

SHIPPING BIOLOGICAL SUBSTANCES

(For assistance, please contact EHS at (402) 472-4925, or visit our web site at <http://ehs.unl.edu/>)

This Standard Operating Procedure (SOP) describes how to prepare a shipment containing biological substances for transport by air with a carrier that subscribes to International Air Transport Authority (IATA) standards. The information in this SOP is based on the IATA Dangerous Goods Regulations, 53rd Edition.

Only persons who have documentation of current DOT/IATA training are authorized to ship packages containing biological substances. This SOP is a supplement to and not a substitute for the DOT/IATA training provided by EHS. Training is required before engaging in any transport-related function and at least every three (3) years thereafter.

SAFETY INFORMATION – BIOLOGICAL SUBSTANCES

Prior to preparing biological substances for shipment, review the Material Safety Data Sheet or agent hazard summary or other technical literature regarding the hazards of the organisms that may be present in the biological substance. Following is a broad summary of the typical hazards of biological substances shipped in commerce.

- In general, these materials are or may contain opportunistic pathogens (meaning that normal healthy adults are not generally susceptible to disease from contact); or potential pathogens are in a form unlikely to cause disease (e.g., clinical specimen, etc.).
- If infectious, inhalation is not generally the primary route of infection. Infection is usually by ingestion, contact with open wounds, or inoculation (skin abrasion with a contaminated object).
- A freshly prepared 10% solution of household bleach with a contact time of 20 minutes is effective in disinfecting non-porous equipment, surfaces, and spills of liquid cultures. Efficacy of disinfection is diminished in the presence of heavy organic loading (e.g., lots of dirt, grime, grease, etc.).
- Use surgical-type protective gloves, protective eyewear, and protective outer garments when handling. Avoid contact with unprotected skin, eyes, and mucous membranes. Wash hands and skin thoroughly after handling.
- Seek medical attention following known or suspected exposures.

Sometimes, biological substances are shipped with dry ice. Following is a broad summary of the hazards of small quantities (e.g., 5 pounds or less) of dry ice shipped in commerce.

- Dry ice sublimates. It changes directly from a solid to a gas. Therefore, packages and over-packs must not be tightly sealed. They must allow gases to escape to prevent the build-up of pressure.

- As dry ice sublimates it creates carbon dioxide gas, which is colorless and odorless. If enough dry ice were to sublime in an unventilated space, the amount of oxygen available could be reduced to an amount that is insufficient to support life.
- Dry ice is extremely cold at -109.3°F (-78.5°C). Touching dry ice unprotected can lead to frostbite. Always handle dry ice with care and wear protective gloves and eyewear. Use mechanical device (e.g., tongs) to handle.

DEFINITIONS

Infectious Substance: Infectious substances are known or reasonably expected to contain pathogens (bacteria, viruses, rickettsiae, parasites, fungi, and other agents such as prions, which can cause disease in humans or animals). Infectious substances are divided into two categories:

- **Category A:** An infectious substance transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals.
- **Biological Substance, Category B:** An infectious substance which does not meet the criteria for inclusion in Category A.

Exceptions: The following materials are not classified as infectious substances:

- Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals.
- Substances containing micro-organisms which are non-pathogenic to humans or animals.
- Substances in a form that any present pathogens have been neutralized or inactivated such that they no longer pose a health risk.
- Environmental samples (including food and water samples) which are not considered to pose a significant risk of infection.
- Dried blood spots, collected by applying a drop of blood onto absorbent material, or fecal occult blood screening tests and blood or blood components which have been collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation and any tissues or organs intended for use in transplantation.

IATA 4.2 DANGEROUS GOODS TABLE

Biological Substance, Category B	
Proper shipping name	Biological Substance, Category B
UN/ID No.	UN3373
Class or Division	6.2
Hazard Label	Not Applicable
Packing Group	Not Applicable
Packing Instruction	650
Maximum Quantity/Package for Limited Quantity Shipment	"E0"- Not permitted as Excepted Quantity
Passenger/Cargo Aircraft	Liquid 1 L/inner package; 4L/outer

	package Solid 4Kg/outer package
Cargo Aircraft Only	Liquid 1 L/inner package; 4L/outer package Solid 4Kg/outer package
Special Provisions	None

Dry Ice	
Proper shipping name:	"Carbon dioxide, solid" or "Dry ice"
UN/ID No.:	UN 1845
Class or Division	9
Hazard Label	Miscellaneous
Packing Group	
Packing Instructions	954
Maximum Quantity/Package for Limited Quantity Shipment	"E0"- Not permitted as Excepted Quantity
Passenger/Cargo Aircraft	200 kg
Cargo Aircraft Only	200 kg
Special Provisions	A48 (package test not required); A151; A805

