen temperature in the warmest part of the freezer, minimizing transient temperature conditions.

Determining the phase of storage is nearly as critical as determining the proper storage temperature. Storing in liquid phase



provides the longest possible hold time and coldest possible temperature. Vapor storage minimizes the possibility of cross contamination and exposure of samples to liquid nitrogen. MVE provides a complete line of freezers that can meet any storage solution in liquid or vapor.

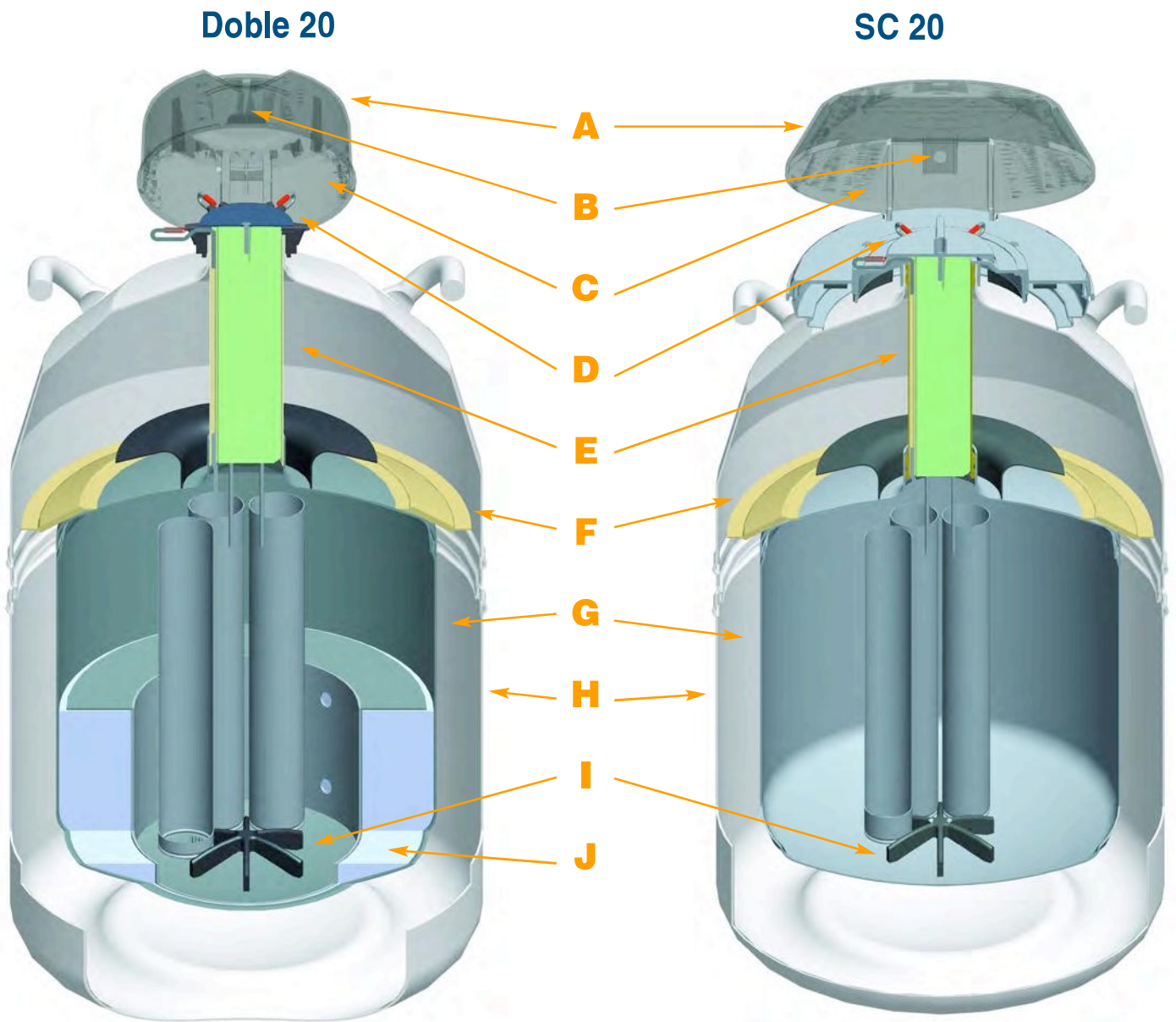
Selecting the proper size freezer is important to ensuring the long term efficiency and cost effectiveness of the repository. MVE offers the widest, most complete product line in the world and can meet the needs of the small research laboratory as well as the largest long term repository. Your local MVE distributor can help you select a freezer that is large enough to meet your current needs and provide room for growth.

