



# Arctic Express™

## Cryogenic Dual Shippers

Operation Manual and Parts List LT509X35 (7000810) Rev. 8

Catalog Numbers	Model Numbers	Name
CK50920	810	Dual 10
CK50921	811	Dual 19
CK50922	812	Dual 28

**MANUAL NUMBER LT509X35 (7000810)**

8	41864	11/07/17	Removed CE mark, number	bpg
7	41238	12/20/16	Combined languages into one file	slb
6	40578	2/23/16	Added symbols and cautions to match unit	ccs
5	30559	11/12/13	Added warnings and cautions to pg 1-2, environmental conditions to pg 2-1	ccs
4	27797	9/20/11	Added new icons and intended usage	ccs
3	audit	8/17/11	Added authorised representative to pg 2-1	ccs
2	27457/SI-10618	7/21/11	Added CE number to pg 2-1	ccs
1	26676/SI-10360	10/28/10	Updated per M Spence/E Pickrell	ccs



**Important** Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance.



**Caution** All internal adjustments and maintenance must be performed by qualified service personnel. ▲



**Caution** It is recommended to have this vessel tested by the manufacturer or qualified cryovessel service technician every 7-10 years, regardless of any problems (or lack thereof) you may have had in the past. This will help insure your samples against sudden loss of liquid nitrogen due to vacuum failure. ▲



**Warning** Nitrogen gas can cause suffocation without warning. Store and use liquid nitrogen only in a well-ventilated place. As the liquid evaporates, the resulting gas displaces the normal air in the area. (The cloudy vapor that appears when liquid nitrogen is exposed to the air is condensed moisture, not the gas itself. The issuing gas is invisible.) In closed areas, excessive amounts of nitrogen gas reduces the concentration of oxygen and can result in asphyxiation. Because nitrogen gas is colorless, odorless, and tasteless, it cannot be detected by the human senses. Breathing an atmosphere that contains less than 19.5% oxygen can cause dizziness and quickly result in unconsciousness and death. Therefore, the use of oxygen monitoring equipment is strongly recommended. ▲



**Warning** Contact of liquid nitrogen with the skin or eyes may cause serious (freezing) injury. ▲



**Warning** Do not roll. Always keep liquid nitrogen vessel in an upright position. Exercise caution to prevent spilling and splashing. ▲

Material in this manual is for information purposes only. The contents and the product it describes are subject to change without notice. Thermo Fisher Scientific makes no representations or warranties with respect to this manual. In no event shall Thermo be held liable for any damages, direct or incidental, arising out of or related to the use of this manual.

#### Intended Use:

The Thermo Fisher Scientific cryogenic storage vessels are intended to store biological samples at cryogenic temperatures. These products are comprised of a vessel and a lid, with or without a level monitor.

#### Unintended Use:

These products are not intended for use within the patient environment.

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Important operating and/or maintenance instructions. Read the accompanying text carefully.



Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.



Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.



Extreme temperature hazards. Only qualified persons should perform procedures associated with this symbol.



WEEE Compliance: Thermo Fisher Scientific has contracted with companies for recycling/disposal in each EU Member State. For further information, send an email to [weee.recycle@thermofisher.com](mailto:weee.recycle@thermofisher.com).



- ✓ Always use the proper protective equipment (clothing, gloves, goggles, etc.)
- ✓ Always dissipate extreme cold or heat and wear protective clothing.
- ✓ Always follow good hygiene practices.
- ✓ Each individual is responsible for his or her own safety.

## Do You Need Information or Assistance on Thermo Scientific Products?

If you do, please contact us 8:00 a.m. to 6:00 p.m. (Eastern Time) at:

1-740-373-4763

1-800-438-4851

1-877-213-8051

<http://www.thermofisher.com>

[service.led.marietta@thermofisher.com](mailto:service.led.marietta@thermofisher.com)

[www.unitylabservices.com](http://www.unitylabservices.com)

Direct

Toll Free, U.S. and Canada

FAX

Internet Worldwide Web Home Page

Tech Support Email Address

Certified Service Web Page

Our **Sales Support** staff can provide information on pricing and give you quotations. We can take your order and provide delivery information on major equipment items or make arrangements to have your local sales representative contact you. Our products are listed on the Internet and we can be contacted through our Internet home page.

Our **Service Support** staff can supply technical information about proper setup, operation or troubleshooting of your equipment. We can fill your needs for spare or replacement parts or provide you with on-site service. We can also provide you with a quotation on our Extended Warranty for your Thermo Scientific products.

