

# Shipping with Dry Ice

## I. Hazard Identification

Dry ice is classified by the International Air Transport Association (IATA) as a “miscellaneous” hazard, class 9. Dry ice is considered hazardous during transportation for three reasons:

1. **Explosion hazard:**
2. **Suffocation hazard.**
3. **Contact hazard:**

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.

## II. Packaging of Samples

1. Samples should be stored in suitable sealed small containers
2. These should be placed in a sealable plastic bag or other secondary container.
3. The container should be placed in a polystyrene box containing sufficient dry ice to last for the transit time (plus an extra 12-24 hours in case of transport delays).
4. The polystyrene box should be placed inside a cardboard box, which can be sealed with packing tape and clearly labeled with the shipping address and shipper’s details. A list of contents should be included inside the cardboard box (but separate from the samples).

## III. Packaging Dry Ice

There are five 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. **(RISK OF EXPLOSION!)**
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, such as Air Sea Containers Ltd.

When shipping by a commercial courier:

4. **Air Waybill:** This must include the statement “Dry ice, 9, UN1845, *number of packages X net weight in kilograms.*” Check with your courier to make sure you have made the proper notation on their paperwork.

5. **Labelling:** the outermost container must be labeled with a hazard class 9 label, UN 1845, and net weight of dry ice in kilograms. A printable version is included below. 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.

#### IV. Transportation

##### Between university sites

For transport by road, the transport regulations apply if the goods are transported on the public highway by any means. However, they do not apply to carriage between one part of University premises and another part situated in the immediate vicinity even if a public road separates them. However, the materials must still be packed in such a way to ensure they do not leak in transit and be appropriately labelled with emergency contact details.

##### By Air

Where the dry ice is used to pack perishables which themselves are NOT classified as dangerous goods, then dry ice is permitted on aircraft as checked or carry-on baggage providing the quantity of dry ice does not exceed 2 Kg and the package permits the release of carbon dioxide gas. Packages must be properly labelled. Passengers are limited to a maximum of 2 Kg in carry-on and checked baggage combined. In all cases the operator (airline) must be informed you wish to carry dry ice (specific approval is required to carry it in checked baggage) to ensure ventilation safety procedures are followed. In some cases the operator will apply their own restrictions on carriage of dry ice.

Where dry ice is used in packages containing other dangerous goods (i.e. Biological) the requirements detailed in the “Shipping of Cat. B Biological Samples” must be met.

#### Recommendations

Note the following recommendations when packaging dry ice shipments:

- Reusing a dry ice box is a good use of resources. If you choose to reuse a box, completely obliterate all unnecessary markings. 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 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 polystyrene. Fragile containers such as glass tubes or vials should be wrapped with cushioning material.
- 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.
- 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.

## **Shipping Category B Biological Samples.**

The air transport regulations specify that dangerous goods must not be carried by passengers as/or in checked baggage, carry-on baggage or on their person.

Biologicals which are KNOWN to be non-hazardous and non-pathogenic are not subject to any transportation regulations. Any untested samples which could possibly carry any kind of pathogen (i.e. any human or animal sample) should be described as a Biological Category B sample described as UN3373

Dangerous goods must always be transported as separate packages in the hold and must always be declared. (The operator/airline is required to report to the appropriate State authority when undeclared or undeclared dangerous goods are discovered. This is a serious offence and would be dealt with accordingly by the authorities)

All Biological Cat B samples traveling by air should be packaged according to IATA packing instruction 650.

[https://www.iata.org/whatwedo/cargo/dgr/Documents/DGR52\\_PI650\\_EN.pdf](https://www.iata.org/whatwedo/cargo/dgr/Documents/DGR52_PI650_EN.pdf)

These are similar to the packing instructions described above, placing the samples inside at least two sealed containers, but also inserting enough absorbing material to collect any leaked liquid.

### **Other Chemicals**

There is a provision in the regulations for the inclusion of small quantities of 'preservative' within these Cat B packages (i.e. ethanol or formalin). There can be no more than 30mls per small tube of sample to a total of 4 litres in the whole outer container. Details of these chemicals do not need to be declared to the courier but may be included in the contents list kept within the box.

