

Guide for Shipping with Dry Ice

(Includes Training Requirement Module)

Shipper's Declaration not Required

Part B is required

Dry Ice amount must be in kilograms.

Note: 2 lbs. = 1 kg.

Airwaybills/airbills must have the following:

1. "Dangerous Goods - Shipper's Declaration not Required".
2. Dry Ice; 9; UN 1845; III
3. _____ x _____ Kg 904
(Number pkgs) (wt)

Dry Ice
_____ kg.

Shipper's name and Address

UN 1845

Consignee Name and Address

9

This guide has been adapted from University of New Hampshire - Environmental Health and Safety; our appreciation to Andy Glode and the University of New Hampshire for providing much of the material used to produce this version of the Guide to Shipping with Dry Ice

The most current version of this document can be found at <http://www.yale.edu/oehs>

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PLEASE NOTE: This training module is not intended to satisfy Federal transportation regulations or training requirements for any hazardous materials other than dry ice. If you intend to ship materials packed in dry ice, you need to complete an EHS “Research Materials Shipping Request” form via the following link: <http://www.yale.edu/ehs/hazmatshiplogon.htm>.

1. 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. Anyone performing these tasks must be provided appropriate training and a record of this training will be kept.

Packages refrigerated with dry ice are normally shipped by air in order to reach their destinations rapidly. Therefore, information in this guide pertains to air shipments of dry ice only. If you intend to ship your package by other means, such as ground, freight, vessel, etc., contact your safety advisor or call EHS to discuss applicability of other shipping regulations.

2. Training Requirements

This training module is not intended to satisfy Federal transportation regulations or training requirements for any hazardous materials other than dry ice. If you intend to ship any radioactive, chemical, or biological materials packed in dry ice, you will need to complete the Yale “Hazmat Shipment Checklist” first, and FAX it to EHS (785-7588) for assessment. Typically, radioactive and chemical shipments are completed by specially trained EHS personnel, while many biological material shipments can be handled by lab personnel that have completed the “Yale University Transportation and Transfer of Biological Agents” training course.

If you are not sure if the material you are sending with the dry ice is considered hazardous, contact your safety advisor or call EHS at 785-3550 for assistance.

When shipping packages that contain no hazardous materials other than the dry ice itself, the training requirements are simplified, but Federal rules still require the shipper complete an appropriate level of training. If you are going to ship non-hazardous items packed in dry ice, or sign any type of shipping documentation (such as a FedEx Airbill) for such a shipment, you must first review this training and pass the attached quiz.

PLEASE NOTE: Shipping regulations change frequently, so it is necessary to renew your dry ice shipper’s certification.

3. 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:

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.

Suffocation hazard: a large volume of carbon dioxide gas emitted in a confined space may create an oxygen deficient atmosphere.

Contact hazard: dry ice is a cryogenic material that causes severe frostbite upon contact with skin.

4. Packaging Dry Ice

Packaging dry ice properly will minimize the risk to personnel transporting the material. The explosion hazard will be eliminated with a package designed to vent gaseous carbon dioxide. Suffocation and contact hazards will be greatly reduced by labeling the package correctly, so those who come in contact with it will be aware of the contents.

A. Requirements

There are five basic requirements to consider for dry ice shipments.

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.
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.
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 A, Manufacturers of Dry Ice Shipping Containers.
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. **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 B. The label should be affixed to a vertical side of the box (not the top or bottom). The maximum allowable net quantity of dry ice allowed per package is 200 kg.

Figure 2

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

The image shows a FedEx USA Airbill form. A purple header contains the FedEx logo, 'USA Airbill Express', tracking number 839360283475, form number 0200, and 'Sender's Copy'. Section 1 'From' includes fields for Date, Sender's Name, Company, and Address. A highlighted oval contains 'Yes Shipper's Declaration not required' and 'Dry Ice, 9, UN 1845, 1 x 6 kg'. Section 4a 'Express Package Service' has options for Priority Overnight, Standard Overnight, 2Day, Express Saver, and Freight. Section 6 'Special Handling' includes 'Saturday Delivery' and 'HOLD Weekday' options. A second highlighted oval contains 'Dry Ice, 9, UN 1845, 1 x 6 kg'. Section 7 'Payment Bill to' has options for Sender, Recipient, Third Party, Credit Card, and Cash/Check. A '446' box is at the bottom right.