PACKAGING - BIOLOGICAL SUBSTANCES, CATEGORY B

Specification packaging is not required, but it must be of good quality, compatible with the contents and shipping conditions (e.g., temperature, humidity), and consist of three components:

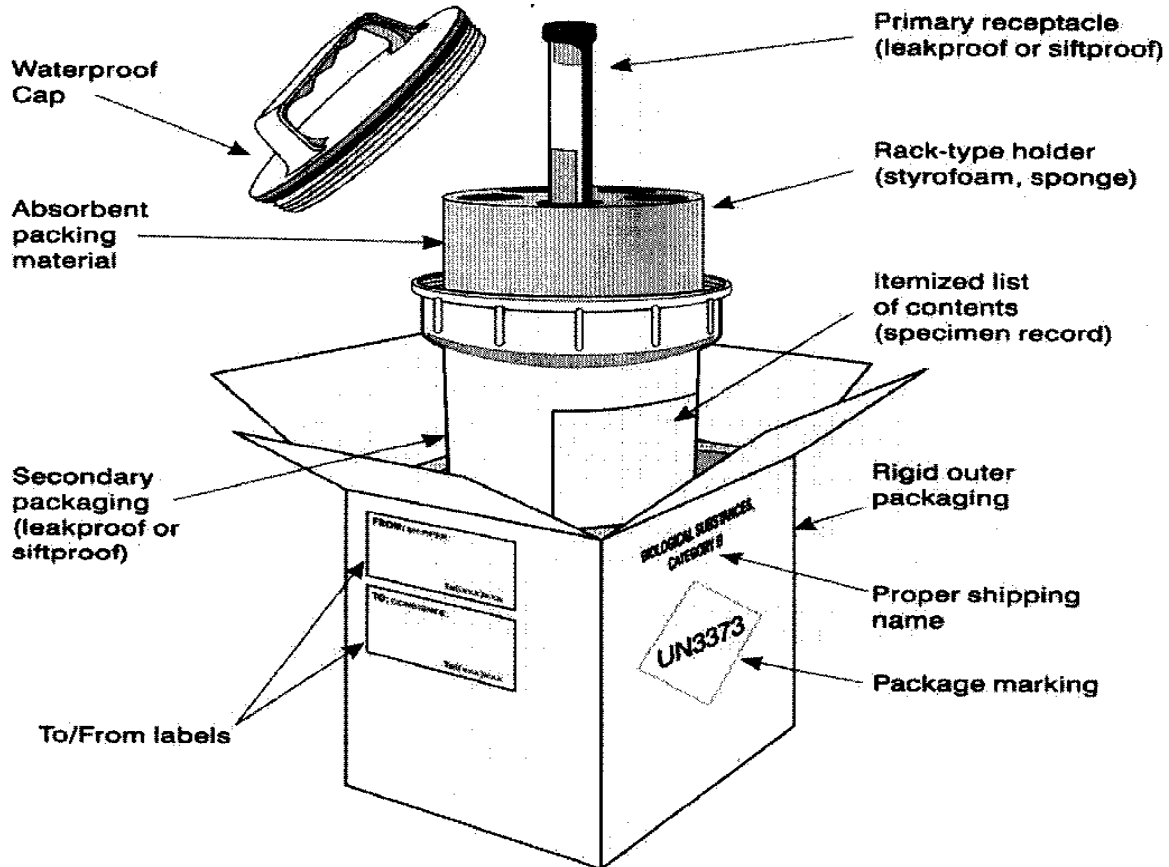
1. Primary receptacle(s) that is/are leak- or sift-proof (liquids or solids, respectively) and have positive means of closure (e.g., tape reinforced lid closure);
2. Secondary packaging that is/are leak- or sift-proof (liquids or solids, respectively) and have positive means of closure (e.g., tape reinforced lid closure); and
3. Rigid outer packaging. If dry ice is included in the package, then the outer package must be designed and closed in a manner that will allow off-gassing vapors to escape.

In addition,

1. Inner packages containing liquids must have sufficient headspace to allow for expansion of the liquid due to temperature/pressure changes.
2. Inner packages must be packed, secured, or cushioned against leakage and/or breakage.
3. Packages cannot be vented except for the venting of dry ice.
4. Packages containing liquids must be orientated with the closures in an upright position, and sufficient absorbent placed between the primary and secondary containers to absorb the entire content.
5. Other dangerous goods must not be packed in the same packaging with *biological substances, category B* unless they are necessary for maintaining viability, stabilizing or preventing degradation, or neutralizing the hazards of potentially infectious substances; and then the quantity is limited to thirty (30) ml

or less of Class 3 (flammable and combustible liquids), 8 (corrosive), or 9 (miscellaneous) per each primary receptacle.

