



U.S. Department
of Transportation

Research and
Special Programs
Administration


Memorandum

Date JUN 12 2001

Reply to Attn of

Ref. No. 01-0038

Subject: INFORMATION: Dry Shipper Instructions from Chart Industries

From: 
Edward T. Mazzullo, Director
Office of Hazardous Materials Standards, DHM-10

To: William Wilkening, Program Manager
Dangerous Goods/Cargo Security, ACO-800

This responds to your memorandum dated February 2, 2001, requesting clarification of the applicability of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to the use of a "dry shipper." A "dry shipper" is a dewar flask that has an outer jacket and an inner containment vessel. The absorbent material, saturated with liquid nitrogen, is located between the inner and outer walls in order to serve as a refrigerated container for the shipment of biological materials.

If there is no free liquid present in the packaging, the liquid nitrogen does not exhibit the characteristics of a "cryogenic liquid" as defined in 49 CFR 173.115(g) and does not pose a hazard in transportation. Therefore, a "dry shipper" with no free liquid present in the packaging, regardless of the orientation of the packaging, is not subject to regulation under either the HMR or the International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Hazardous Materials. However, if the packaging is offered for transportation with free liquid present, it is subject to regulation when offered for transportation by aircraft (see 49 CFR 173.320).

I hope this answers your inquiry. If you need further assistance, please do not hesitate to contact us.

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U.S. Department
of Transportation
Federal Aviation
Administration

Boothe
\$173.320
Exceptions
01-0038

Memorandum

Subject: **ACTION:** Dry shipper instructions from Chart Industries

Date: FEB 2 2001

From: Program Manager, Dangerous Goods/Cargo Security, ACO-800

Reply to
Attn. of:

To: Robert McGuire, Associate Administrator for Hazardous Materials Safety, DHM-1

Our Western Pacific region has opened a case against the University of Arizona Medical School for offering an improperly packaged cryogenic liquid in air transportation. The university failed to drain excess nitrogen from a "dry shipper" container, and the package leaked at a Federal Express facility.

In response to our Letter of Investigation, the university provided the attached letter from the Applied Technologies Division of Chart Industries, dated August 16, 2000. We request your opinion as to whether the information provided in this letter is valid, and section 173.320(a)(3)(iii) is in effect. If the letter cannot be verified, we will continue to move against the shipper. (b)(2)

We are interested in sending an agent from our Minneapolis field office to inspect this company, which is located in Burnsville, Minnesota. We invite participation by your Central Region inspectors on this inspection to clarify the regulations.

We appreciate any support you can provide on this matter.

William Wilkening

Attachment

cc: Debra Straus, AGC-300

JUN 19 2001

JUN 11 2001

JUN 12 2001

JUN 12 2001



Applied Technologies Division
CAIRE Industries, Inc.

3509 County Road 42 West
Burnsville, MN 55306-3803 USA
Tel: 612.892.5000 Fax: 612.892.5172
www.caire-inc.com

August 16, 2000

Attention:

This confirms our telephone conversation concerning the applicability of the Federal Hazardous Material Regulations to the shipment of refrigerated samples in your "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, complete package serves as a refrigerated container for the shipment of biological materials.

In consideration of the above, consultation with the Material Transportation Bureau of the Research and Special Programs Administration has determined that the use of nitrogen refrigerated liquid charged "dry shipper" containers for the shipment of biological materials falls within the regulation exception provided in 49CFR173.320. Paragraph (a)(3)(iii) of that section states the requirements of this subchapter (subchapter C-the Hazardous Material Regulations) do not apply to atmospheric gases and helium when used in the operation of a process system; such as a refrigeration system.

(b)(2)

Sincerely,

Lois Tuma
Inside Sales
Biological Products

NO. 8395 P. 3/3

NO. 091 P003

JAN. 26 2001 3:45PM
01/26/01 13:59
MVE - CAIRE
952 882 5008
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01/26/01 15:12

Federal Aviation Administration
Civil Aviation Security
Dangerous Goods Advisory Bulletin *

Information of Concern to Air Carriers

Subject: Liquid Nitrogen In Dewars

Number: DGAB-98-03

Date: AUG 25 1998

INFORMATION: The Federal Aviation Administration (FAA) is issuing this Advisory Bulletin to alert air carriers to the hazards associated with mishandling authorized packagings utilizing liquid nitrogen as a refrigerant. These packagings are "non-pressurized" flasks and specially designed flasks known as "dry shippers", which are used to transport refrigerated biological specimens. Liquid nitrogen is a regulated material subject to 49 CFR Parts 100 - 180, Hazardous Materials Regulations, (see 173.320(c)) and the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (see Packing Instructions 202).

Safe Handling:

The closure of the container is designed to allow venting to the atmosphere, through the fill opening, in order to prevent the build up of pressure within the package. Packages are designed to be transported in an "upright" position at all times. These containers release of liquid nitrogen through the venting system when handled adversely to the orientation markings and package design. Therefore, it is important that personnel that handle, load and unload flasks that contain liquid nitrogen maintain the flask in the upright position at all times. Failure to do so may result in the release of liquid nitrogen and cause injury.

