



Brandeis University Guide to Shipping with Dry Ice

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for permission to use and modify these documents*

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I. Introduction

The U.S. Department of Transportation (DOT) and the International Air Transport Association (IATA) regulate shipments of dry ice because it is a hazardous material. As a result, specific procedures must be followed when packaging and shipping materials refrigerated with dry ice and a record of training must be kept.

Follow procedures outlined in this guide when your shipment includes *no hazardous materials other than dry ice*. If you are not sure if the material you are sending is considered hazardous, contact the Brandeis Safety Office or the Science Stockroom for additional information. **See Section IV for specific shipping requirements.**

Packages refrigerated with dry ice are normally shipped by air in order to reach their destinations rapidly. However, Brandeis University requires that the information in this guide be followed when shipping by any mode of transportation. The guidelines found in this manual will fulfill the IATA requirements for Packaging Instruction 904 for air transport.

II. Training Requirements

Federal rules require that anyone wishing to ship dry ice must first have shipping training. If you are going to package dry ice for shipment or sign any type of shipping documentation (such as a FedEx Airbill) for a dry ice shipment, you must follow the training certification requirements outlined below.

1. **Read this guide.** This guide will explain the general provisions relating to the regulations and detailed training in the requirements applicable to dry ice.
2. **Complete and submit to the BRANDEIS SAFETY OFFICE an [Intent to Ship Dry Ice form](#) (Appendix A).**

You must renew your certification every two years. Training sessions reviewing the material in this manual are available from the Safety Office and the manual will be made available electronically for refresher training.

III. Hazard Identification

Dry ice is classified by DOT and IATA as a “miscellaneous” hazard, class 9. Dry ice is considered hazardous during transportation for three reasons:

1. **Explosion hazard:** dry ice releases a large volume of carbon dioxide gas as it sublimates. If packaged in a container that does not allow for release of the gas, it may explode, causing personal injury or property damage. Packaging must allow for venting.
2. **Suffocation hazard:** a large volume of carbon dioxide gas emitted in a confined space may create an oxygen deficient atmosphere. Label the package properly to communicate the hazards.
3. **Contact hazard:** dry ice is a cryogenic material that causes severe frostbite upon contact with skin. Label the package properly to communicate the hazards.

IV. Packaging Dry Ice

A. Requirements

There are basic requirements for shipments of dry ice:

1. **Gas venting:** packages must allow for release of carbon dioxide gas. Dry ice must never be sealed in a container with an airtight seal such as a jar with a threaded lid or a plastic cooler. Pack dry ice loosely in the outer package such as a Styrofoam shipping package. Check the [Manufacturers](#) list for prefab packaging.
2. **Package integrity:** a package containing dry ice must be of adequate strength for intended use. It must be strong enough to withstand the loading and unloading normally encountered in transport. It must also be constructed and closed in order to prevent any loss of contents that might be caused by vibration or by changes in temperature, humidity, or altitude. **(See Figure 4)**
3. **Package materials:** do not use plastics that can be rendered brittle or permeable by the temperature of dry ice. This problem can be avoided by using commercially available packages intended to contain dry ice, see [Appendix B, Manufacturers of Dry Ice Shipping Containers](#) (ex.: Saf-T-Pak STP 310 or Source Packaging INF-5000).
4. **Airbill:** the airbill (also referred to as the air waybill) must include the statement “**Dry ice, 9, UN1845, *number of packages X net weight in kilograms.***” FedEx has a check box on their airbill to satisfy this requirement; see Figure 2. Airborne Express requires a slightly different format; see Figure 3. Check with your courier to make sure you have made the proper notation on their paperwork.
5. **Marking the package.** The shipping container must be marked with the following (Place two labels, one on each opposite side of box):
 - a. “**Carbon dioxide, solid**” or “**Dry Ice**”, UN1845 in this order and in English;
 - b. The FULL name and address of the shipper and consignee (where/who it is being shipped to);
 - c. The net quantity of dry ice within each package in kilograms.

[NOTE: The IATA label available in the Safety Office and the Science Stockroom would fulfill these requirements (5 & 6).]

