

<b><u>Program Title</u></b> Dry Ice Shipper Requirements	<b><u>Program No.</u></b> 6.3.3	<b><u>Classification</u></b> Transportation of Hazardous Materials
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## 1.0 INTRODUCTION

Dry ice is often used when shipping samples which must remain at low temperatures. Dry ice is regulated as a dangerous good when shipped because of its off-gassing properties. Specifically, dry ice is solidified carbon dioxide and undergoes sublimation (changes from solid to gas) at normal atmospheric conditions. The off-gassing of carbon dioxide can lead to the displacement of oxygen resulting in asphyxiation. Additionally, if improperly packaged (i.e., not vented), the off-gassed carbon dioxide can pressurize a container, potentially resulting in the container exploding. As such, the use of dry ice in shipments is regulated by the United States Department of Transportation (USDOT) and the International Air Transport Association (IATA).

This Dry Ice Shipments procedure has been developed as part of the Weill Cornell Medical College's ("WCMC") Environmental Health and Safety (EHS) Program Manual, to provide guidance and training to shippers of dry ice with the stringent regulations established by the USDOT and IATA.

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Appendix A – Acceptance Checklist for Dry Ice Shipments

Appendix B – Packaging Vendor List

### 3.0 OBJECTIVE

The objective of this Procedure is to provide WCMC employees guidance in the proper shipment of dry ice in accordance with federal and international regulations as well as WCMC procedures. The shipment process includes:

1. **Train** all persons shipping dangerous goods. Initial and re-current training required.
2. **Determine** the appropriate packing instructions and guidelines.
3. **Select** appropriate packing materials.
4. **Pack, mark, and label** the package(s) properly.
5. **Complete and retain** shipping documentation.

A checklist is provided in **Appendix A** to assist shippers in the proper completion of these steps.

### 4.0 APPLICABILITY

#### 4.1 WHO DOES THIS PROCEDURE APPLY TO?

The requirements of this Procedure apply to all WCMC faculty, staff, employees, or students who perform any of the activities of the shipment process identified in Section 3.0 – Objective. People performing any of these activities will hereby be identified as “shippers.”

#### 4.2 WHAT DOES THIS PROCEDURE APPLY TO?

This procedure focuses on the IATA air transportation requirements for dry ice shipments. The IATA air transport regulations are more restrictive than the USDOT ground transportation requirements. As such, ground shipments prepared in accordance with this procedure are compliant with the USDOT regulations.

If the shipper intends to ship any other biological, chemical, or radiological substances not specifically identified in this Procedure, then the shipper must contact EHS and/or Health Physics for further instructions and training.

#### 4.3 HOW LONG DO THE REQUIREMENTS OF THIS PROCEDURE APPLY?

The shipping guidelines and requirements of this procedure are primarily derived from the 2008 IATA Dangerous Goods Regulations (49<sup>th</sup> Edition). These regulations are revised on an annual basis. **Shippers must ensure that they possess and are compliant with the most current version of this Procedure prior to conducting any shipments.**

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## 5.0 PACKAGING REQUIREMENTS

Dry ice must be shipped in compliance with IATA Packing Instruction 904. Shippers are compliant with the requirements of IATA Packing Instruction 904 when shipping in accordance with this procedure and utilize appropriate packaging in accordance with the manufacturer's specifications. Note that many manufacturers have incorporated these criteria into certain models of diagnostic specimen and infectious substance packaging.

### 5.1 GENERAL PACKAGING CRITERIA

#### 5.1.1 Venting

Dry ice must utilize packaging designed and constructed to permit the release of carbon dioxide gas and prevent a build-up of pressure that could rupture the package. **Do not place dry ice in air-tight canisters or containers.**

#### 5.1.2 Package Integrity

The package must be free from damage and 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.

#### 5.1.3 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.

### 5.2 PACKAGING LIMITATIONS

Packaging must not contain more than 200 kg of dry ice.

### 5.3 PACKAGING VENDORS

A list of packaging vendors is provided in **Appendix B**. FedEx boxes are not acceptable for shipping dry ice.

