

# Shipping with Dry Ice (OHS\_BIO200) Course Material

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## Introduction

Welcome to the **Shipping with Dry Ice (OHS\_BIO200)** training course. This course is **required** for anyone mailing shipments refrigerated with solid Carbon Dioxide (Dry Ice).

If you choose to ship a package using Dry Ice, International and Federal requirements dictate that you **must** be trained to do so every two years or when regulations change. Additional training may be required depending on the samples/materials that are being shipped with Dry Ice.

UAB **requires** additional shipping training for anyone that will be packing:

- Materials shipped on Dry Ice: **Shipping with Dry Ice (OHS\_BIO200)**
- Infectious substances capable of causing disease in humans or animals: **Shipping Infectious Substances, Category A (OHS\_BIO202)**



Failure to properly pack and ship materials is a **violation** of the law and is punishable with fines and/or imprisonment.

## Objectives

At the conclusion, participants should be able to:

1. Identify and use the United Nations (UN) Classification and Proper Shipping Names (PSN) for Dry Ice.
2. Pack any primary, secondary containment, or overpack boxes correctly.
3. Mark and Label any shipping packages correctly.
4. Complete a Shipper's Declaration if required.
5. Follow all safety guidelines to avoid any accidents or injuries.

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## Overview



**Dry Ice Blocks**

If you need to send shipments that are refrigerated, you may choose to use gel packs or Solid Carbon Dioxide (Dry Ice). Gel packs are **not regulated**. They are not capable of the cooling to the temperature and duration achieved by Dry Ice. Wet ice, or ice made from water, is **not allowed** due to the likelihood of leaks.

Dry Ice is a commonly used refrigerant for shipping biological samples and is classified as a Class 9 Miscellaneous Dangerous Good. The United States Department of Transportation (US DOT) and the International Air Transportation Association (IATA) regulate Dry Ice shipments and dictate the specific procedures to follow when shipping with Dry Ice.

Dry Ice refrigerated packages are normally shipped by air. The following course material summarizes the regulatory requirements of Dry Ice-containing shipments by air. The requirements for shipping with Dry Ice as a refrigerant are combined with the shipping requirements that apply to the actual samples/materials you intend to refrigerate. Contact OH&S at 205-934-2487 if you have any questions.



**Gel Pack**

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## Shipper Responsibilities

### Packaging

#### *UN and PSN*

Proper identification requires both a UN number **and** the Proper Shipping Name (PSN). For Dry Ice, the UN Number is **UN 1845**. The Proper Shipping Name is “Dry Ice” **or** “Carbon Dioxide, Solid.” Together the proper identification would look like this:

“UN 1845 Dry Ice” **or** “UN 1845 Carbon Dioxide, Solid.”

#### *Selecting the Proper Packaging*

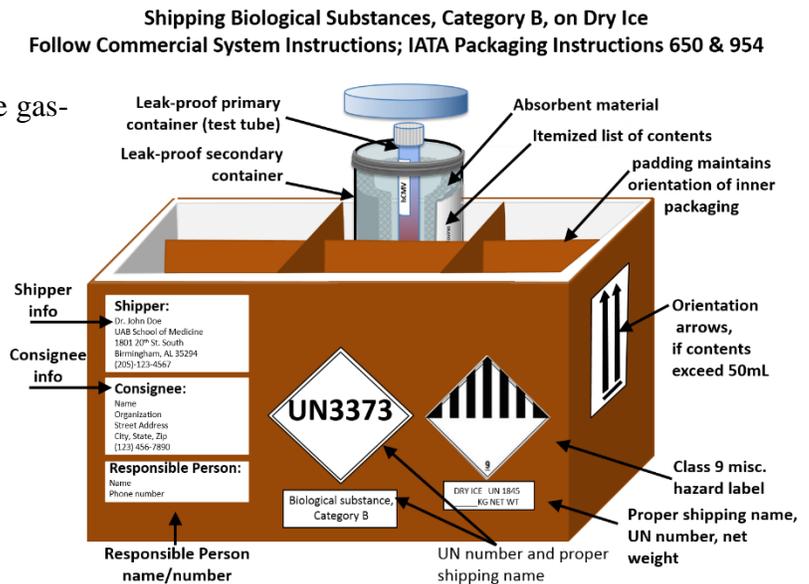
Packaging components for certain hazardous samples must pass testing requirements as a system. Mixing and matching packaging components from different manufacturers is **not allowed** for Category A or B shipments.