6. An itemized list of the content must be included between the primary and secondary packaging.



MARKING & LABELING - BIOLOGICAL SUBSTANCES, CATEGORY B

General marking and labeling requirements must be observed, such as: all markings must be in English; all markings and labels must be durable and in the correct location, and; only relevant markings and label are allowed. The following marking and labeling is required on the outer package:

1. Complete name and address of the shipper. The shipper's telephone number must also be recorded on the outer container. This does not need to be a 24-hour emergency response number but should be for someone who is knowledgeable of the potential hazards of the shipment.
2. Complete name and address of the consignee.
3. The proper shipping name and the UN number (*Biological Substance, Category B, UN3373*) in letters at least 6 mm (about ¼ inch) high. If dry ice is included, the package must also contain the additional UN number, proper shipping name (Dry Ice, UN1845), and net amount of dry ice in the package (in Kilograms).

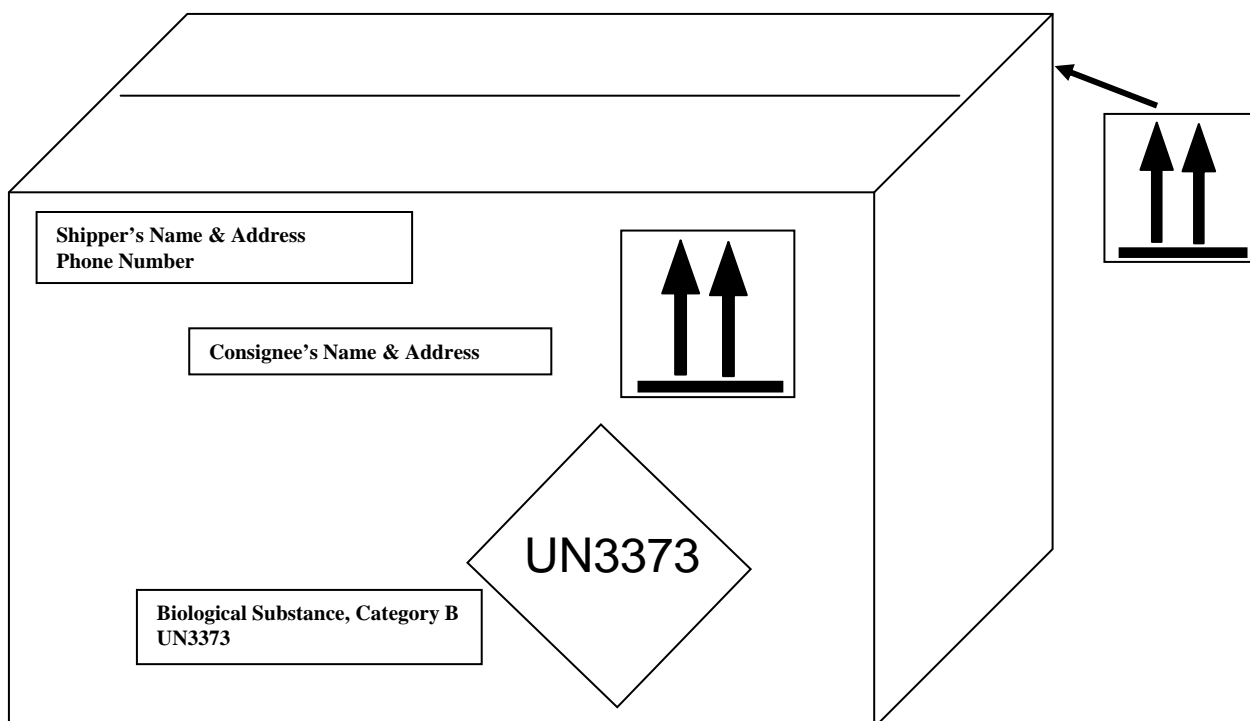
4. A diamond of the minimum specified size containing the UN3373 designation.
5. A miscellaneous hazard class 9 label, if the package contains dry ice.
6. The word "Overpack" if applicable.
7. "Orientation" arrows if the package contains liquids.