6. **Labeling:** the outermost container must be labeled with a hazard class 9 label, UN 1845, and net weight of dry ice in kilograms. See Figure 1. A printable version is included in [Appendix C](#). The label should be affixed to a vertical side of the box (not the top or bottom) and oriented as in Figure 1. The maximum allowable net quantity of dry ice allowed per package is 200 kg. Special IATA Class 9 labels will also be available in the Safety Office and Science stockroom. Reminder: Place one of these labels on two opposing sides of the box.

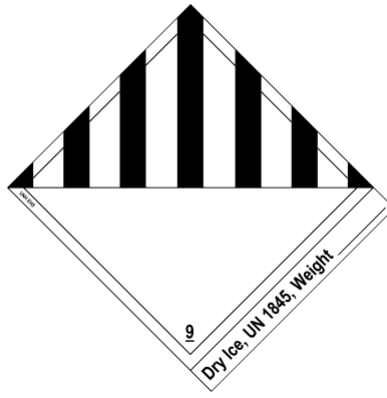


Figure 1. Dry ice label.

FedEx USA Airbill FedEx Tracking Number **839360283475** Form I.D. No. **0200** Sender's Copy

1 From Please print and press hard. Sender's FedEx Account Number

2 Your Internal Billing Reference First 21 characters will appear on invoice. OPTIONAL

3 To Recipient's Name, Company, Address, City, State, ZIP

4a Express Package Service Packages up to 150 lbs. Next business morning, Next business afternoon, FedEx First Overnight, FedEx Standard Overnight, FedEx Express Saver, FedEx 2Day, FedEx 2Day Freight, FedEx 3Day Freight

Express Freight Service Packages over 150 lbs. Day Freight*, Cargo Aircraft Only

Packaging FedEx Envelope*, FedEx Pak*, Other

6 Special Handling SATURDAY Delivery, HOLD Weekday at FedEx Location, HOLD Saturday at FedEx Location, Shipper's Declaration not required, Dry Ice, 9, UN 1845, 1 x 6 kg

7 Payment Bill to: Sender, Recipient, Third Party, Credit Card, Cash/Check

8 Release Signature Sign to authorize delivery without obtaining signature.

Try online shipping at fedex.com

Questions? Visit our Web site at fedex.com or call 1.800.Go.FedEx® 800.463.3339.

Figure 2. FedEx Airbill. Highlighted area properly documents 1 box containing 6 kg of dry ice.

Sender Account Number Preprint Format No. **3 Payment** Sender will be billed unless marked otherwise. Bill to: Receiver, 3rd Party, Amount

FROM (Company) Street Address, City, State, ZIP, Sent by (Name/Dept), Phone (Required)

2 TO (Company) PLEASE PRINT NEATLY Street Address, City, State, ZIP CODE (Required), Attention: (Name/Dept), Phone (Required)

3 Service Type Express (Letter - 150 lbs), Next Afternoon over 5 lbs charged at the Express rate, Next Afternoon to Bold Red destinations only, Next Afternoon (Letter - 5 lbs), Second Day (Letter - 150 lbs)

4 Special Instructions Saturday Delivery, Hold at Airborne, Lab Pack Service, Declared Value, Asset Protection, Shipment Valuation

Description Dangerous Goods Shippers Declaration not required DRY ICE, 9, UN 1845, III, 1 X 5 KGS, 904

Thank You for Shipping with Airborne!

AIRBORNE EXPRESS PO BOX 662, SEATTLE, WA 98111-0662 1-800-247-2676

Figure 3. Airborne Express Airbill. Highlighted area shows format required for 1 box containing 5 kg of dry ice.

Figure 4. Typical Dry Ice shipping container, internal foam core with cardboard box exterior. DO NOT tape the Styrofoam top or the box top on tightly. Taping should be secure but NOT air tight.