All packaging intended for shipment with Dry Ice must be designed and constructed to allow release of Carbon Dioxide gas, preventing the build-up of pressure. Shippers must make arrangements with the carrier **before** Dry Ice may be transported.

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## Outside Packaging

The outside packaging is typically a fiberboard box or container used to hold the gas-permeable insulated cooler, preferably Styrofoam, containing the Dry Ice. Outside packaging also serves as a surface for displaying clear Marks, Labels, and other important information.



## Inside Packaging

- Properly **classify** and **identify** the samples or materials you are shipping with the Dry Ice.
- Please refer to the interactive [Classification Flowchart](#) if you are unsure of the proper classification and to determine if any additional training will be required.
- Once the sample or material is packed with the appropriate packaging material and according to the appropriate packing instructions, you can begin the process of packing it according to Dry Ice regulations (Packing Instructions 954).



All packaging components for Infectious Substances, Category A, or Biological Substances, Category B must be assembled per the manufacturers packing instructions specific to the packaging system purchased. If you will be packing any Category A or B substances, you **must** complete the **required** training.

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## Sealed Containers

Sealed containers and Dry Ice **do not** mix. Dry Ice is frozen Carbon Dioxide gas and expands exponentially as it sublimates.



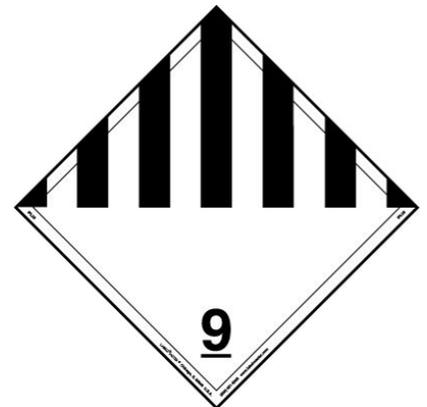
**Never** place Dry Ice in a sealed container.

Please watch this [video](#) to see how dangerous Dry Ice in a sealed container can be. UAB professionals did this experiment. UAB Police were present, and all safety precautions were followed.

## Marks and Labels

Dry Ice shipments require the labels described below:

- A Class 9 Miscellaneous hazard black & white diamond-on-point label
- Proper Shipping Name and UN Number (which is either “UN 1845 Dry Ice” **or** “UN 1845 Carbon Dioxide, Solid”)
- The weight of the Dry Ice (in kilograms) must be included adjacent to the black & white on-point label or the Proper Shipping Name (PSN)
- Any additional substance-specific Marks and Labels required of the material being refrigerated by the Dry Ice



Vendors provide Marks and Labels with the appropriate packaging components. These labels must meet minimal font and dimension requirements.



If you have any questions about the appropriate required Marks and Labels, contact OH&S at (205) 934-2487.

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This is an example of a [pre-printed label](#) available on the [OH&S website](#) that you can complete and affix on the outside of packages that do not contain Category A or B substances. If you are **not** shipping Category A or B substances but are shipping with Dry Ice, you **must** label the **contents being cooled**.

## CONTENTS BEING COOLED:

- Diagnostic or Treatment Purposes
- Exempt Animal Specimen
- Exempt Human Specimen
- Non-Regulated

## Documentation

### Shipper's Declaration

A Shipper's Declaration is **required** for UN 1845 Dry Ice **only** when it is used as a refrigerant for Infectious Substances, Category A. If it contains Dry Ice as the packing refrigerant, then the Dry Ice **must** also be listed on the Shipper's Declaration.

Refer to [49 CFR 173.127](#) to confirm that all requirements have been met.

The form is titled "SHIPPER'S DECLARATION FOR DANGEROUS GOODS" and includes a FedEx logo. It contains several sections: "SHIPPER'S DECLARATION FOR DANGEROUS GOODS", "TRANSPORT DETAILS", "NATURE AND QUANTITY OF DANGEROUS GOODS", and "Additional Handling Information". The "NATURE AND QUANTITY OF DANGEROUS GOODS" section includes a table with columns for Proper Shipping Name, Class or Division, UN ID No., Packing Group, Subst. Hazard Class, Quantity and type of packaging, Packing Inst., and Authorization. The form also includes a "WARNING" section and a signature line.