## 6.0 MARKING AND LABELING REQUIREMENTS

Dry ice shippers must ensure that all packages are properly marked and labeled as follows:

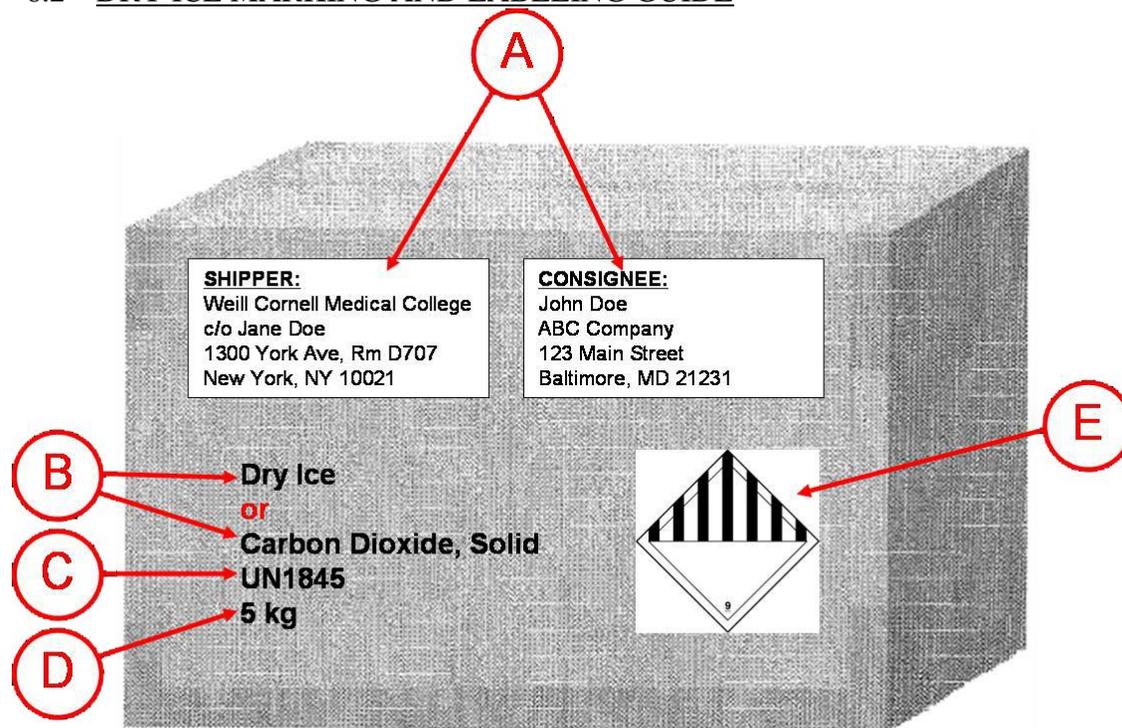
### 6.1 SHIPPER'S RESPONSIBILITIES

- Ensure all markings and labels are properly applied and located on the same side of the package. Labels must not overlap or obscure information.
- Ensure all markings and labels are in written in English and in good condition.
- Remove or obliterate any irrelevant marking already on the package.

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## 6.2 DRY ICE MARKING AND LABELING GUIDE



### 6.2.1 Ship “From” and “To” Information (“A” in illustration above)

The full name and address of the shipper (“From”) and consignee (“To”) must be clearly labeled or marked on the package.

### 6.2.2 Proper Shipping Name (“B” in illustration above)

The proper shipping name for dry ice is either “Dry Ice” or “Carbon Dioxide, Solid.” One of these shipping names must be marked on the package. No spelling variations are acceptable.

### 6.2.3 Dangerous Goods Identification Number (“C” in illustration above)

“UN1845” is the United Nations (UN) dangerous goods identification number for dry ice and must be clearly marked next to the proper shipping name.

### 6.2.4 Net Weight of Dry Ice (“D” in illustration above)

The net weight of dry ice placed in the package must be marked on the package adjacent to the proper shipping name and UN number. **The net weight must be in kilograms.**

### 6.2.5 Class 9 – Hazard Class Label (“E” in illustration above)

A Class 9 hazard class label must be affixed to the side of the package. Labels must be 4”x 4” in size. Use only pre-printed shipping labels. Package must be large enough for the label to fit on one side.

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**7.0 SHIPPING DOCUMENTATION**

**7.1 COMMERCIAL INVOICE**

A commercial invoice is not required for shipments of dry ice.

