



WORTHINGTON
INDUSTRIES

CX Series

**Cryo Exchange
Vapor Shippers**



Safety

Before using any cryogenic refrigerator, read the *Handle with Care* booklet provided with the unit. It details safety precautions that must be understood before using the equipment. If a replacement booklet is needed, order publication *Handle with Care* from your supplier. Following are a few of the safety precautions described in the *Handle with Care* booklet. Please be sure to read the entire booklet.

Store and use these containers only in well ventilated areas. In a confined area, nitrogen gas from these units may cause suffocation by displacing air needed for breathing. Install a suitable oxygen monitor.

Do not touch liquid or cold metal surfaces with your bare skin. The liquid nitrogen refrigerant in these containers is **extremely cold:** -196°C (-320°F). Exposure of

skin or eyes to liquid, cold gas or frosted parts could result in a severe frostbite-like injury. Because of the extremely low temperature, a face shield and gloves must be worn when transferring liquid nitrogen and material into or out of these containers.

Use only the necktube core supplied with this unit or a listed replacement part. A tight fitting plug or stopper will cause a pressure increase in the container that may damage the container and/or cause personal injury.

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

Operation

Important note: Before filling the CX for the first time, record the tare weight and serial number of each container. Recording the "as received" tare weight on the container itself is recommended.

Filling: Adding liquid nitrogen to a warm container may cause splashing and will generate a significant volume of nitrogen gas as cold liquid contacts warm refrigerator surfaces. Add liquid slowly to minimize these effects. Be sure there is adequate ventilation. Keep your head clear of the heavy volume of vapor that may be produced. It is extremely cold and could cause personal injury.

Operation, Continued

WARNING

DO NOT OVERFILL. Over-filling may result in personal injury due to liquid spillage.

CAUTION: When filling the Cryogenic Refrigerator, avoid liquid nitrogen coming in contact with the vacuum plug. In order to accomplish this, the Cryo Exchange must be removed from its shipping container during the "fill" operation.

Removing the Unit from its Shipping Container

Set the unit on a scale and fill the refrigerator with liquid to the bottom of the necktube. Then allow the unit to stand undisturbed while the refrigerant is being absorbed. About every five minutes, add liquid to maintain the refrigerant level as the liquid is absorbed by the filler. This procedure can take ten to fifteen cycles. When the liquid levels remains at the bottom of the necktube, the shipper is full. At this point, the quantity of liquid standing in the central cavity of the refrigerator must be poured out to prevent spillage during shipment. To assure a complete fill, the dry CX100 weight should increase by approximately 7.9 lb. (3.7 kg). The material to be stored in the Cryo Exchange Refrigerator, as well as the canister should be pre-cooled before being placed in the shipper. When the refrigerator is fully charged, place the pre-cooled material to be stored in the pre-cooled canister and lower it into the necktube. Install the necktube core and cap to hold the canister in place.

CAUTION: When the Cryo Exchange is in use, it must be kept upright. When properly filled, there is no concern for liquid refrigerant spills. However, holding time will be drastically reduced when the refrigerant is on its side.

Securing Contents

The contents of all models may be secured with a seal or lock through tabs on the edge of the lid.

Routine Care & Maintenance

DO NOT attempt to fasten any device to the container. Welding, brazing, or piercing of the container in any manner will cause permanent damage and will void the limited warranty.

Refrigeration depends on the presence of liquid nitrogen in the refrigerator. Be sure to maintain correct refrigerant levels to prevent loss of stored material. Check liquid levels regularly. If high evaporation rates are apparent under normal operating conditions, the refrigerator may be losing its vacuum. Sweating and the formation of frost on the outer casing are indications that the vacuum integrity of the refrigerator is not normal. All necessary steps should be taken to protect the refrigerator's contents. If these conditions persist, contact you supplier or Worthington Industries's Customer Service Department at 844-273-7517 or +1 614-438-7968 or e-mail us at customerservice@worthingtonindustries.com for information on how to conduct a normal evaporation rate (NER) test in the field.

Transportation

Although the CX Series refrigerators are rugged, they can be damaged if mishandled.

A specially designed hard-shell shipping container (refer to the parts section for ordering information) should be used anytime the refrigerator is transported. This container will help prolong the life of the unit and should be replaced if damaged during use.

When moving or transporting the refrigerator, keep the unit upright. Take every necessary precaution to prevent sliding, tipping, bumping or dropping the unit. Although there is no safety hazard if the properly filled refrigerator is on its side, the refrigerant consumption is much greater with the unit on its side and holding time will be significantly reduced.

Returns

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 Worthington Industries for any reason, you must first obtain a Material Return Authorization (MRA) number for tracking purposes. Please have a description of your symptoms and the refrigerator's serial number ready. Contact your supplier or call Worthington Industries's Customer Service Department at 844-273-7517 or +1 614-438-7968 or email us at customerservice@worthingtonindustries.com.

Accessories

The following accessories are available for CX Series refrigerators:

SHIPPING ENCLOSURE	P/N	MODEL
For ease of transport and protection of container.	367152 (padded carton)	CX100
	367817 (hard shell)	CX100
	366548 (high-density polyethylene)	CX100

REPLACEMENT PARTS

REFRIGERATORS	CX100
Handle	366691
Handle Pin (Set)	367357
Canister	366695
Neckplug Assembly	366694

Ordering Information

Order all replacement parts and accessories from your local distributor. Please include the part and model number, quantity, and each part requested. For more information or the name of your local distributor, contact Worthington Industries at the phone number or email listed below.



CONTACT US

US Toll Free: 844-273-7517

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Sales Support/Order Placement:

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Technical Services:

techservices@worthingtonindustries.com