DANGEROUS GOODS IDENTIFICATION					Quantity and type of packaging	Packing Inst.	Authorization
Proper Shipping Name	Class or Division	UN ID No.	Packing Group	Subst. Hazard Class			

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## *Waybill*

If the items you are shipping **do not** require a Shipper's Declaration (non-dangerous goods, "Biological Substance, Category B," or Exempt Human/Animal Specimens) then the following information must be included on the waybill in the "Nature and Quantity of Goods" section:

- UN Number: UN1845
- Proper Shipping Name: "Carbon Dioxide, Solid" or "Dry Ice"
- The Class or Division Number: 9
- The number of packages
- The Net Weight of the Dry Ice in each package
- "UN3373, Biological Substances, Category B" (if appropriate).

## Examples

Appendix A at the end of this document contains pictures showing the correct shipping label requirements for each one below:

- Shipping Nonhazardous or Exempt Specimens
- Shipping Genetically Modified Organisms
- Shipping Biological Substances, Category B
- Shipping Infectious Substances, Category A

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## Security

After preparing the package for shipment, the package must remain under the direct control of trained personnel until it is handed over to the carrier. This reduces the chances of tampering, theft, destruction, or invalidating the shipper's signature that signifies the package has been prepared in accordance with 49 CFR/IATA regulations.



If you suspect a package has been tampered with notify UAB OH&S immediately at (205) 934-2487.

## Things You Need To Remember

There are several things you should remember when shipping items that need to be refrigerated:

- Using “wet ice,” or ice made from water, is **never allowed** due to the likelihood of leaks. You should use Dry Ice or gel packs.
- When using Dry Ice, read and pack according to PI 954.
- Use a Styrofoam box when packing with Dry Ice.
- **Never** place Dry Ice within a sealed container due to the possibility of an explosion.
- If you are shipping a package containing an Infectious Substances, Category A on Dry Ice, the Shipper's Declarations **must** include the information for Dry Ice as well as the Infectious Substance, Category A.
- If your shipment does not require a Shipper's Declaration, you must use a waybill.

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## Exceptions

### *Overpacks*

If multiple fully compliant Dangerous Goods packages are placed within a fiberboard box, it is considered an overpack. All Marks and Labels on the inner packages must be reproduced on the overpack. The word “overpack” must also be placed on the outside of the overpack.

### *Non-Dangerous Goods*

There are exceptions in the regulations for non-dangerous goods shipments by air within the U.S. when using less than 2.5Kg (5.5 pounds) of Dry Ice. The packages must allow for the release of the CO<sub>2</sub> gas, be marked “Dry Ice”, list the quantity of Dry Ice and the contents of the package. These packages can be checked on commercial air flights as long as the airline knows ahead of time.

## Operator (or Carrier) Responsibilities

- Must detect errors
- Use acceptance checklist
- Ensure safe loading, storage, and transport
- Inspect for damage or leaks
- Report any problems to the proper authorities

## Receiver (or Consignee) Responsibilities

The **Receiver (or Consignee)** is the person(s) the material was sent to at the final destination. Responsibilities are to:

1. Provide assistance with import permits
2. Inspect received packages for damage or leaks. Report any damages to hazardous materials immediately to OH&S at (205) 934-2487.
3. Verify itemized list of contents
4. Report receipt to the shipper
5. Report leaking packages to the appropriate authority

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## Conclusion

This concludes the **Shipping with Dry Ice (OHS\_BIO200)** training course. This course has the following parts:

1. Shipping Dangerous Goods Module
2. Shipping Dangerous Goods Attestation
3. Shipping with Dry Ice Course Material
4. Shipping with Dry Ice Assessment: 90% or higher is considered passing. You have three chances to successfully complete the assessment. Failing all three attempts means that you fail the course and must retake the course.

## Want to Learn More?

OH&S has many training courses available to all UAB active employees and students. This includes topics such as in depth radiation training, biosafety, bloodborne pathogens, chemical safety, Controlled Substances, building life safety, hazardous and medical waste, universal waste, PPE, Hazard Communication, etc.

