

UNIVERSITY OF SUSSEX**SPG 37-11**

Revision 1 May 2011

Guidance for shipping biological material and environmental testing samples

Certain biological samples, cultures and materials other than chemicals fall within the description of dangerous goods for transport and both national and international legislation demand that stringent requirements are met if the goods are transported by any means. Non-dangerous biological materials also have to be transported in such a way that they are not likely to leak in transit and trigger safety/security alerts or cause unnecessary concern to anyone who may come into contact with leaked material. The Human Tissue Act also requires that human material be transported in an appropriate manner as described below.

This guidance, some of which has been taken from FEDEX advice booklet summarises the main requirements when transporting the most common types of biological research materials. The term "Transporting" is used in the general sense and should be interpreted as including the sending or taking of such materials by any means, including road, rail and air.

In general terms the proper packaging of these biological, human/animal samples or environmental materials requires the following:

1. Watertight Primary Receptacles
2. Watertight Secondary Receptacles
3. Absorbent Material
4. Sturdy Outer Packaging

Labelling and documentation of these materials will depend on their hazard category.

There are 3 categories of dangerous goods covered within this document

Category A - These are samples known to contain pathogens or infectious substances capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals.

Category B - Pathogens or infectious substances which do not meet criteria for category A

Exempt – Patient/animal specimens within this category must also meet all the shipping requirements discussed within this document.

A patient/animal specimen maybe EXEMPT from the regulations if there is a minimal chance that pathogens are present according to professional judgment, e.g. blood or urine samples to monitor glucose levels or therapeutic drug monitoring.

This is also the preferred method for transporting non-pathogenic cultures, pathogen free cells, recombinant DNA etc. Pathogenic eukaryotic virus DNA that is more than 2/3 of the genome must be shipped as category B.

Genetically modified micro-organisms - If a GMMO or GMO does not meet the definition of an infectious substance and does not fall into either category A (UN2814 or UN2900) or category B (UN3373), it must be assigned to the classification “Genetically Modified Micro-Organisms” (UN3245) in Class 9. It is not subject to any other requirements in the IATA Regulations. A diamond-shaped marking for UN3245 must be applied to the outside of the outer packaging

Environmental Test Samples

Packaging of environmental test samples such as soil and water must also meet the four basic packaging requirements listed above.

Refrigerants

Dry Ice is considered a miscellaneous hazard (class 9) for shipping and all packages **MUST** show the miscellaneous hazard diamond and UN 1845.

If shipping dry ice, the packaging must be leak-proof and the outer packaging must allow for the release of carbon dioxide gas when the solid sublimates i.e. not completely sealed. Dry ice must be placed outside the secondary packaging and interior supports must be provided to secure the secondary container as the refrigerant sublimates

Liquid Nitrogen for use in shipping specimens is regulated and the liquid nitrogen is a dangerous good. This will need to be shipped as UN1977 Nitrogen, refrigerated liquid.

Dry shipper for shipping materials on liquid nitrogen is a safer method and biological materials can be shipped refrigerated in dry shippers. These are insulated packages containing refrigerated liquid nitrogen fully absorbed in a porous material.

Packaging

1)

Primary Container



Leak Proof

- at temp range range of -40 C to 55 C
- pressure differential of not less than 95 kPa
- positive closures (such as screw-on, snap-on or push-on lids) that must be taped.
- Cushioned if multiple fragile primaries
- Limits per container:
50ml or 50g – air or 4L or 4Kg - cargo

2)

Watertight Secondary Container

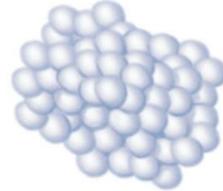
Examples
Sealed plastic bag
Plastic canister
Or
Screw cap can



3)

Absorbent material

Place absorbent material between the primary and secondary receptacle, making sure that if more than one item that each are separately wrapped to cushion them from each other. Use enough absorbent material to absorb the entire contents of all primary receptacles.



Paper towels, cellulose wadding, cotton wool

4)

Sturdy Outer Container – Overpack

Sturdy outer packaging must be rigid, consisting of corrugated fiberboard, wood, metal or rigid plastic and be appropriately sized for content.

