PrincetonCryo.com
Cryogenic Delivery and Storage Systems

MVE Tech Tips

A monthly publication for the MVE Biological Products Distributors *July 2001*

OPERATING INSTRUCTIONS FOR VAPOR SHIPPERS:

The shipping of Biological material is becoming more and more common. This has brought up the need for a new and complete manual on the proper handling and charging of Vapor Shippers. This new manual is now available from our literature department and is included with every new unit. Please notice the new exception letter included with the manual. This letter refers to the changed regulations and lists the new paragraph numbers. Any questions, please contact Technical Service at 952-758-8520

GENERAL DESCRIPTION

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

These high quality vacuum insulated units are constructed of durable material, compatible with the divergent temperature extremes and broad applications of cryobiology. The absorbent material used in construction after 1993 is hydrophobic (will not absorb water) which unlike calcium silicate does not need to be periodically heated to remove absorbed moisture.

A. SAFETY

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.

CAUTION (using aluminum SC or XC vapor shipper 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 area of skin exposed.
- Always wear proper safety attire over clothing: face shield, cryogenic gloves, cryogenic apron.

- Never overfill vapor shippers with liquid nitrogen.
- Always keep vapor shippers in 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 ensure maximum performance from your MVE vapor dewar simply follows the listed steps just prior to shipping to final destination:

1. Open container that dewar is in and remove cork/cover. (do not twist)
2. Fill unit to bottom of neck tube.

A. Follow established safety practices & procedures for transferring

B. Transfer using Ln2 hose with phase separator or pouring container & LN2. approved funnel.

C. Canisters are to remain inside.

TO TEST FOR DEWAR EFFICIENCY FOLLOW STEPS 1 –4 AND PROCEDE TO #6

1. Replace cork/cover & allow unit to stand for 24 hours. (cooling down unit)
2. weigh unit (first weight) and record
3. Pour off excess liquid just prior to shipment.
4. Allow filled unit to sit for another 24 hours
5. weigh second time
6. Never overfill your dewar with liquid nitrogen. Overfilling the tank may cause immediate or premature vacuum failure to occur.
7. Calculate evaporation rate. The difference between the first weight and the second weight is the evaporation rate in lbs. This can be converted to liters by multiplying lbs. X .5606. This figure roughly signifies the N.E.R. (first weight – second weight) X .5606 = liters/day.
   A. Also, during this time take note of any uncommon occurrences such as excess frosting or sweating along the outside of dewar. Take note of excess nitrogen boil off especially after the second weight. LN2 should settle (cease boiling) after an hour.

The MVE vapor shipper were primarily designed as vapor shipping containers; however, they can also be used for immersion of samples. 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.
Use the weight table below as a general guide to determine if your vapor shipper is fully charged:

MODEL	EMPTY WEIGHT	WEIGHT FULL (SUGGESTED)	STATIC HOLD TIME (DAYS)
SC2/1V	6	8.8	8
SC4/2V	11	18	14
SC4/3V	13	20.6	21
CRYOSHIPPER XC	30	47	14
CRYOSHIPPER	27	37.5	10
CRYOMOOVER	30.5	38	12
MINI-MOOVER	8	11.6	14
XC20/3V	23	35	23
SC20/12V	30		85

C. REPLACEMENT PARTS

MODELS	**SC2/1V**	**SC4/2V**	**SC4/3V**	**SC20/12V**
canister	9722219	9710171	9719079	9710101
Cork/cover	10507219	10507032	10507083	10726817

MODELS	**XC20/3/V**	**CRYOSHIPPER**	**CRYO XC**	**CRYOMOOVER**
Canister	11022731	see brochure	see brochure	10654497
Cork/cover	11016745	10509556	10509556	10654500

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

D. SHIPPING INSTRUCTIONS

Dewar is charged for 24 hours for full absorption capacity. Generally dewar will be 60% charged at 8 hours, 80% charged at 12 hours and 100% charged at 24 hours. Prior to packaging dewar for shipment the entire contents of liquid nitrogen must be removed. This is usually done by pouring out excess liquid nitrogen until no liquid is visible on the bottom of the inner dewar. place in bio-samples, package dewar and ship. The plastic-shipping container provided by MVE/Chart is recommended to help keep dewar in upright position. IF DEWAR IS SHIPPED ON ITS SIDE IT WILL ONLY PROVIDE 40% OF THE SPECIFIED HOLD TIME. IF SHIPPED UPSIDE DOWN IT WILL ONLY PROVIDE 10% OF HOLD TIME CAPACITY. Remember that all MVE vapor shippers can also be used for liquid nitrogen storage as well, so it is imperative that all liquid nitrogen be removed so dewar remains classified as a vapor shipper. If liquid nitrogen is visible in the bottom of the inner it then becomes a liquid shipper and the exception status is void. The liquid inside is now classified as hazardous material.

LETTER EXPLAINING EXCEPTION

This is concerning the applicability of the Federal Hazardous Material Regulations to the shipment of refrigerated samples in the "Dry Shipper" container.
A "Dry Shipper" package consists of an outer container that is lined with an absorbent material. The container is charged with nitrogen refrigerated liquid which is absorbed into the container lining. The charged, completed package serves as a refrigerated container for the shipment of samples.
In consideration of the above. Consultation with the Research and Special Programs Administration of the DOT has determined that the use of nitrogen refrigerated liquid charged "dry shipper" containers for the shipment of samples falls within the regulation exception provided in 49CFR 173.320 paragraph (a) of the section states the requirements of this subchapter do not apply to atmospheric gases and helium when used in the operation of the process system' such as a refrigeration system. Paragraph (c) of 173.320 pertains to air transport of same refrigeration system.
For exception status of air shipments please refer to IATA-Dangerous Goods Regulations fore nitrogen refrigerated liquid. This falls in the class of 2.2 non-flammable gas, packing instructions 202 with special provisions A-800. For answers to questions regarding shipping regulations contact MVE, AI-Cryo-Biological Tech Service Representative @ 888 683-2796.

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.