Recommended maximum temperature for storage of biological samples.

MATERIAL TO BE STORED	VOLUME	CONTAINER	INVENTORY CONFIGURATION	CRITICAL TEMPERATURE
Algae	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Blood	0.5 - 500 mL	Cryovial/Blood Bag	Boxes or canes/bag rack	-150°C
Cells:				
Animals				
/Human	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Plant	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Embryos		Straw	Canes	-150°C
Fungi:				
Mycelium	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Hybridomas	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Phage:				
Libraries	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Protozoa	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C
Viruses: Animal				
In Cells	0.5 - 1.0 mL	Cryovial	Boxes or canes	-150°C

Source: F. Simeone, American Type Culture Collection, Manassas, VA

Product Overview: Aluminum



A Durable, tamper-proof lid design

B Locking tab

C Easy maintenance lid design

D Color-coded canister/lid numbering system

E High strength neck tube reduces liquid nitrogen loss

F Advanced chemical vacuum retention system

G Insulation to provide maximum thermal performance

H Superior strength, lightweight aluminum construction

I Spider design for easy retrieval and insertion of product canisters

J Hydrophobic liquid nitrogen absorbent system

MVE

Tech Tips

A monthly publication for the MVE Biological Products Distributors

REPLACEMENT DEWARS AVAILABLE AT GREATLY REDUCED PRICES:

Model	Description	Price	Qty
XC 47/11-6	Unit slightly above NER spec	\$565.00	1
XC 32/8-10	Ten canister, 32 liter, 8 week dewar	\$430.00	1
Lab 5	Repumped, retested, repainted	\$201.00	3
Lab 10	Refurbished, retested, new c/c	\$227.00	1
Lab 4	Completely refurbished	\$190.00	2
CryoSystem 8	6.5" ID neck tube, 90 liter capacity, no racks (available upon request) 1800 vial Capacity	\$650.00	7
CryoSystem 3600	Similar to a CryoSystem 4000 with 4-9 tier racks, 3600 vial capacity	\$850.00	2
CryoSystem 4000	Refurbished with racks and c/c included	\$950.00	1
Cryoshipper XC		\$1,000.00	1
SC 20/12V	This is both a vapor shipper and a liquid dewar, similar to SC 20/20	\$550.00	1
XC 35/12	35 liters with 10 canisters, unit carries a one year warranty	\$550.00	1

OPERATING INSTRUCTIONS FOR LIQUID NITROGEN DEWARS

GENERAL DESCRIPTION

The SC, XC, & LAB series container is a vacuum insulated container of aluminum with fiberglass neck construction providing you with the highest efficiency possible in liquid nitrogen storage. Use the container for inert fluids only. Liquid oxygen is not compatible with fiberglass material and should not be stored.

A sharp blow to the outer vessel can damage the neck tube or start a vacuum leak. Use caution and common sense in handling the container.

Upon receipt of the container, examine it for any evidence of damage during shipping. Watch after the first fill for any signs of vacuum loss, such as frost or sweating on the outside jacket. (Some frost near the tip just after filling is normal.)

NOTE

Fill the container with a funnel or transfer line when possible. Avoid spilling liquid nitrogen over the vacuum cap near the neck as this can shrink the seal and allow air to leak into the vacuum space.