Whatever Thermo Scientific products you need or use, we will be happy to discuss your applications. If you are experiencing technical problems, working together, we will help you locate the problem and, chances are, correct it yourself...over the telephone without a service call.

When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 6:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:



Thermo Fisher Scientific (Asheville) LLC  
401 Millcreek Road, Box 649  
Marietta, OH 45750

International customers, please contact your local Thermo Scientific distributor.

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# Section 1 Safety Information

This manual contains important operating and safety information. The user must carefully read and understand the contents of this manual prior to the use of this equipment.

Your cryogenic vessel has been designed with function, reliability, and safety in mind. For safe operation, please pay attention to the alert signals throughout the manual.

All cryopreservation vessels, regardless of who manufactures them, use a vacuum to provide for the super insulative properties needed to keep nitrogen in a liquid form. They are very similar, in fact, to the Thermos™ vessels you may have used to store coffee, soup or milk. Since no vacuum is perfect or will last forever, we suggest that you monitor the consumption of liquid nitrogen used by your Dual vessel on a regular basis, i.e. every 1-2 days. By monitoring, you may be able to anticipate subtle changes in consumption and possibly react to problems before they arise.

Also, if your samples are critical, one-of-a-kind, or irreplaceable, consider allocating your samples into 2 separate vessels.

As stated before, no vacuum lasts forever. Therefore, it is recommended to have your vessel tested by a qualified cryovessel manufacturer after 7 years regardless of any problems (or lack thereof) you may have had in the past. After 7 years, a yearly test is recommended to ensure no vacuum leak has occurred. This will help insure your samples against sudden loss of nitrogen due to vacuum failure.

Vapor Shippers are ideally suited for the transportation of cryobiological materials. The liquid nitrogen is retained in an absorbent material and the cold nitrogen vapors maintain the Cryo Storage Area at -190°C. The absorbent material retains the liquid nitrogen and prevents accidental spills.

Liquid nitrogen is classified as “Dangerous Goods” by the Department of Transportation (DOT). At least three regulatory agencies publish dangerous goods regulations:

DOT - Department of Transportation

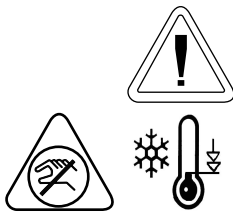
IATA - International Air Transportation Association

ICAO - International Civil Aviation Organization

Liquid nitrogen is classified under the name “Nitrogen, refrigerated liquid” and has a UN 1977 code number. The name classification and UN Code Number must be indicated on the shipping carton in addition to a “Gas non-flammable” label. Packing and labeling requirements can be obtained from the above organizations. Also, contact your carrier for any variances in the rules as they may apply specifically to that company and/or the ultimate destination of the shipment.

Be aware that the regulations undergo periodic revisions. If you need current information prior to the shipping of your cryobiological specimen, contact your air carrier for the most recent regulations.

## Warnings



- This unit is intended to be used by trained personnel in a well-ventilated environment.
- Liquid nitrogen is extremely cold; it boils at  $-196^{\circ}\text{C}$ .
- Follow all precautions and warnings relevant to applicable hazards such as frostbite, contact burn, asphyxiation, etc. in cryogenic area.
- To avoid injury due to frostbite or ruptured vials 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.
- Wear adequate PPE where necessary: face shield, cryogenic gloves, cryogenic apron.
- Do not tightly seal liquid nitrogen containers or prevent nitrogen gas from escaping.
- Always handle vials with tongs.
- Use extreme care to prevent spilling and splashing liquid nitrogen during transfer and removal of storage contents and holders.
- Immediately remove any clothing or safety attire on which liquid nitrogen has been spilled or splashed .
- Get immediate medical attention for any frostbite injuries due to liquid nitrogen.
- Never overfill liquid nitrogen vessels.



## **Warnings (continued)**

- When inserting or removing cans be careful not to come in contact with the neck tube area of the vessel. Remove or insert cans slowly in a vertical manner. Scratches on the neck tube area can cause premature vacuum failure.
- Do not tamper with or remove vacuum port (covered by a black plastic cap on side of vessel); this will void warranty.
- Do not spill liquid nitrogen on vacuum port - this can cause vacuum failure.
- Always keep liquid nitrogen vessel in an upright position, except as directed for decontamination.