If a commercial invoice is required for another dangerous good (e.g., infectious substance), then the information pertaining to dry ice must be included. Refer to the 6.2 – Biological Material Shipper Requirements procedure for further instructions.

**7.2 SHIPPER'S DECLARATION OF DANGEROUS GOODS**

A Shipper's Declaration for Dangerous Goods is not required for dry ice.

If a Shipper's Declaration for Dangerous Goods is required for another dangerous good (e.g., infectious substance or genetically modified micro-organisms), then the information pertaining to dry ice must be included. Refer to the 6.2 – Biological Material Shipper Requirements of the EHS Program Manual for further instructions.

**7.3 CARRIER'S AIR WAYBILL**

The carrier's air waybill (e.g., FedEx Airbill) must be completed. In general, the following information must be completed on the carrier's air waybill. The following example FedEx Airbill is for the example package from Section 6.2.

The image shows a FedEx USA Airbill form with several fields highlighted by red circles labeled A through G. The form includes sender and recipient information, service selection, packaging details, and a section for dangerous goods. The highlighted areas are: A (Sender's Name: Jane Doe), B (Tracking Number: 844964519855), C (Recipient's Name: John Doe), D (Does this shipment contain dangerous goods? - Yes, Shipper's Declaration required), E (Dry Ice checkbox), F (Payment Bill to: Recipient), and G (Release Signature).

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7.3.1 Ship “From” and “To” Information (“A” in illustration above)

The full name and address of the shipper (“From”) and consignee (“To”) must be clearly printed on the airbill and must be the same as on the package.

7.3.2 Priority Service (“B” in illustration above)

It is highly recommended that all packages with dry ice be shipped priority overnight whenever possible. Insulated containers will still sublimate an estimated 5 to 10 pounds of dry ice in a 24-hour period. Actual time frames will vary depending on the package used and volume and density of dry ice.

7.3.3 Packaging (“C” in illustration above)

Identify the type of packaging used. Dangerous goods, including dry ice, can not be shipped in FedEx boxes or packaging, as such “Other” would be marked on the FedEx Airbill.

7.3.4 Declaration of Dangerous Goods (“D” in illustration above)

Dry ice is a dangerous good but a Shipper’s Declaration is not required (as noted in Section 7.2). For FedEx Airbills, check the appropriate box.

7.3.5 Nature and Quantity of Goods

The proper shipping name, hazard class, UN identification number, number of packages, and net weight must be entered on the carrier’s air waybill.

7.3.5.1 Pre-Printed Information (e.g., FedEx Airbills)

FedEx pre-prints this information in Section 6 of their FedEx USA Airbill for domestic service. Complete the following:

1. Check the Dry Ice box. (“E” in illustration above)
2. Enter the total number of packages with dry ice (“F” in illustration above) and the net weight of dry ice per package in kilograms (“G” in illustration above).

7.3.5.2 Not Pre-Printed Information

If the information is not pre-printed, the following information must be entered in the **Nature and Quantity of Goods** section of the carrier’s air waybill:

**Dry Ice or Carbon Dioxide, Solid** (as selected in Section 6.2.2)  
**9, UN1845**

(Enter # of packages) x (Enter net weight per package in kgs)

For example package: **1 x 5 kg**

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## **8.0 INTERNATIONAL SHIPMENTS**

International shipments may require additional permits and documentation. Shippers must contact EHS for assistance to coordinate the importation and/or exportation of international shipments. **Shipments to and from foreign nationals working within the United States is still considered an international shipment.**

## **9.0 ADDITIONAL CARRIER REQUIREMENTS**

**Always inform the carrier that the package contains dry ice when scheduling the shipment.** In addition to the requirements established by IATA for the transport of dangerous goods by air, specific carrier's may have more stringent requirements. The shipper must contact their intended carrier and verify if the carrier has any additional requirements from those specified in this procedure. The following are additional limitations for a few common carriers which relate to shipment of dry ice.

### 9.1 FEDERAL EXPRESS (FEDEX)

FedEx has no additional restrictions for shipments of dry ice.

### 9.2 UNITED PARCEL SERVICE (UPS)

The following are the additional requirements and limitations for UPS:

#### 9.2.1 Contracted Services

Shipments of dry ice and other dangerous goods without an approved contract with UPS are prohibited. Shippers must establish contracted services with UPS in order to ship dangerous goods.