B. Recommendations

Note the following recommendations when packaging and labeling dry ice shipments:

- **Do not write “specimens” or “diagnostic specimens” on the box.** Diagnostic specimens are subject to specific packaging requirements and there should not be any misunderstanding about your shipment. Diagnostic specimens, in shipping terminology, are materials that may be infectious to humans or animals. If you think your samples might be infectious, contact the Brandeis Safety Officer.
- **Reusing boxes.** If you choose to reuse a box, completely obliterate all unnecessary marking such as hazard labels, addresses, FedEx (or other courier) labels and barcodes. Use caution if reusing a box that has been used to ship infectious material or diagnostic specimens. Only reuse a box if you can personally verify it is not contaminated and its integrity is intact. A box should not be reused if it is torn, cut, stained, or if the insulation is cracked or broken.
- **Secure your inner package** in such a way that when the dry ice sublimates, it will not move freely inside of the insulated box. You may want to wedge the package in place with cardboard or styrofoam. Fragile containers such as glass tubes or vials should be wrapped with cushioning material.
- Shipments are generally recommended to contain 5-10 pounds (2.27-4.54 kg) of dry ice per 24 hours. Refer to your package manufacturer’s recommendations. Make arrangements with your consignee to make sure your package will be received on its intended delivery date. Take into account local holidays or closings that might delay package receipt.
- Dry ice shipments can be made with FedEx (Refer to Fedex *How to Pack* manual, pages 12-13.) and DHL. UPS and the U.S. Postal Service have extremely restrictive policies concerning shipments of hazardous materials; do not ship dry ice with UPS or the U.S. Postal Service.

Appendix A. Intent to Ship Dry Ice

After reading the Brandeis University Guide to Shipping with Dry Ice, fill out this form to qualify to ship dry ice.

- 1) Why is dry ice considered a hazardous material?

- 2) Which of the following labels/markings must appear on a package containing dry ice? Check all that apply.
 - Class 9 hazard label
 - Class 8 hazard label
 - Inner packages comply with prescribed specifications*
 - Net weight of dry ice
 - Dry ice, UN1845*
 - Biohazard symbol
 - Diagnostic specimens*

- 3) I have to put a class 9 label on the box only when there are other hazardous materials in the box.
 - a) True
 - b) False

- 4) It is acceptable to put a class 9 label on the top or bottom of the box.
 - a) True
 - b) False

- 5) The only consideration when reusing a dry ice shipping box is labeling it with the correct address.
 - a) True
 - b) False

- 6) If you are shipping non-hazardous plant tissue samples to a lab for diagnostic analysis, it is okay to write on the shipping box, "Diagnostic specimens enclosed."
 - a) True
 - b) False

I understand the hazards associated with dry ice and the shipping requirements for dry ice, as outlined in this manual.

Print Name:			
Signature:			
Department:			
Date:		Phone:	
Please return in campus mail to the Brandeis Safety Office, Kalman 21 , MS 067			

Appendix B. Manufacturers of Dry Ice Shipping Containers

Air Sea Atlanta
1234 Logan Circle
Atlanta, GA 30318
(880) 351-8600

<http://www.airseatlanta.com>

All-Pak, Inc.
Corporate One West
1195 Washington Pike
Bridgeville, PA 15017
(800) 245-2283

<http://www.all-pak.com>

CARGOpak Corporation
3215-A Wellington Court
Raleigh, NC 27615
(800) 266-0652

<http://www.cargopak.com>

DG Supplies, Inc.
5 Boxal Drive
Cranbury, NJ 08512
(800) 347-7879

<http://www.dgsupplies.com>

HAZMATPAC, Inc.
5301 Polk St., Bldg. 18
Houston, TX 77023
(800) 923-9123

<http://www.hazmatpac.com>

Inmark, Inc.
220 Fisk Drive S.W.
Atlanta, GA 30336-0309
(800) 646-6275

<http://www.inmarkinc.com>

Polyfoam Packers Corporation
2320 S. Foster Avenue
Wheeling, IL 60090
(888) 765-9362

<http://www.polyfoam.com>

SAF-T-PAK, Inc.
10807-182 Street, Edmonton
Alberta, Canada, T5S 1J5
(800) 814-7484

<http://www.saftpak.com>

Source Packaging of New
England, Inc.
405 Kilvert Street
Warwick, RI 02886
(800) 200-0366

<http://www.sourcepak.com>

Package examples:

SAFT-T-PAK: STP 3100

Source Packaging: INF-5000

Appendix C. Dry Ice Shipping Label

The label below should print with the proper dimensions of a class 9 hazard label (minimum dimensions: 100 mm on a side). Cut around the outside border of the label and affix it a vertical side of the box (not the top or bottom), oriented as shown below. Many printer inks run when exposed to even small amounts of water, such as rain or snow. Therefore, when using this label, cover with clear plastic tape after filling in the weight of dry ice.