Non-pressurized flasks; (other than "dry-shippers")

These types of containers are authorized for liquid nitrogen (Division 2.2, cryogenic), in the ICAO Technical Instructions (TI), and must meet the packing instructions in 202. Non-pressurized flasks are similar in design and appearance to "dry shippers", except they are filled with liquid nitrogen, and the biological specimens are suspended in it.


OPTIONAL FORM 89 (7-89)	
FAX TRANSMITTAL	
# of pages → 3	
To <i>John Gale</i>	From <i>Bromo</i>
Dept/Agency	Phone # <i>73201</i>
Fax # <i>63012</i>	Fax #
NSN 7540-01-317-7266	5000-101 GENERAL SERVICES ADMINISTRATION

Dry Shippers:

Dry shippers, when properly prepared (see the Note at the end of Packing Instructions 202) are not subject to the requirements of the regulations. However, if the dry shippers are offered with free liquid nitrogen present, they would be subject to the regulations when offered for transportation by aircraft (see 49 CFR 173.320) and must be offered in accordance with the ICAO Technical Instructions. These packagings use liquid nitrogen (Division 2.2, cryogenic liquid) as a refrigerant. A dry shipper consists of an outer metal jacket and an inner shell, with the space between filled with insulation and vacuum-sealed. The interior of the packaging contains a cylindrical void, which holds the material requiring refrigeration, surrounded by absorbent material. The absorbent material is saturated with the liquid nitrogen. The FAA has found shipments where the nitrogen is not completely absorbed so when handled adverse to the orientation markings, results in a loss of liquid nitrogen.

FAA Enforcement:

The FAA will actively pursue enforcement actions against all parties who violate the Hazardous Materials Regulations or the ICAO Technical Instructions. Violators are subject to civil penalties of \$27,500 and criminal prosecution with penalties of \$250,000 and up to five years in prison.



Bruce Butterworth
Director, Office of Civil Aviation Security Operations



MVE, Inc.
 3505 Country Road 42 West
 Burnsville, MN 55306
 P-800-400-4683
 F-612-882-5172

FILLING INSTRUCTIONS FOR MVE VAPOR SHIPPERS

THESE HIGH QUALITY VACUUM INSULATED UNITS ARE CONSTRUCTED OF DURABLE MATERIALS, 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.

THE MVE VAPOR SHIPPERS WERE PRIMARILY DESIGNED AS VAPOR SHIPPING CONTAINERS; HOWEVER, THEY CAN ALSO BE USED FOR IMMERSION OF SAMPLES. WHEN USING IN EITHER CONDITION, THE RECOMMENDED FILLING PROCEDURE IS AS FOLLOWS: FILL THE UNIT TO THE TIP AND ALLOW THE LIQUID NITROGEN TO ABSORB. UPON COMPLETE ABSORPTION OF THE FIRST FILL OF LN2, WHICH SHOULD TAKE A MINIMUM OF 8 HOURS, REPEAT WITH ANOTHER FILL. REPEAT AGAIN IF NECESSARY. COMPLETE ABSORPTION MAY TAKE UP TO 24 HOURS. AFTER COMPLETING THE LAST FILL, JUST PRIOR TO SHIPMENT, POUR OFF THE EXCESS LIQUID IF THEY ARE INTENDED TO BE USED AS A VAPOR (DRY) SHIPMENT.

TO INSURE THAT THE VAPOR SHIPPERS HAVE ABSORBED THEIR FULL CAPACITY OF LIQUID, IT IS ADVISABLE TO WEIGH THEM. TO COMPLETELY FILL THE ABSORBENT, THE SUGGESTED ABSORBED WEIGHT OF THE UNITS IS A LISTED BELOW SHOULD BE REACHED. THIS WILL ALLOW THE CONTAINERS TO HOLD THE MAXIMUM NUMBER OF DAYS IN THE VAPOR PHASE.

SPECIFICATIONS			
UNIT	EMPTY WEIGHT	RECOMMENDED FULL WEIGHT	STATIC HOLD TIME (DAYS)
SC2/1v	6	8.8	8
SC4/2v	11	15	14
SC4/3v	13	20.6	21
SC20/12v	30	52	65
XC20/3v	23	35	25
XC14/2v	24	39	25
CRYOSHIPPER	24	37.3	10
CRYOSHIPPER x cap.	30	47	14
MINI-MOOVER	8.8	11.6	14
CRYO-MOOVER	30 1/2	38	12
SC2/1v-11"	8	11.63	14
ARCTIC x 5	6	8.8	8

DURING THE INITIAL FILL, OR AFTER THE UNIT IS ALLOWED TO WARM, THE AMOUNT OF LN2 NEEDED TO FILL THE ABSORBENT WILL BE GREATER. THE TIME NEEDED FOR THIS FILLING PROCEDURE WILL ALSO BE GREATER.

NO. 8995 P. 2/3

JAN. 26. 2001 01/26/01 13:59
 MVE - CAIRE
 552 882 5028