## **10.0 TRAINING**

All WCMC employees ("shippers") who conducted any of the activities described in this procedure must receive Dry Ice Shipper Training and safety training before conducting the activities.

### 10.1 DRY ICE SHIPPER TRAINING

Dry Ice Shipper Training consists of two components:

#### 10.1.1 Dry Ice Shipments Procedure

Shippers must have read and be familiar with the requirements identified in the most current version of this procedure prior to each shipment. *Note that IATA re-issues / revises its regulations on an annual basis and necessary revisions will be made accordingly by EHS.*

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#### 10.1.2 Dry Ice Shipper Training Course

Shippers must attend the Biological Materials and Dry Ice Shipper Training course provided by Environmental Health and Safety (EHS) once every two years and successfully pass the competency test. Employees requiring this training must pre-register on EHS' website.

### 10.2 SAFETY TRAINING

In addition to the Dry Ice Shipper Training, shippers must attend the following safety training as required for the materials they will be handling.

#### 10.2.1 Laboratory Personnel

Laboratory Chemical Safety and Disposal (Chemical Hygiene Plan) training is required for shippers of dry ice in laboratories. This training must be completed annually.

#### 10.2.2 Non-Laboratory Personnel

Hazard Communication Program for Chemicals training is required for shippers of dry ice in non-laboratory areas. This training must be completed annually.

### 10.3 TRAINING RECORDS

Records for EHS conducted and/or coordinated for dry ice shipper training are maintained by EHS. If training is conducted by a training entity other than EHS, then copies of training records must be forwarded to EHS for approval.

## **11.0 RECORD RETENTION, AVAILABILITY, AND REVISIONS**

### 11.1 SHIPPING DOCUMENTS

Shipping documents must be retained by the Shipper for a minimum of two (2) years from the date of shipment and have available upon request.

### 11.2 REVISIONS

IATA revises the Dangerous Goods Regulations on an annual basis. This procedure will be updated by EHS accordingly. Shipper's must ensure that all shipments of dry ice are in accordance with the most current version of this procedure.

## **12.0 DEFINITIONS**

**Carrier(s)** means a person or entity engaged in the transportation of passengers or property by:

- (1) Land or water, as a common, contract, or private carrier, or
- (2) Civil aircraft.

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**Dangerous goods** are articles or substances which are capable of posing a risk to health, safety, property or the environment. General classifications of dangerous goods include explosives, gases, flammable liquids, flammable solids, spontaneously combustibles, water reactives, oxidizers, organic peroxides, toxic and infectious substances, radioactive material, corrosives, and miscellaneous (e.g., dry ice).

**Foreign national** is any person who is not a U. S. citizen, including permanent resident aliens.

**Net quantity** is the weight or volume of the dangerous goods contained in a package excluding the weight or volume of any packaging material. Note, only International System units of measure (e.g., kg, g, L, ml, etc.) may be used when shipping dangerous goods by air.

**Shipper(s)** refers to WCMC faculty, staff, employees, or students who perform any of the activities identified in Section 3.0 – Objective.

### **13.0 REFERENCES**

Dry Ice Info.com (<http://www.dryiceinfo.com>)

Federal Express – Dangerous Goods Shipping (2004,  
<http://fedex.com/us/services/express/addservopt/dangerousgoods>)

IATA Dangerous Goods Regulations (49<sup>th</sup> Edition, 2008)

University of New Hampshire Guide to Shipping with Dry Ice

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**APPENDIX A**

**Acceptance Checklist for Dry Ice Shipments**

(refer to next page)

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**ACCEPTANCE CHECKLIST FOR DRY ICE SHIPMENTS**

This checklist is provided to assist WCMC personnel with shipments containing dry ice. This checklist identifies the primary requirements of the 6.3 – Dry Ice Shipments procedure. Refer to the specific section of the procedure for the full requirements associated with each question. The section number for each question is provided under “Sect #” below. Each question must be completed in accordance with the procedure and answered “YES” or “N/A” (not applicable) before the shipment can be shipped. Contact EHS for further assistance if any information is unclear.