Figure 3

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

The image shows an Airborne Express Airbill form. A header contains 'Sender Account Number', 'Preprint Format No.', 'Payment' (Sender will be billed unless marked otherwise), 'Origin', and 'Airbill Number' 2959950825. Section 1 'FROM (Company)' includes fields for Street Address, City, State, and ZIP. Section 2 'TO (Company) PLEASE PRINT NEATLY' includes similar fields. A highlighted oval contains 'Dangerous Goods Shippers Declaration not required DRY ICE, 9, UN 1845, III, 1 X 5 KGS, 904'. Section 3 'Special Instructions' includes 'Saturday Delivery' and 'Hold at Airborne'. Section 4 'Service Type' has options for Express (Letter - 150 lbs), Next Afternoon (Letter - 5 lbs), and Second Day (Letter - 150 lbs). A 'Thank You for Shipping with Airborne!' box is at the bottom center. The bottom right features the Airborne Express logo and contact information.

B. Recommendations

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

1. Do not write descriptive or superfluous words on the exterior surfaces of your package. The dry ice label and airbill entries are the only references necessary for compliance with “hazmat” regulations related to your air shipment of dry ice. You may be instructed by EHS to apply additional labels or markings that are sometimes added for specific items that, while not “hazardous materials”, are “regulated”.
2. Reusing a dry ice box is a good use of resources. 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.
3. Secure your samples in such a way that when the dry ice sublimates, they will not move freely inside of the insulated box. This can be accomplished by wedging your samples in place with cardboard or Styrofoam. Fragile containers such as glass tubes or vials should be wrapped with cushioning material.
4. Minimize the volume of air to which the dry ice is exposed in order to slow the rate of sublimation. If there is any air space after you fill your package with dry ice, fill it with packing peanuts or other material to reduce the volume of air space.
5. 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.
6. Dry ice shipments can be made with FedEx 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 - 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>

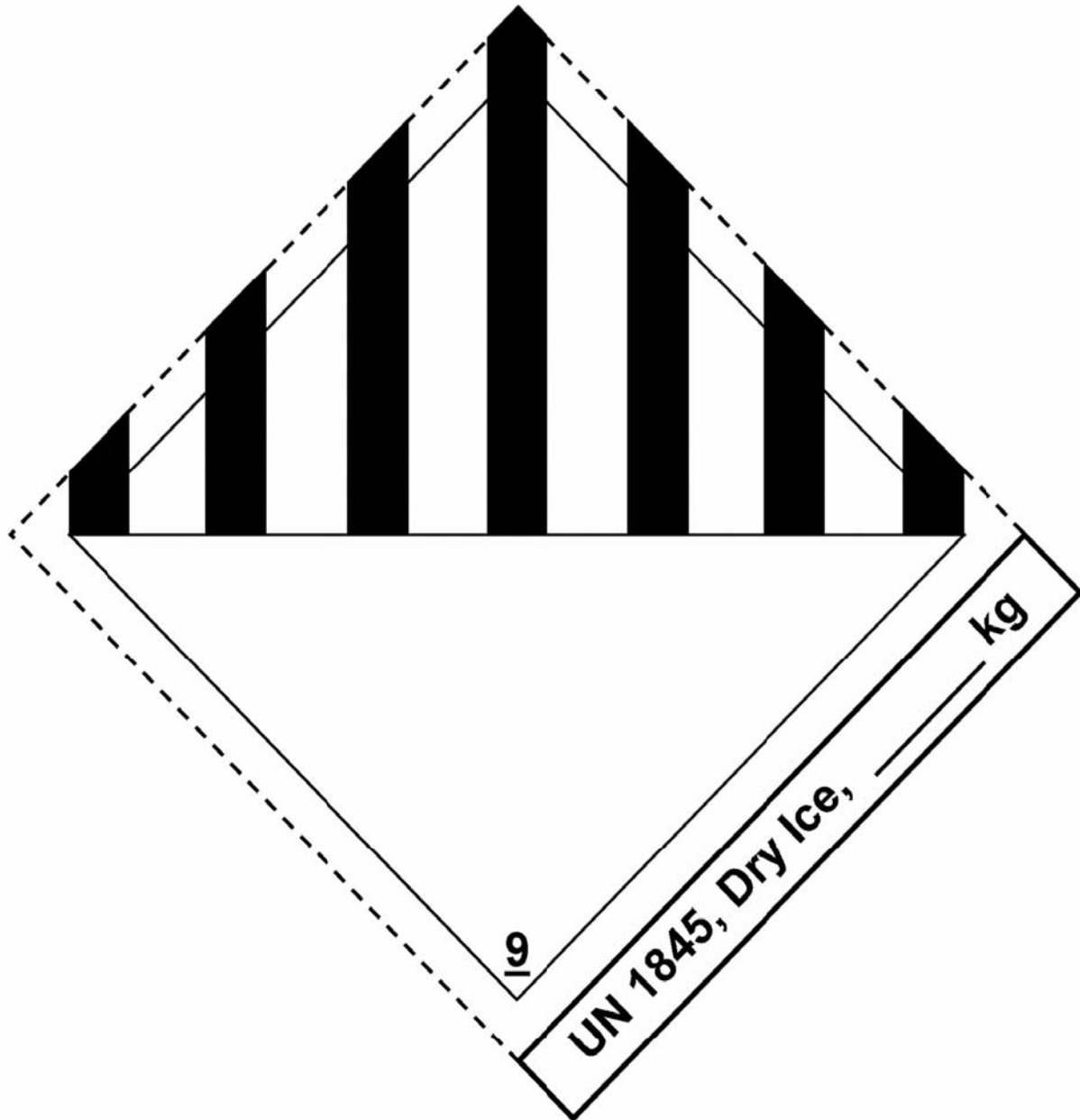
Polyfoam Packers Corporation
2320 S. Foster Avenue Wheeling, IL 60090
(888) 765-9362
<http://www.polyfoam.com>