For liquids, the outer packaging must not contain more than 4 L.

For solids, the outer packaging must not contain more than 4 kg.

At least one surface of the outer packaging must have a minimum dimension of 100 mm x 100 mm (4 in x 4 in).



Dry ice if needed (200 Kg limit) must be between secondary and outer packaging

Interior support must be provided to secure the secondary packaging(s) or packages in the original position after the ice or Carbon dioxide, solid (dry ice) has been dissipated. If ice is used the packaging must be leak-proof. If Carbon dioxide, solid (dry ice) is used the outer packaging must permit the release of carbon-dioxide gas ie the parcel must not be sealed.

For Biological Substances Category B (UN 3733), an itemized list of contents must be enclosed between the secondary packaging and the outer packaging.

Labels and Documentation

The following must be adhered to:

Air Waybill declarations – (please note UPS will NOT SHIP Infectious Substances, Category A!!)

- a. If you are planning to ship infectious materials, Category A please contact the University Biological Safety Advisor for advice on this process.
- b. Biological substance, Category B
 - The name, address and phone number of the responsible person must be on this document

NOTE: The phone number of the responsible person should be available during regular business hours in case of questions or problems.

- The "Nature and Quantity Goods" box must show the text "BIOLOGICAL SUBSTANCE, CATEGORY B" and UN 3373 together with the number of samples.
- c. Exempt specimens

- The "Nature and Quantity Goods" box must show the text "Exempt animal specimen" or Exempt human specimen".

In addition if using cold chain for shipping

Dry Ice

- The "Nature and Quantity Goods" box must show the text "Dry Ice UN 1845" and the amount of dry ice within the package described in kg".

Dry Shipper

- The "Nature and Quantity Goods" box must show the text "not restricted" and "A152".

Liquid Nitrogen

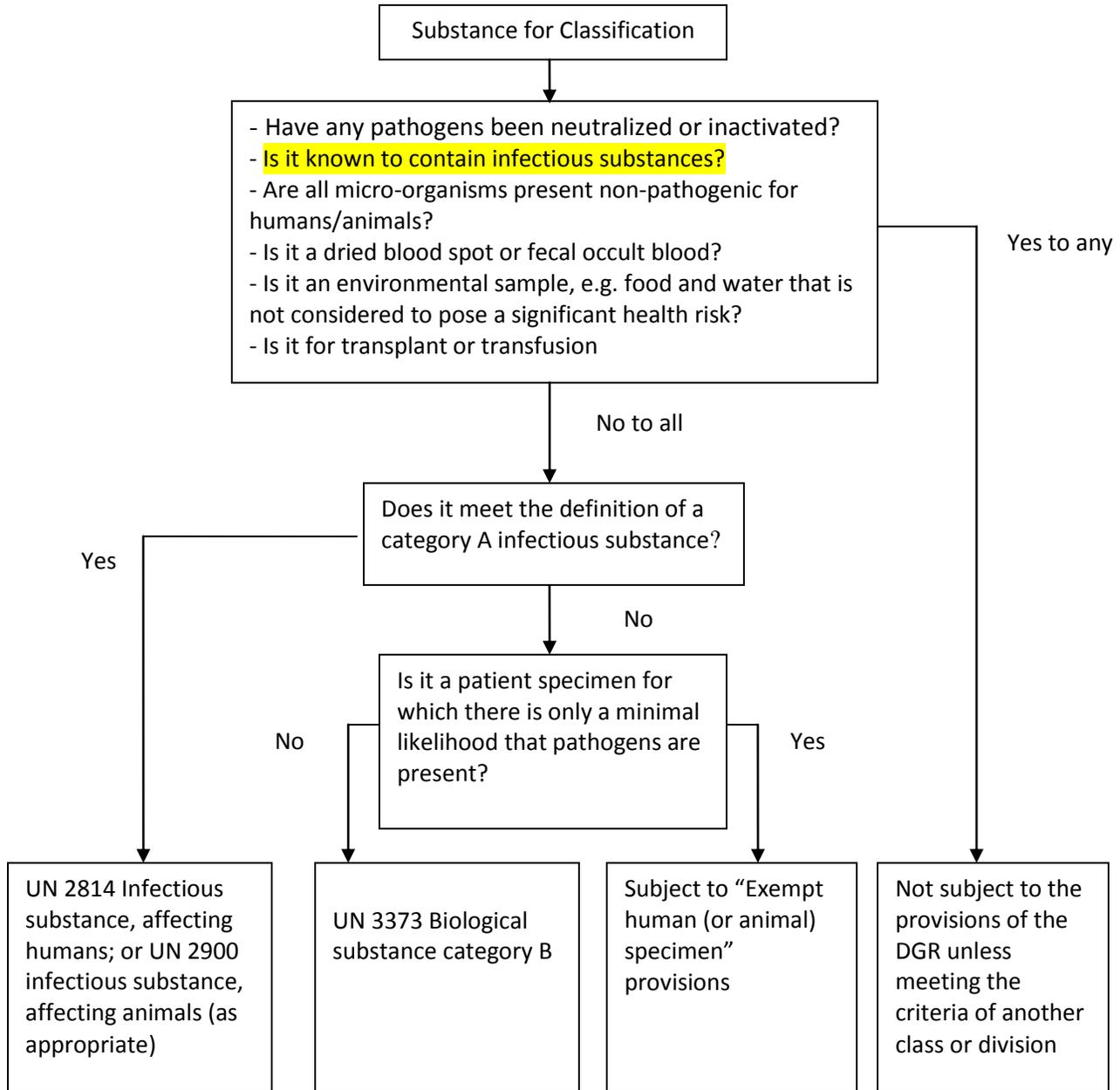
- The "Nature and Quantity Goods" box must show the text "UN1977 Nitrogen, refrigerated liquid".