	Sect #	YES	N/A
<b>Training</b>			
Personnel must complete the following:			
1. Only trained personnel are packaging and shipping with dry ice.	4.1	<input type="checkbox"/>	
2. Utilize the most recent version of this procedure when preparing shipment.	10.1.1	<input type="checkbox"/>	
3. Attended the Biological Materials and Dry Ice Shipper training course within the last 2 years.	10.1.2	<input type="checkbox"/>	
4. Attended Chemical Hygiene Plan training for lab personnel or Hazard Communication Program for Chemicals training for non-lab personnel within the last year.	10.2	<input type="checkbox"/>	
<b>Carrier Specific Requirements and International Shipments</b>			
5. Shipper contacted carrier to determine for additional requirements and packaged accordingly.	9.0	<input type="checkbox"/>	
6. Contacted EHS for International Shipments	8.0	<input type="checkbox"/>	<input type="checkbox"/>
<b>Air Waybill</b>			
The Air Waybill contains the following information:			
7. Full name and address of shipper and consignee matches packaging	7.3.1	<input type="checkbox"/>	
8. The words “Carbon Dioxide, Solid” or “Dry Ice”	7.3.5	<input type="checkbox"/>	
9. The hazard class number “9”	7.3.5	<input type="checkbox"/>	
10. The UN dangerous goods identification number “UN1845”	7.3.5	<input type="checkbox"/>	
11. The number of packages of dry ice	7.3.5	<input type="checkbox"/>	
12. The net weight of dry ice (in kilograms) per package	7.3.5	<input type="checkbox"/>	
13. Identify that the shipment contains a Dangerous Goods and/or Shipper’s Declaration is not required	7.3.4	<input type="checkbox"/>	<input type="checkbox"/>
<b>Packages</b>			
14. The quantity of dry ice added per package is 200 kg or less	5.2	<input type="checkbox"/>	
15. The same number of packages as shown on Air Waybill	7.3.5	<input type="checkbox"/>	
16. Packages are free from damage and in a proper working condition	5.1.2	<input type="checkbox"/>	
17. The package is designed for use with dry ice (in accordance with IATA Packing Instruction 904) and is vented to permit the release of gas.	5.1 5.3	<input type="checkbox"/>	
<b>Markings and Labels</b>			
The package must be marked and labeled with the following information:			
18. Full name and address of the shipper and consignee	6.2.1	<input type="checkbox"/>	
19. The words “Carbon Dioxide, Solid” or “Dry Ice”	6.2.2	<input type="checkbox"/>	
20. The UN dangerous goods identification number “UN1845”	6.2.3	<input type="checkbox"/>	
21. The net weight of dry ice (in kilograms) within each package	6.2.4	<input type="checkbox"/>	
22. Appropriate Class 9 label affixed	6.2.5	<input type="checkbox"/>	
23. Remove or obliterate all irrelevant marks and labels	6.1	<input type="checkbox"/>	<input type="checkbox"/>

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## **APPENDIX B**

### **Packaging Supplier List**

Air Sea Atlanta  
Phone: (404) 351-8600  
<http://www.airseatlanta.com>

All-Pak, Inc.  
Phone: (800) 245-2283  
<http://www.all-pak.com>

CARGOpak Corp.  
Phone: (800) 266-0652  
<http://www.cargopak.com/>

DG Supplies, Inc.  
Phone: (800) 347-7879  
<http://www.dgsupplies.com>

EXAKT Technologies, Inc.  
Phone: (800) 866-7172  
<http://www.exaktpak.com>

Fisher Scientific International  
Phone: (800) 766-7000  
<http://www1.fishersci.com>

HAZMATPAC, Inc.  
Phone: (800) 923-9123  
<http://www.hazmatpac.com>

Inmark, Inc.  
Phone: (800) 646-6275  
<http://www.inmarkinc.com>

JIT Certified, Inc.  
Phone: (800) 962-8636  
<http://www.jitcertified.com>

Saf-T-Pak, Inc.  
Phone: (800) 814-7484  
<http://www.saftpak.com>

Source Packaging of New  
England, Inc.  
Phone: (800) 200-0366  
<http://www.sourcepak.com>

Therapak Corporation.  
Phone: (888) 505-7377  
<http://www.therapak.com>

Tuscarora Incorporated  
Phone: (800) 323-7442  
<http://www.polyfoam.com>

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