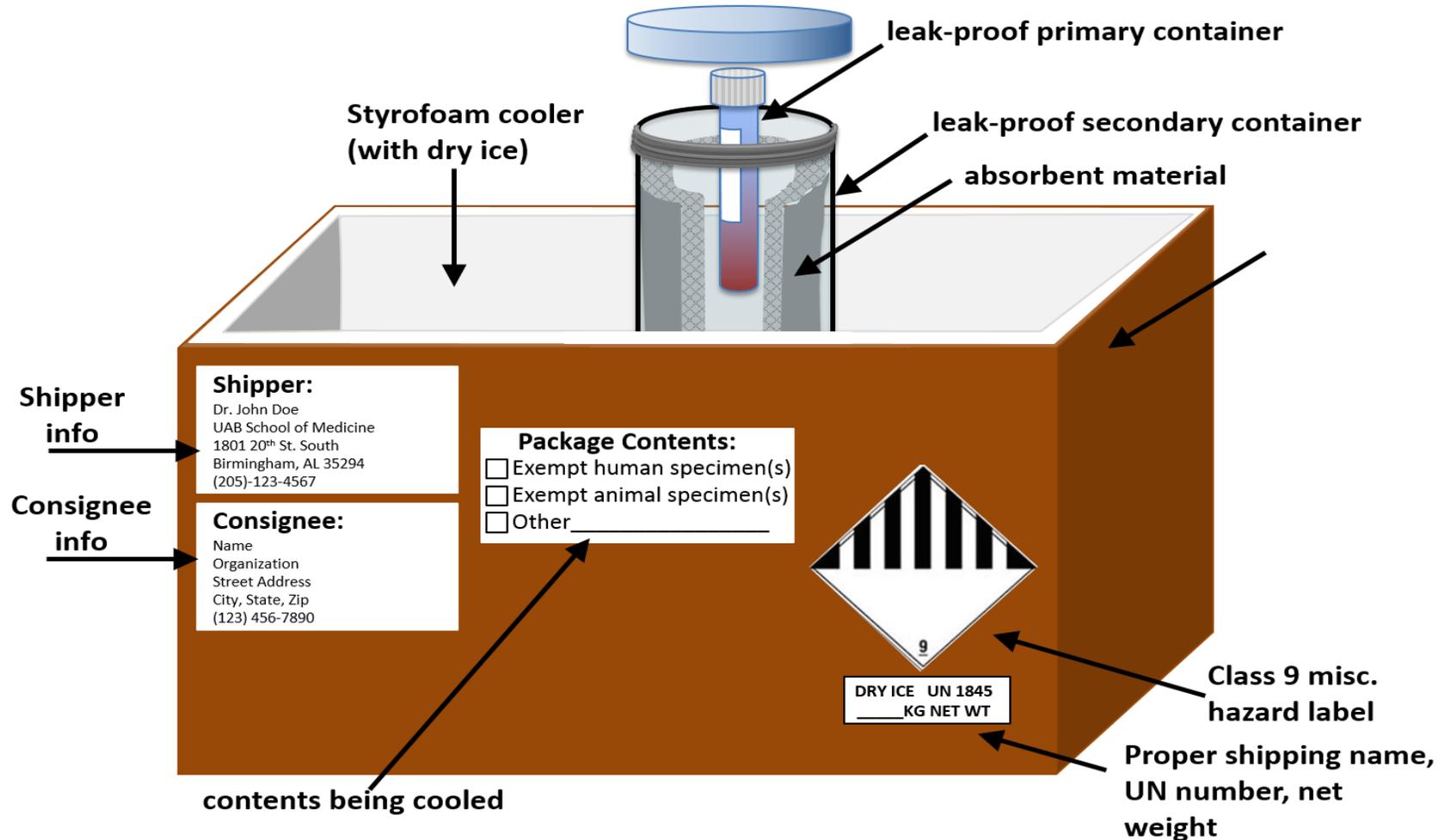
We have a [decision tree](#) to assist you in choosing the right course to match the knowledge/skills you may need at work every day as well.

If you have any questions or comments, please feel free to contact OH&S at (205) 934-2487.