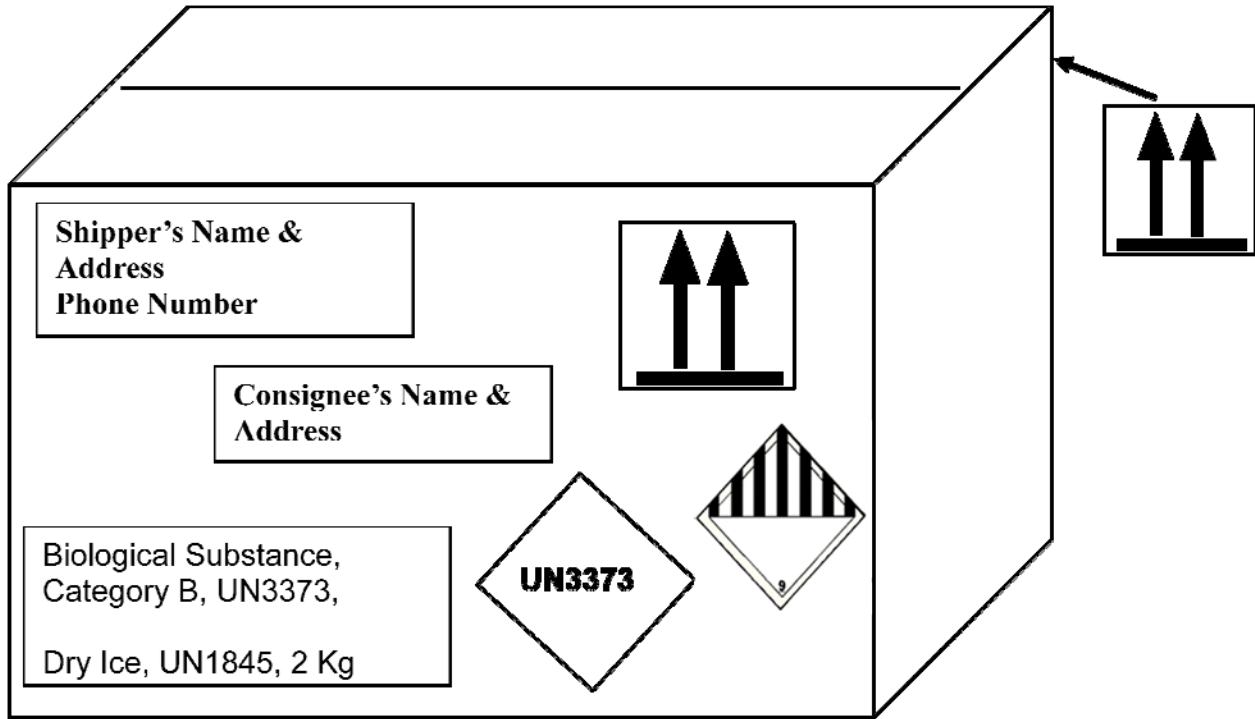
DOCUMENTATION - BIOLOGICAL SUBSTANCES, CATEGORY B

A "Shippers Declaration of Dangerous Goods" is not required. An airway bill containing the following information is required:

- Proper shipping name (*Biological Substance, Category B, UN3373*) and list the number of packages being shipped.
- The appropriate box checked to indicate that the shipment contains dangerous goods, but a declaration is not required.
- Name of the person preparing the shipment if different from the name recorded as the consignor/shipper.
- The airway bill must be retained by the shipper for at least 2 years.