Checklist for Dry Ice Shipping

This checklist should be used when shipping dry ice.
Do not ship your material if "NO" is checked for any of these entries.

Is the following correct for each entry?	YES/NO
Air Waybill	
The Air Waybill contains the following information in the "Nature and Quantity of Dangerous Goods."	
1. The words "Carbon dioxide, solid" or "Dry ice"	
2. The Class number "9"	
3. The UN number "UN 1845" The number of packages of dry ice	
4. The net quantity of dry ice in kilograms Note: The packing group "III" and packing instructions "904" are optional upon the particular air waybill being used.	
Quantity	
5. The quantity of the dry ice per package is 200kg or less	
Packages and Overpacks	
6. Outer packaging is UN approved and has correct signage - this will depend on the hazard within package	
7. Packages are free from damage and in proper condition for carriage	
8. The packaging conforms to packing instruction 904 and the package is vented to permit the release of gas.	
Markings	
9. The words "Carbon dioxide, solid" or "Dry ice"	
10. The UN number "UN 1845"	
11. Full name and address of the shipper and consignee	
12. The net quantity of dry ice within each package	
Labels	
13. Class 9 label affixed	
14. Irrelevant marks and labels removed	

Shipping Flowchart



Label and Marking Packages

Example 1 - Shipping “Biological substances, category B” with dry ice

The diagram shows a light blue rectangular label with several white boxes and markings. On the left side, there are three stacked boxes: the top one contains 'From: shipper' and 'Tel. #'; the middle one contains 'To: consignee' and 'Tel. #'; the bottom one contains 'Responsible Person', 'Dr. John Smith', and 'Tel. #'. On the right side, there is a box at the top containing 'Biological substance, category B'. Below this is a white diamond-shaped hazard label with 'UN 3373' inside. Further down is another box containing 'Dry Ice', 'UN1845', and 'Net Weight: 3 kg'. To the right of this box is a diamond-shaped hazard label with vertical black and white stripes and the number '9' at the bottom.

Example 2 - Shipping Exempt Human or Animal Specimens on Dry Ice

The diagram shows a brown rectangular label with several white boxes and markings. On the left side, there are two stacked boxes: the top one contains 'Shipper Address:' and the bottom one contains 'Consignee Address:'. On the right side, there is a large white box containing the text: '“Exempt Human Specimens”', 'Or', and '“Exempt Animal Specimens”'. Below this is a box containing 'Dry Ice', 'UN1845', and '2.5kg'. To the right of this box is a diamond-shaped hazard label with vertical black and white stripes and the number '9' at the bottom.