OPERATING INSTRUCTIONS FOR LIQUID NITROGEN DEWARS CON'T

A. CAUTION (using aluminum SC, XC, LAB series)

To avoid injury by frostbite, use 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 areas of skin exposed.
- Always wear proper safety attire over clothing: face shield, cryogenic gloves, cryogenic apron
- Never overfill liquid nitrogen vessels.
- Always keep liquid nitrogen vessel in an upright position.
- Do not tightly seal liquid nitrogen container or prevent nitrogen gas from escaping.
- Use extreme care to prevent spilling and splashing liquid nitrogen during transfer.
- Immediately remove any clothing or safety attire on which liquid nitrogen has been spilled.
- Get immediate medical attention for any frostbite injuries due to liquid nitrogen.

B. FILLING INSTRUCTIONS

To avoid damage to your aluminum cryogenic vessel which may result in premature vacuum loss it is important that the following procedure be used during the addition of liquid nitrogen to a warm vessel and on subsequent additions.

1. Slowly pour liquid nitrogen to new or warm vessels.
2. Allow liquid nitrogen to sit in covered vessel for 2 hours to completely cool inner
3. Fill your vessel to the desired level after the 2 settling (cooldown) time.
4. If you are filling your dewar from a pressurized source, make sure that the source tank is at a low pressure (22 PSI or below).
5. If transfer hose is used for extracting liquid nitrogen from a pressurized liquid source always use a phase separator on the end of the hose.
6. Remember to always wear proper safety attire over clothing; face shields cryogenic gloves and apron.
7. Never overfill your dewar with liquid nitrogen. Overfilling the tank may cause immediate or premature vacuum failure to occur.

C. MEASURING LIQUID NITROGEN QUANTITY

1. Use wooden or plastic dipstick. Never use a hollow tube to measure liquid nitrogen.
2. Level will be indicated by frostline, which develops when dipstick is removed.

D. LIQUID WITHDRAWAL

1. liquid withdrawal for the LAB units is always done by pouring or utilizing a withdrawal device. Withdrawal device pressurizes to approximately 5 psi and the pressure forces liquid up the withdrawal tube out the valve.
2. Always wear proper safety attire; shield, gloves and apron.

OPERATING INSTRUCTIONS FOR LIQUID NITROGEN DEWARS CON'T

REPLACEMENT PARTS

MODELS	SC3/3	SC8/5	SC11/7	SC16/11	SC20	SC36
Canister	9710601	9710611	9710091	9721489	9710101	9710101
Cork/cover	10507059	10507059	10507059	10507438	10726817	1072681
Pumpout caps	3911217	3911217	3911217	3911217	3911217	3911217

MODELS	XC20/20	XC21/6	XC22/5	XC32/8		
	XC33/22	XC34/18				
Canister	11006344	9721469	9719349	9719339	9719319	9719309
Cork/cover	11028236	10507024	10506996	10507454	10507067	10507489
Pumpout caps	3911217	3911217	3911217	3911217	3911217	3911217

MODELS	XC35/12	XC43/28	XC47/11-6	XC47/11-10	XC47/11-6 SQ.
Canister	10854966	9719319	9719299	9719289	9723199
Cork/cover	10855723	10507067	10721397	10726711	10721397
Pumpout caps	3911217	3911217	3911217	3911217	3911217

MODELS	LAB 4	LAB 5	LAB 10	LAB 20	LAB 30	LAB 50
Cork./cover	10588362	10580299	10580299	10580475	10580459	10580459
Pumpout caps	3911217	3911217	3911217	3911217	3911217	3911217

WARNING: the venting of nitrogen vapors will create a dilution of the air's oxygen concentration necessary to support life. Exposure to this diluted atmosphere can cause asphyxiation or even death. DO NOT store or use liquid container in areas that have poor ventilation. Place liquid container outdoors or in a well-ventilated area. Failure to comply with this warning may cause serious personal injury including death.

NEW TECHNICAL SERVICE NUMBER

MVE Technical Service person will be moving to the Burnsville Facility. The new direct phone number is 952-882-5168, pager 612-579-8367, fax 952-882-5175, email address jim.bachman@chart-ind.com

For copies of past Tech Tips or for more information on maintaining your nitrogen storage dewars please contact Jim Bachman at (952) 882-5168, Pager (612) 579-8367, Fax (952) 882-5175.