EXAMPLE PACKAGE AND AIRWAY BILL





FedEx <i>US Airbill</i> <small>Express</small>		FedEx Tracking Number 8531 5774 6190	0200 Sender's Copy						
1 From <small>Package destination</small> Date 9-23-2005 Sender's FedEx Account Number 1234567890		4a Express Package Service <small>Packages up to 150 lbs. ^{**Standard handling}</small> <input checked="" type="checkbox"/> FedEx Priority Overnight <small>Next business day*</small> <input type="checkbox"/> FedEx Standard Overnight <small>Next business day**</small> <input type="checkbox"/> FedEx First Overnight <small>Earliest next business morning ^{***} delivery available</small> <input type="checkbox"/> FedEx 2Day <small>Second business day*</small> <input type="checkbox"/> FedEx Express Saver <small>Third business day*</small> <small>*FedEx Express service available. **Minimum charge. \$\$\$ minimum rate.</small>							
Sender's Name Ann Smith Phone (402) 472-0000 Company University of Nebraska-Lincoln EHS Address 3630 E. Campus Loop <small>Dept./Room/Box/Room</small> City Lincoln State NE ZIP 68583-0824		4b Express Freight Service <small>Packages over 150 lbs. ^{**Standard handling}</small> <input type="checkbox"/> FedEx 1 Day Freight* <input type="checkbox"/> FedEx 2Day Freight <input type="checkbox"/> FedEx 3Day Freight <small>Third business day**</small> <small>*Call for Confirmation.</small>							
2 Your Internal Billing Reference <small>For all shipments with invoice numbers.</small>		5 Packaging <small>**See price list for details</small> <input type="checkbox"/> FedEx Envelope* <input type="checkbox"/> FedEx Pak* <small>For other FedEx Mail, FedEx Large Pak, and FedEx Heavy Pak</small> <input type="checkbox"/> FedEx Box <input type="checkbox"/> FedEx Tube <input type="checkbox"/> Other <small>PK</small>							
3 To Recipient's Name Marge Harley Phone (000) 1 000-0000 Company MBD Inc. Recipient's Address 6075 S. Spencer <small>Use correct delivery to APO, FPO, ZIP codes.</small> <small>Dept./Room/Box/Room</small> Address <small>To register a package to be held at a FedEx location, print full valid zip code.</small> City Las Vegas State NV ZIP 89109		6 Special Handling <small>Include FedEx address in Section 3.</small> <input type="checkbox"/> SATURDAY Delivery <small>Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1 Day Freight, and FedEx 2Day Freight to other ZIP codes.</small> <input type="checkbox"/> HOLD Weekday at FedEx Location <small>NOT Available for FedEx Priority Overnight.</small> <input type="checkbox"/> HOLD Saturday at FedEx Location <small>Available ONLY for FedEx Priority Overnight, FedEx 2Day, and FedEx 1 Day Freight.</small> Does this shipment contain dangerous goods? <input type="checkbox"/> No <input type="checkbox"/> Yes <small>See price list for details.</small> <input checked="" type="checkbox"/> Yes <small>See price list for details.</small> <input checked="" type="checkbox"/> Dry Ice <small>On FedEx, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 00.</small> <input type="checkbox"/> Cargo Air craft Only							
7 Payment Bill to: <small>Enter FedEx Account No. or Credit Card No. below.</small> <input type="checkbox"/> Sender <small>Account No. or Credit Card No.</small> <input type="checkbox"/> Recipient <input type="checkbox"/> Third Party <input type="checkbox"/> Credit Card <input type="checkbox"/> Cash/Check		<table border="1"> <thead> <tr> <th>Total Packages</th> <th>Total Weight</th> <th>Total Declared Value*</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4 lbs</td> <td>\$ 0 .00</td> </tr> </tbody> </table> <small>*Our liability is limited to \$100 unless you declare a higher value. See back for details. FedEx Use Only</small>		Total Packages	Total Weight	Total Declared Value*	1	4 lbs	\$ 0 .00
Total Packages	Total Weight	Total Declared Value*							
1	4 lbs	\$ 0 .00							
8 Sign to Authorize Delivery Without a Signature By giving you a signature to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.		<input type="checkbox"/> Signature Required <input checked="" type="checkbox"/> Signature Not Required 467 <small>For Order: 1-800-FedEx (3633) • 1-800-300-3000 • 1-800-477-0000 • 1-800-477-0000</small>							
Try online shipping at fedex.com <small>By using this Airbill you agree to the service conditions on the back of this Airbill and in our current Service Guide, including terms that limit our liability.</small> Questions? Visit our Web site at fedex.com or call 1.800.GoFedEx 1.800.463.3333.									

Note: Section 6 must indicate the quantity of dry ice, if included in the package

Security Awareness Training Reminder

Hazmat employees must receive training relative to security. Following is a summary of the security awareness information included in the EHS IATA training program. Reduce the possibility of unauthorized access, possession, and use of hazardous materials by securing all hazardous materials, including dangerous goods. The following general guidelines represent minimum requirements:

- Packages containing dangerous goods must be kept in a secured area, or under the supervision of a designated shipper, or other authorized employee(s) until picked up by the carrier. Limit access to areas where dangerous goods packages or other hazardous materials are prepared for shipment, received, stored, unpacked or used to authorized employees only. Report latches and locks on doors or other security devices that are damaged, sticky, or have been tampered to your supervisor and the Building Maintenance Reporter.
- Make sure the carrier picking up dangerous goods shipments has identification (e.g. company ID, uses a clearly identified company vehicle, or wears a company uniform).
- Report suspicious individuals, behavior, stolen or missing hazardous materials and hazardous materials packages, and known or suspected unauthorized entry into secured areas to your supervisor and to the UNL Police Department 402-472-2222. Be aware of your surroundings; look for out-of-place vehicles and abandoned or out-of-place backpacks, bags, or other containers.
- Limit information concerning hazardous materials shipments to individuals who need to know, such as other authorized employees, carrier personnel, and supervisors. Do not share information on dangerous goods shipments with casual acquaintances or strangers.
- Be familiar with emergency procedures in place at UNL and know what to do if a package is leaking or damaged.