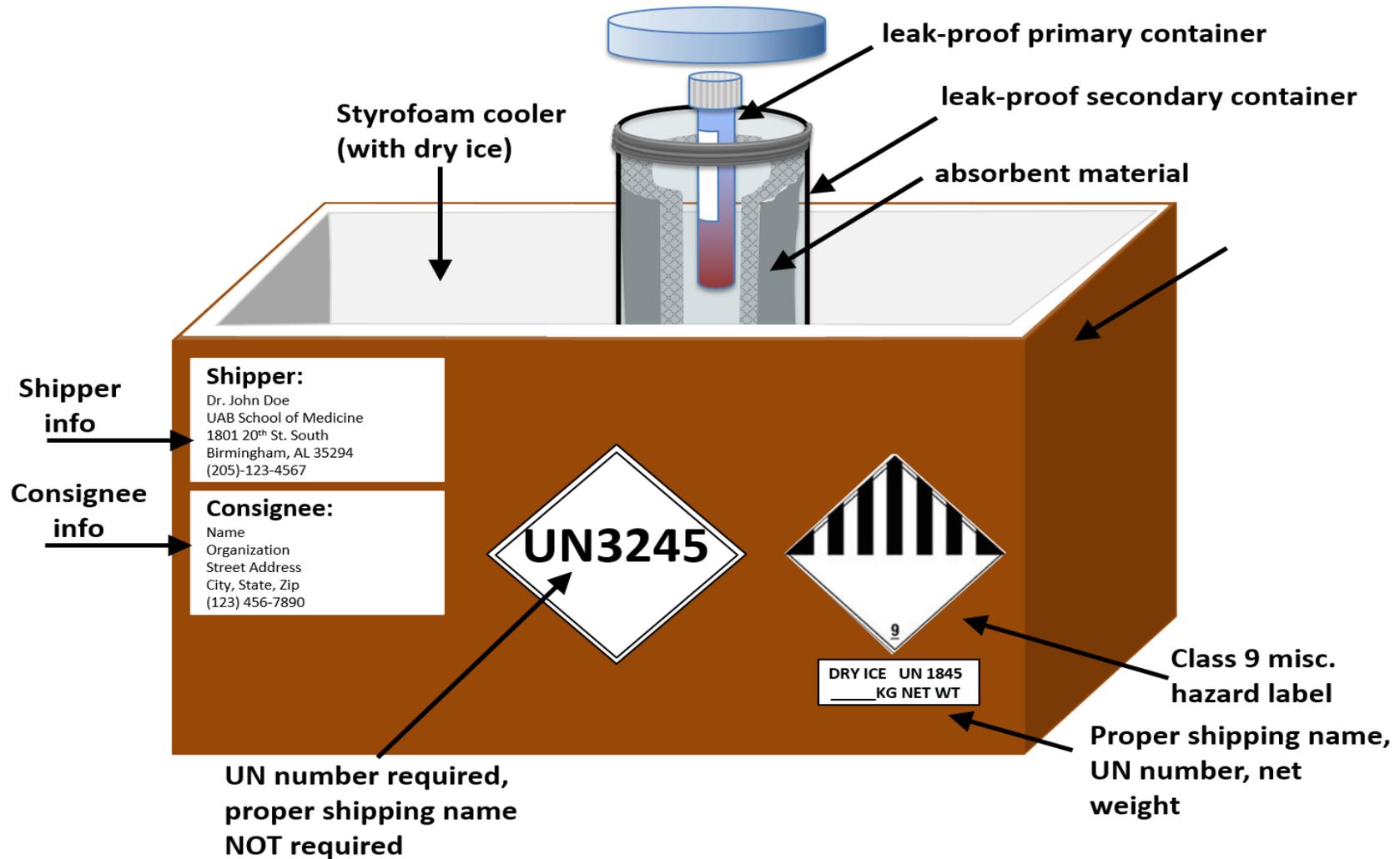
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## Appendix A: Shipping Label Requirements