Transfer Liquid Nitrogen With Care.

The primary hazards of transferring liquid nitrogen from one container to another are spilling and splashing. Special funnels (with the top partially covered) will reduce splashing. For MVE cryo-biological storage containers, a self pressurizing discharge device is available that allows controlled LN2 withdrawal up to two liters per minute. (Specify the container model number when ordering.) Always follow carefully the instructions on containers or accessories when transferring liquid nitrogen. NEVER overfill the containers. Filling above the specified level is likely to produce spillage when the necktube core is replaced.

Use Solid Metal Or Wooden Dipsticks

Because of the extremely low temperature of liquid nitrogen, plastic measuring devices tend to become very brittle or even shatter. NEVER use hollow rods or tubes; the gasification and expansion of the rapidly cooling liquid inside the tube will force liquid to spurt from the top of the tube. Always wear insulated or heavy gloves when measuring.



Nitrogen Gas Is Colorless, Odorless, Tasteless...And Deadly.

It reduces the concentration of oxygen and can cause suffocation. Since it can not be detected by sight, taste or smell, it may be inhaled as if it were air. That is why liquid nitrogen must always be stored and used ONLY in areas that are fully ventilated. As liquid nitrogen evaporates, the resulting nitrogen gas displaces the normal air -- and breathing air that is less than 18% oxygen may cause dizziness, unconsciousness and even death.

Nitrogen Gas Is Extremely Cold.

The eyes can be damaged by exposure to this gas even when the contact is too brief to affect the skin.

Nitrogen Gas Is Invisible.

When liquid nitrogen is exposed to the air, the cloudy vapor that you see is condensed moisture, not nitrogen gas. The gas itself is invisible.

ACCESSORIES

ROLLER BASE

The roller base allows convenient movement of containers. It is fabricated from painted cast aluminum. Call your customer service representative for part number to fit your dewar.

CANES AND VIALS

Aluminum canes are designed to hold vials or ampules and feature visual identification for quick retrieval. Standard size canes accommodate vials available from MVE in 11mm, 12mm, 14.5mm, 15mm, 16mm, and 20mm diameter.

SELF PRESSURIZING DISCHARGE DEVICE

The self pressurizing discharge device allows controlled liquid nitrogen withdrawal from MVE cryogenic containers. It allows up to two liters per minute to be extracted. The device is installed without canisters and is ready to use in 12 hours or immediate use if externally pressurized.

CRYO-GLOVES

Cryo-Gloves are available in three sizes (M, L, XL) and three lengths for use with liquid nitrogen vapor phase and ultra-low temperature freezers.

Liquid Nitrogen Container



Handling Instructions

A little caution and a little common sense are needed for the safe handling of liquid nitrogen in cryo-biological storage containers. You should always be aware of two primary facts concerning liquid nitrogen:

- **It is extremely cold. At atmospheric pressure, liquid nitrogen boils at 320 degrees below zero (-196°C).**
- **It produces a large amount of gas. One liter of liquid nitrogen vaporizes into almost 25 cubic feet of nitrogen gas.**

Either of these two properties can produce personal injury or property damage. Do not handle liquid nitrogen until you have read the cautionary notes in this booklet. The MVE Cryo-Biological System is a versatile, integrated family of A.I. containers whose reliability and safety can best be assured by following the precautions outlined in this booklet.



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Handle Liquid Nitrogen With Care.

Contact with skin may cause serious frostbite. Because it is extremely cold, it can freeze human flesh almost instantaneously.

Do Not Allow Objects Cooled By Liquid Nitrogen To Touch Your Bare Skin.

Even worse than sticking your tongue against the bottom of an ice-cube tray fresh from the freezer, objects cooled by liquid nitrogen may stick to the skin and tear flesh away when you attempt to remove the object. Use forceps or tongs to remove straws or canes from the storage container.