## Section 2 General Specifications

	Dual 10	Dual 19	Dual 28
Height - inches (cm)	21.6" (54.9)	25.7" (65.3)	22.0" (55.9)
Diameter - inches (cm)	10.2"	14.5"	18.2"
LN2 Capacity (liters)	10	18.5	28.0
Holding Time (days)	21	21	21
Static Holding Time (days)	42	125	50
LN2 Capacity Absorbed (liters) *	3	3	8
Liquid Phase Capacity (1.2 ml ampules)	150	150	810
Can Size - inches (cm)	1-1/2 x 11 (3.8 x 27.9)	1-5/8 x 11 (4.1 x 27.9)	3-1/16 x 11 (7.9 x 27.9)
Number of Cans	6	6	6

*\* Actual working time may vary due current atmospheric conditions, container history, manufacturing tolerances, and any individual patterns of use.*

### Environmental Conditions

Operating temperature: 17°C - 27°C

20% to 80% relative humidity, non-condensing.

Installation Category II (overvoltage) in accordance with IEC 664.

Pollution Degree 2 in accordance with IEC 664.

Altitude limit: 2,000 meters.

Storage: -25°C to 65°C; 10% to 85% relative humidity.

Locator and Locator Plus units are intended for indoor use only.

## Section 3 Unpacking

**Note** The most prevalent cause of failure of liquid nitrogen storage vessels is mechanical. The vessel neck tube supports the full weight of the inner shell and all liquid nitrogen it contains. A side or corner blow to the vessel causes the inner shell to swing in a pendulum motion causing the neck tube to be damaged. Any storage vessel which has been exposed to an accident, has been dropped or lowered to hit on one corner will tend to fail more rapidly than one which has not. ▲

Before using your new vessel, carefully inspect it. Check for signs of damage which may have occurred in shipment. It is advisable to fill (see **Filling Instructions**) all new units with liquid nitrogen and watch liquid nitrogen loss rate for a few days. If there are any problems, call Technical Services as soon as possible.

The on-line warranty registration address is listed on the front of this manual. The unit should be registered within 30 days to make warranty effective. This information must include the serial number which is located on the handle of the vessel or on the label located on the opposite side of the Arctic Express logo.

## Section 4 Operation



**Caution** Never overfill liquid nitrogen vessels.

When inserting or removing cans be careful not to come in contact with the neck tube area of the vessel. Remove or insert cans slowly in a vertical manner. Scratches on the neck tube area can cause premature vacuum failure.

Do not spill liquid nitrogen on vacuum port - this can cause vacuum failure. ▲

### Filling Instructions

To avoid damage to your cryogenic storage 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:

1. Add only a small amount of liquid nitrogen (2-10 liters) to new or warm vessels.
2. Allow this small amount of liquid nitrogen to sit in the covered vessel for a minimum of 2 hours. This will limit stress caused by the sudden temperature change associated with adding liquid nitrogen to a warm vessel.
3. Add additional LN2 to vessel.
4. Allow vessel to sit for 48 hours and monitor liquid nitrogen consumption.
5. Fill vessel as desired. Remember to allow for displacement of liquid nitrogen when canisters and canes are inserted (when using vessel as a laboratory “wet” vessel.)
6. Insert and remove canisters slowly. Allow liquid nitrogen to run out of canisters.

## Measuring Liquid Nitrogen Quantity

1. Use a wooden yardstick to measure liquid nitrogen level. Never use a hollow tube or plastic dipstick to measure liquid nitrogen level.
2. Level will be indicated by frost line which develops when dipstick is removed and waved in a back and forth motion away from the user.

## Preparing for Shipping

The Dual Shipper contains a solid absorbent which holds liquid nitrogen. During shipment, there is no “liquid” nitrogen to move around and potentially spill within the airplane, truck or train. Only absorbed nitrogen and boil-off from absorbed nitrogen is present to keep samples at cryogenic temperatures.

A “warm” shipper, one standing at room temperature, should not be immediately filled with liquid nitrogen. A small amount of liquid nitrogen should be dispensed into the shipper. The top of the shipper is then closed and the container allowed to equilibrate for approximately 2 hours. After this period, the vessel may be filled with liquid nitrogen. It is important that the level of liquid nitrogen remain below the fiberglass necktube of the vessel and that it not come in contact with the vacuum port which is covered with a black plastic cap.

Shortly after filling the vessel, it is important to check for areas of frost or “sweating.” Frost patches and sweating are not normal and may signify a compromised vacuum. Vacuum leaks will measurably decrease holding times and may endanger sample integrity. If you suspect a vacuum leak, call Technical Services. Do not ship precious samples if there is any other alternative!

In preparation for shipping, the vessel should be allowed to remain full of liquid nitrogen for 24 hours. At the end of this period, the liquid remaining in the vessel should be poured off into another vessel. Charging is now complete and full transfer holding times will be achieved.