### **Air Waybill**

When shipping with a commercial courier the air waybill must include the statement "Biological Substance Category B, UN3373 x *number of packages*"

### **Labelling**

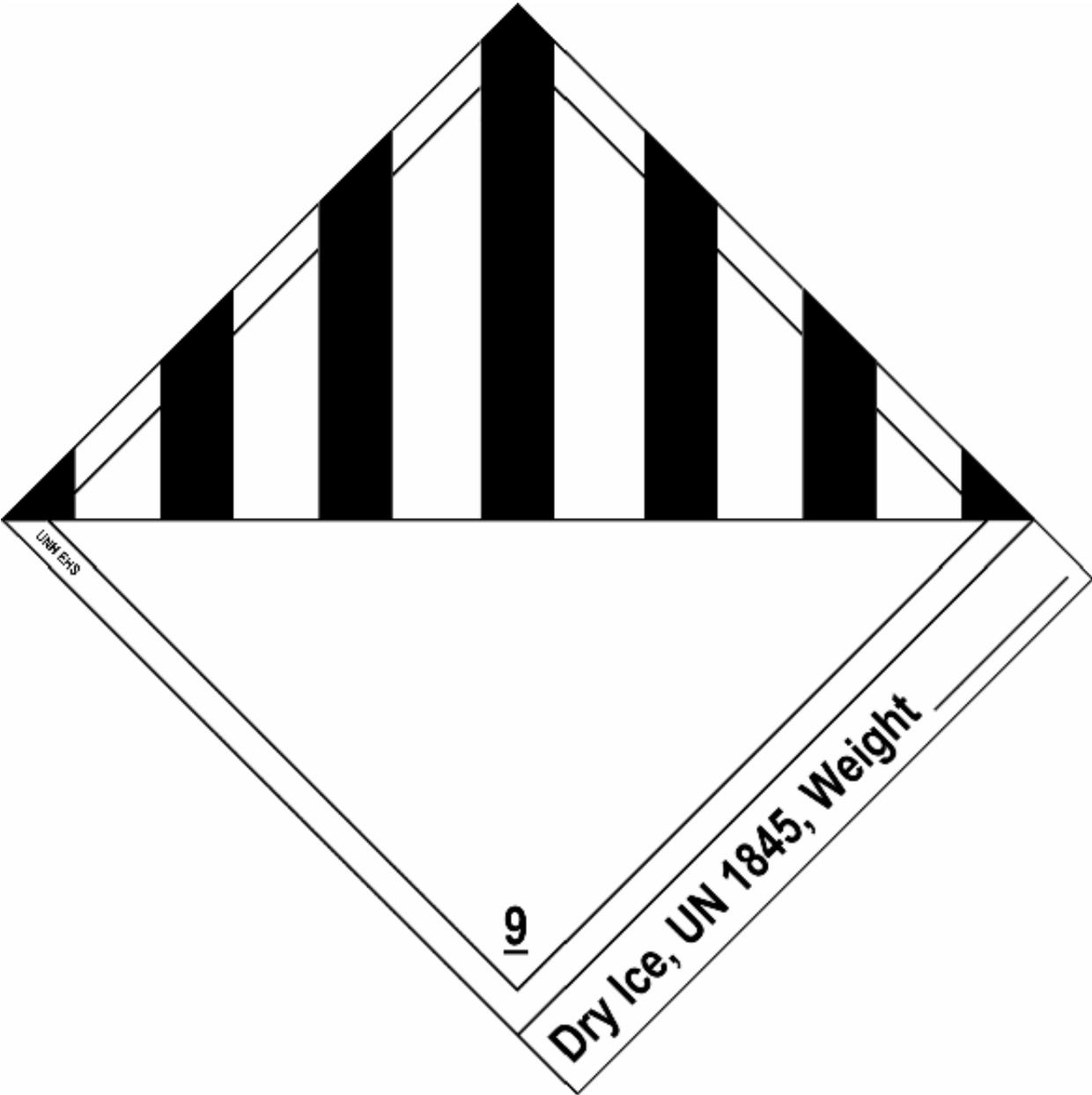
The outermost container must be labeled with a hazard diamond label, UN 3373 and it is also recommended that "This-way-up" labels are attached especially if the shipment contains liquid. Printable versions of these are included below. The labels should be affixed to a vertical side of the box (not the top or bottom).

Packages must display the full name and address of the consignor and consignee along with the name and telephone number of a "responsible person" who can be contacted in case of an emergency.

Please refer to the University Safety Office policy (form hsd057b) for more information.

**Shipping Labels**

The label below should print with the proper dimensions (minimum dimensions: 100 mm on a side). When using these labels, cover with clear plastic tape after filling in the weight of dry ice.





**UN3373**

**BIOLOGICAL SUBSTANCE  
CATEGORY B**

**This way  
up**