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>

Appendix B - Dry Ice Shipping Label

Dry Ice labels are generally available from shipping and receiving rooms, FedEx and other carriers, and from EHS. Additionally, the label below can be printed out and used. It 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 kilogram weight of dry ice.



Appendix C – IATA Acceptance Checklist

2009 ACCEPTANCE CHECKLIST FOR DRY ICE (Carbon Dioxide, solid) (For use when a Shipper's Declaration for Dangerous Goods is not required)

A checklist is required for all shipments of dangerous goods (9.1.4) to enable proper acceptance checks to be made. The following example checklist is provided to assist shippers and carriers with the acceptance of dry ice when packaged on its own or with non-dangerous goods.

Is the following information correct for each entry?

	YES	NO	N/A
The Air Waybill contains the following information in the "Nature and Quantity of Goods" box (8.2.3)			
1. The UN Number "1845", preceded by the prefix "UN"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The words "Carbon dioxide, solid" or "Dry ice"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The Class number "9"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The number of packages of dry ice.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The net quantity of dry ice in kilograms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: **The packing group "III" and packing instruction "904" are optional.**

Quantity

6. The quantity of dry ice per package is 200 kg or less [4.2] YES NO N/A

Packages and Overpacks

7. The number of packages containing dry ice delivered as shown on the Air Waybill..... YES NO N/A
8. Packages are free from damage and in a proper condition for carriage YES NO N/A
9. The packaging conforms with Packing Instruction 904 and the package is vented to permit the release of gas YES NO N/A

Markings (Only use this section when accepting individual packages containing dry ice)

10. The words "Carbon dioxide, solid" or "Dry ice" [7.1.5.1(a)] YES NO N/A
11. The UN number "1845" preceded by prefix "UN" [7.1.5.1(a)] YES NO N/A
12. Full name and address of the shipper and consignee [7.1.5.1(b)] YES NO N/A
13. The net quantity of dry ice within each package [7.1.5.1(e)] YES NO N/A

Labels

14. Class 9 label affixed [7.2.3.10] YES NO N/A
15. Irrelevant marks and labels removed [7.1.1(b); 7.2.1(a)] YES NO N/A

State and Operator Variations

16. State and operator variations complied with [2.9] YES NO N/A

Comments: _____

Checked by: _____

Place: _____ Signature: _____

Date: _____ Time: _____

***IF ANY BOX IS CHECKED "NO", DO NOT ACCEPT THE SHIPMENT AND GIVE A DUPLICATE COPY OF THIS COMPLETED FORM TO THE SHIPPER.**

Dry Ice Shippers Quiz:

To complete your training, please log on to the “Dry Ice Shipping” quiz located at:

<http://learn.yale.edu/oehs/dryice/login.asp>

Note: You are only authorized to ship DRY ICE. You are not authorized to ship hazardous materials. Additional training is required.

If you have any questions or need additional information, please contact EHS at 785-3550 or via email at ehshazmat@yale.edu.