It is important that shippers remain in the upright position during transit. The mushroom-shaped shipping cases provided with the Dual 10, 19, and 28 shippers are especially shaped to prevent the shipper from being inverted or placed on its side. Holding times are significantly reduced from the stated values if the containers are not kept upright during shipping.

## **Preparing for Shipping (continued)**

Samples arriving in Arctic Express Dual vessels may be transferred to other vessels or may be kept in the Dual shipper. If arriving samples are to be permanently kept in the Arctic Express Dual vessels, the vessel must be filled with liquid nitrogen. Do not fill above the level of the fiberglass neck tube. As damage sometimes occurs in transit, it is important to check the performance of the vessel using a wooden yardstick as described in 'Measuring Liquid Nitrogen Quantity'. Expected losses of liquid nitrogen may be calculated from values found in 'General Specifications'. If expected boil-off rates are significantly exceeded or if frost patches appear on the outside of the vessel, call Technical Services at once. Do not leave precious samples unattended! As a precaution, it is advisable to keep a supply of liquid nitrogen near the suspect vessel.

## Section 5 **Ordering Procedure**

Refer to the serial number stamped into one of the two handles when requesting service, replacement parts or in any correspondence concerning this unit.

All parts listed herein may be ordered from the Thermo Scientific dealer from whom you purchased this unit, or can be obtained promptly from the factory. When service or replacement parts are needed, check first with your dealer. If the dealer cannot process your request, then contact our Technical Services Department.

Prior to returning any materials to Thermo, contact Technical Services for a "Return Materials Authorization" number (RMA). Material returned without an RMA number will be refused.

## Section 6 Decontamination Statement

### Returns

If, for any reason, it becomes necessary to return your vessel to Thermo Scientific, an RMA (Return Materials Authorization) must be obtained from Customer Service. Prior to issuing an RMA, the Customer Service representative will ask that you submit a Vessel Decontamination Certification. When a signed and dated copy of this certification is received, an RMA will be issued. This policy is necessary to protect the employees of Thermo Scientific from biological hazards of which even the end-user may be unaware.

Suggested decontamination methods are found in a following section of this manual. Vessels received without an RMA will be returned to the sender unopened.

We acknowledge that many of our customers are experts in decontamination procedures for the cells/organisms used in their work. Because of this, we leave the decontamination practice to the discretion of our customers. Methods that we suggest have proven generally applicable for most contaminants. We therefore ask that these vessels not be returned.

### Security

In recent years, security has become even an even more important consideration for those shipping tissues and cells by common carrier. Dual shippers are constructed with provisions for padlocks.

### Decontamination

Dual Shipper/Laboratory cryogenic storage vessels are made with aluminum interiors and fiberglass neck supports. Any sanitizing solution that does not react with aluminum or fiberglass can be used. Decontaminants which can be used include chlorine bleach, hydrogen peroxide, chlorine/water, denatured alcohol and most household disinfectants. The entire inner surface of the vessel must come in contact with the disinfectant for a period of 1/2 hour. We advise filling the interior of the shipper to its holding capacity, followed by thoroughly rinsing with water until all disinfectant residue has been removed. The shipper should be allowed to dry in an inverted position for 24 hours.



## Section 6

### Decontamination Statement

## **Decontamination (continued)**

While the generally accepted practice of using 10% chlorine bleach as a disinfectant is still preferred, some viruses are resistant to this treatment and require treatment with 30% chlorine bleach solutions. Prions (like those associated with Mad Cow Disease) are not known to be killed even with this treatment. At the production time of this manual, we are unaware of any completely safe and practical method for their removal/destruction.

## THERMO FISHER SCIENTIFIC STANDARD PRODUCT WARRANTY (LN<sub>2</sub> Vacuum)

The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows for shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the first year warranty period.

During the first year, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, labor included. *LN<sub>2</sub> Vacuum Integrity is covered for three years.* Installation and calibration are not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, glass, filters and gaskets are excluded from this warranty.

Replacement or repair of components parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any components or equipment. At Thermo's option, all non-conforming parts must be returned to Thermo postage paid and replacement parts are shipped FOB destination.

**THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL OR IMPLIED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY.** Thermo shall not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

Your local Thermo Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation and preventive maintenance.

If equipment service is required, please call your Technical Services Department at 1-800-438-4851 (USA and Canada) or 1-740-373-4763. We're ready to answer your questions on equipment warranty, operation, maintenance, service and special application. Outside the USA, contact your local distributor for warranty information.



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**Thermo Fisher Scientific (Asheville) LLC**

401 Millcreek Road  
Marietta, Ohio 45750  
United States

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