### Shipping Nonhazardous or Exempt Specimens on Dry Ice Follow IATA Packaging Instruction 954

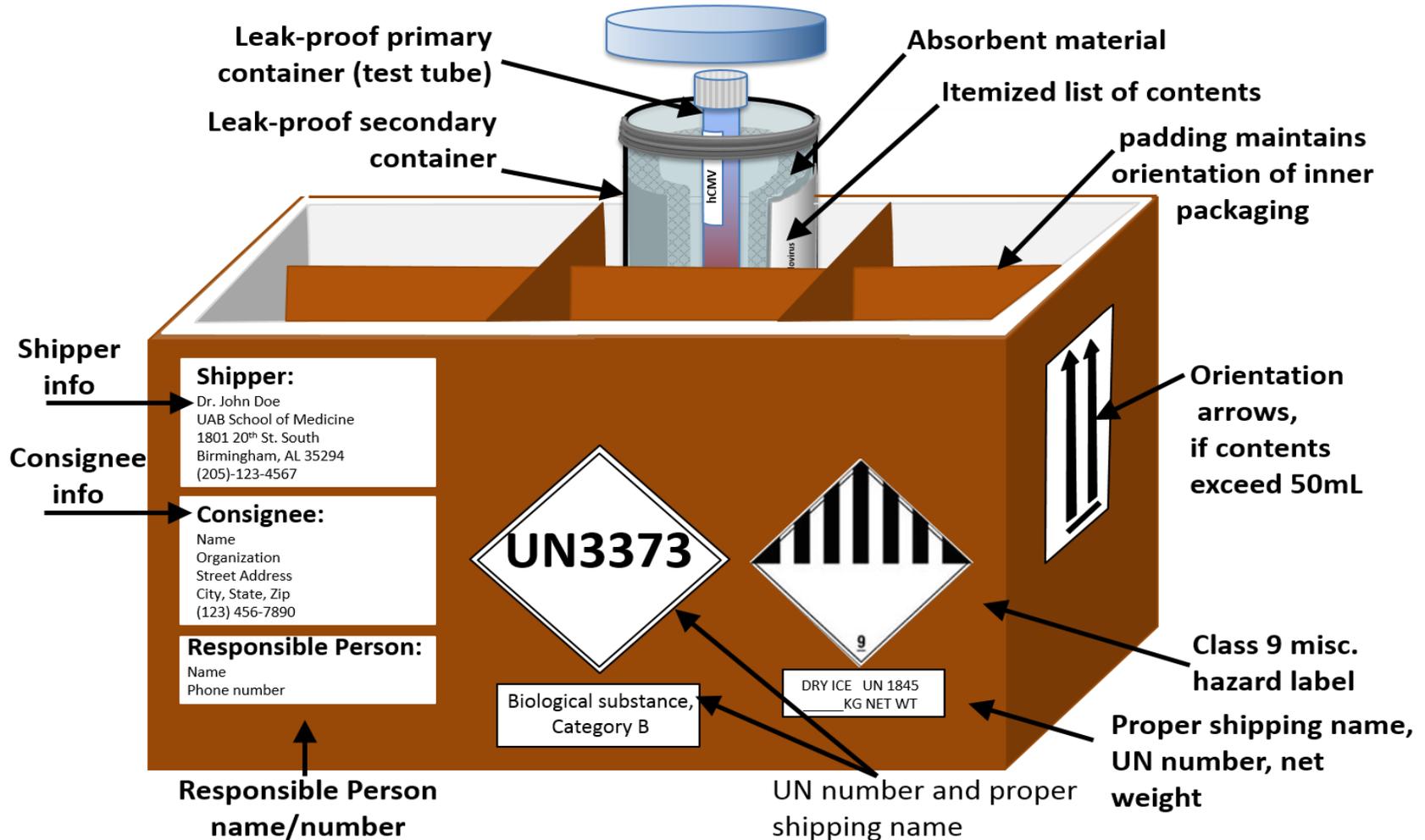


## Shipping Genetically Modified Organisms on Dry Ice Follow IATA Packaging Instructions 959 & 954



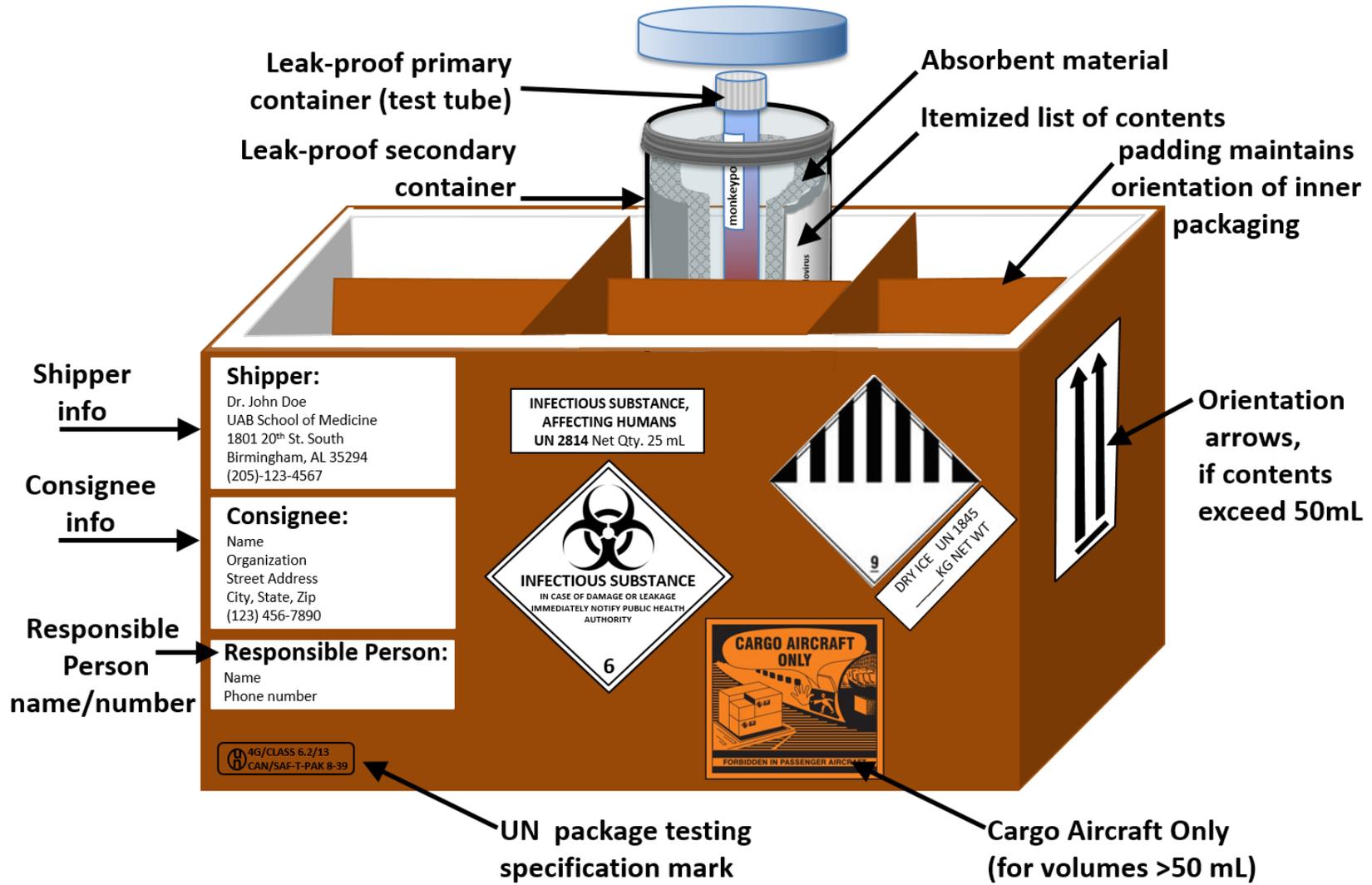
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## Shipping Biological Substances, Category B, on Dry Ice Follow Commercial System Instructions; IATA Packaging Instructions 650 & 954



# Shipping with Dry Ice (OHS\_BIO200) Course Material

## Shipping Category A, Infectious Substances on Dry Ice Follow Commercial System Instructions; IATA Packaging Instructions 620 & 954



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## Appendix B: Shipper's Declaration Example

### SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper: \_\_\_\_\_

Consignee: \_\_\_\_\_

(Provide at least two copies to the airline)

Air Waybill No. \_\_\_\_\_

Page 1 of 1 Pages

Shipper's Reference Number: \_\_\_\_\_



**Two completed and signed copies of this Declaration must be handed to the operator.**

**TRANSPORT DETAILS**

This shipment is within the limitations prescribed for: (delete non-applicable)

PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY
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Airport of Departure: \_\_\_\_\_

Airport of Destination: \_\_\_\_\_

**WARNING**

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder, or an IATA cargo agent.

Shipment type: (delete non-applicable)

NON-RADIOACTIVE     RADIOACTIVE

**NATURE AND QUANTITY OF DANGEROUS GOODS**

Dangerous Goods Identification					Quantity and type of packaging	Packing Inst.	Authorization
Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Subsidiary Risk			

Additional Handling Information: \_\_\_\_\_

Emergency Telephone Number: \_\_\_\_\_

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable International and National Governmental Regulations.

Name/Title of Signatory: \_\_\_\_\_

Place and Date: \_\_\_\_\_

Signature: \_\_\_\_\_  
(see warning above)

FOR RADIOACTIVE MATERIAL SHIPMENT ACCEPTABLE FOR PASSENGER AIRCRAFT, THE SHIPMENT CONTAINS RADIOACTIVE MATERIAL INTENDED FOR USE IN OR INCIDENT TO RESEARCH, MEDICAL DIAGNOSIS, OR TREATMENT.

FedEx 501421 0212 L20024 201170946 0PC