Protective Clothing Can Reduce The Hazards Of Handling Liquid Nitrogen.

Insulated or heavy leather gloves should always be worn when handling any object that has been in contact with liquid nitrogen. Loose fitting gloves are recommended so that they may be discarded quickly in the event that any liquid nitrogen splashes into them. If you are working with open containers of liquid nitrogen, boots should be worn and trousers should not be tucked into boots, but worn outside.

Special Containers Are Required.

MVE cryo-biological storage containers are specifically designed and constructed to withstand the extreme temperature variances involved in handling liquid nitrogen. These special containers should be filled slowly to avoid the expansion stress that occurs as a result of the rapid cooling. Too much stress can damage the container.

Do Not Seal The Containers Tightly.

MVE cryo-biological storage containers are designed to function with little or no internal pressure. The use of any tight-fitting stopper or plug that prevents the adequate venting of gas builds up pressure that could severely damage or even burst the container. Even icing or accumulated frost can interfere with proper venting and containers should be checked for such obstructions. To assure safe operations, only the original neck-tube core or approved accessories for closing the necktube should be used.

To Lessen The Danger From Nitrogen Gas,

liquid nitrogen should be disposed of ONLY in outdoor areas. The liquid should be poured slowly onto the ground (never on pavement) where it can evaporate into the open air.



First Aid.

If anyone working with liquid nitrogen becomes dizzy or loses consciousness, move them to a fully ventilated area at once and call a doctor. If they appear to have difficulty breathing, administer oxygen. Where breathing has stopped, apply artificial respiration immediately and then give oxygen. Keep the person warm and as calm as possible until the doctor arrives.

If a person is exposed to liquid nitrogen or gas, the affected tissue should be restored to normal body temperature (98.6°F) as quickly as possible. Remove or loosen any clothing, belts, collars, etc., that might restrict circulation to the affected area, and bathe or immerse the area in water heated to 108°F.

DO NOT heat water above 112°F. Protect the injured tissue from further damage or infection and call a doctor. DO NOT rub the affected area in an attempt to improve circulation and DO NOT allow the person to smoke or drink any alcoholic beverage.



Store Containers In Clean, Dry Areas.

Moisture, manure, caustic cleanser, chemicals, or other substances which might cause corrosion should be removed at once. Wash container with plain water or mild detergent solution and then wipe dry.

Transport Containers With Care.

Closed trucks or vans are not recommended for transporting cryo-biological storage containers; ventilation is required to prevent nitrogen gas from accumulating. In addition, containers should be secured in an upright position to prevent spillage and they should be protected from heavy jolting or colliding with one another.

Handle Containers With Care.

A few simple precautions in the handling of your cryo-biological storage containers can protect you and your investment. Containers should always be stored in an upright position. Tipping the container or letting it lie on its side can result in spillage and may damage the container or the materials stored in it. Dropping the container or subjecting it to severe vibrations may damage the vacuum insulation system. Walking or dragging containers could result in a partial or complete vacuum loss. For containers that cannot be easily and safely carried, the MVE Handler or the MVE Roller Base can provide safe and easy movement of containers.

Container Contents.

The extremely low temperature of the liquid nitrogen or nitrogen gas provides the protection of the materials stored in the MVE cryo-biological storage containers. When all the liquid nitrogen has evaporated, the temperature inside the container will rise slowly. The rate of evaporation depends upon the age, condition and use pattern of the container. Just like our kitchen refrigerator, opening and closing the container or moving it about will reduce its cooling efficiency. You should check the liquid nitrogen level in your containers at least weekly; make sure there is enough liquid nitrogen in the container to maintain the required temperature to avoid damage to the ampules, canes, straws or vials stored in the container. If the liquid has evaporated faster than usual or if the container is covered with frost or condensation, the vacuum system may be damaged. In such instances, transfer the contents to another container and remove the damaged one from service at once.

For more detailed information on handling cryogenic liquid send for CGA pamphlet P-12:

COMPRESSED GAS
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