

Transport & Packaging of Specimens

The following guidelines are based upon available information from the Centers for Disease Control (CDC) and the Department of Transportation (DOT). Packaging rules may vary depending on the type of transport required, so refer to the appropriate section. For additional information on shipping hazardous materials, including infection substances, contact UW Environmental Health and Safety (EH&S) Hazardous Materials and Waste Office at (206) 685-2848.

A. Infectious Substances

The Code of Federal Regulations (49 CFR Part 173) subdivides infectious substances into two categories (*Category A* and *Category B*), each with their own shipping and packaging requirements.

- ***Category A***: High risk specimens, transported in a form capable of causing permanent disability or life-threatening or fatal disease. See last page of this document for examples of *Category A* organisms. Note that some organisms are considered *Category A* only when in culture form. New or emerging pathogens which do not appear on the list but meet the criteria must also be transported as *Category A* substances.
- ***Category B***: Lower risk samples, defined as an infectious substance not in a form generally capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals when exposure occurs. Most laboratory samples fall into this category. The official shipping name for these samples has changed from “Diagnostic Specimens” to “*Biological Substance, Category B*”.

B. Exempted Specimens

The regulations also specify specimens where the risk is so low the specimens can be transported without following Department of Transportation packaging requirements. Some examples of exempted specimens are as follows:

- Samples transported by private or contracted couriers in dedicated vehicles. This exemption does not apply to personal or private vehicles.
- Dried bloodspots and specimens used to detect fecal blood.
- Slides or specimens treated so as to inactivate or neutralize the pathogen.

C. Transport by Dedicated Courier

1. The DOT does not regulate specimens transported via dedicated couriers in dedicated motor vehicles, including private or contracted couriers. Examples include transporters who carry specimens within a building, or UW-sponsored couriers transporting specimens in vehicles owned by the UW. It does not include taxi, commercial shipping companies, US Mail or employees transporting specimens in their private vehicle.
2. The primary specimen container (i.e. vacutainer, urine cup) must be leakproof, and tightly closed. It must be recognizable as containing specimen so that all personnel handling it will practice Universal Precautions.

3. Primary containers must be placed within a watertight secondary container. For example, seal the test tube in a leakproof plastic bag. It is good practice to place absorbent material between the bag and the tube to cushion the tube and absorb leakage from improperly sealed tubes. Contact Reference Lab Services for supplies of specimen bags.
4. Couriers should transport specimen containers in securely closed crush-resistant carriers which contain absorbent material.

D. Transport by Commercial Carrier

1. The DOT requires that all commercially transported specimens must be triple packaged. Examples of commercial carriers include taxi, Federal Express, or privately owned vehicles. The Health Science Express Shuttle also requires packaging as outlined below.
2. Unless the sample is known or has a strong suspicion to fit the definition of 'Category A', it can be packaged and labeled according to the regulations for "*Biological Substance, Category B*". Some carriers have additional special labeling or packaging requirements – check with the specific carrier for current requirements.
3. All staff involved with packaging and shipping of infectious substances by commercial carrier must have documented current certification of training (bi-annual training required).
4. If liquid specimens might be transported by airplane, pressure-resistant primary or secondary packaging must be used, and primary specimen lids must be secured with tape or other positive means.
5. Specimens may contain up to 30mL (or 30g) of a preservative or stabilizing agent (such as anticoagulant, alcohol, methanol, boric acid, formaldehyde, formalin or sodium borate) per specimen without requiring additional chemical hazard packaging or labeling.
6. Specimens shipped with dry ice require outer packaging that allows the release of carbon dioxide gas. If dry ice is sent by ground transportation the package should indicate "Dry Ice – Frozen Medical Specimens". Shipments containing dry ice that are sent by air or water must be specifically labeled as to the content and amount of dry ice present, according to regulations governing hazardous materials.
7. Specimen shipments containing wet ice must be leakproof. Use of Kool-Packs is recommended instead of wet ice whenever possible. Wet ice should be contained in a separate leak-proof container, e.g. closed zip-lip bag.

Category B Triple Packaging Requirements for Commercial Transport

1. Triple packaging means the specimens must be enclosed in 3 layers of packaging as described below. The entire package should be able to withstand being dropped from a distance of 4 feet without damage to or leakage from the contents.
 - Primary Receptacle (sample container)
 - 1) Must be leakproof and contain no more than 1 L of liquid.
 - 2) Must be packed in secondary packaging in such a way that, under normal conditions of transport, it cannot break, be punctured or leak.

- 3) Absorbent material must be placed between the primary receptacle and the secondary packaging, and must be sufficient to absorb the entire contents of the primary receptacles (examples include paper towels or absorbent gel sheets).
 - 4) If several fragile primary receptacles are packed in a single secondary package, they must be individually wrapped or separated so as to prevent contact.
- Secondary Packaging (specimen bag, pressure-resistant canister, etc.)
 - 1) Must be leakproof.
 - 2) Must be secured in the outer packaging with suitable cushioning material so the secondary package will not shift around during transport.
 - 3) If possibly being transported by aircraft, the secondary packaging must be capable of withstanding a 95 kPa pressure differential without leakage (unless primary receptacle is pressure resistant). Examples of pressure resistant secondary packages are plastic containers with O-ring gaskets or Safe-T-Pac+ Envelopes.
 - 4) If leakage occurs in a reusable secondary package, the packaging must be disinfected prior to reuse.
 - 5) A biohazard label should be present on secondary packaging.
 - Outer Packaging (sturdy cardboard box, rigid cooler, etc.)
 - 1) May contain more than one secondary package, but no more than 4 liters of liquid or 4kg of solids per outer package.
 - 2) Must be rigid (able to maintain its shape through all conditions of transport), larger than 4 inches square on one side, and tightly closed.
 - 3) An outer envelope or other non-rigid overpack can be placed over the outer packaging.
 - Required Package Labeling
 - 1) Address being shipped to and shipped from.
 - 2) UN3373 diamond with “*Biologic Substance, Category B*” label.
 - 3) The name and phone number of an emergency contact familiar with the shipment in case of spills. This phone number must be monitored during business hours.
 - 4) If a biohazard label is not present on the primary or secondary packaging, it must be present on the outer packaging.

Shipping Category A Substances via Commercial Transportation

1. All *Category A* substances must be packaged and shipped in UN rated, performance tested packaging according to the rigorous packaging standards of IATA Instructions 602. Packages must be capable of withstanding a drop from a distance of 30 feet without damage to or leakage from the contents.
2. All staff involved with packaging and shipping of *Category A* substances must have documented current certification of training (bi-annual training required). A simple summary of the packaging requires is provided below, but complete training is beyond the scope of this document.

- a. The primary receptacle must be leakproof and tightly closed. Specimens must have a positive means of securing a leakproof seal, such as securing lid with adhesive tape.
 - b. The primary receptacle(s) must be placed inside leakproof secondary packaging along with sufficient absorbent material to contain the entire contents of the primary container(s). If the primary containers are fragile, they must be individually wrapped or separated to prevent contact.
 - c. Either the primary or secondary container must be pressure-resistant and able to withstand temperatures between -40oC to +55oC (-40oF to +131oF) without leakage.
 - d. An itemized list of contents must be enclosed between the secondary packaging and the outer packaging.
 - e. A complete shipper's declaration must accompany each package.
 - f. The outer package must be properly labeled:
 - 1) Address being shipped to and shipped from.
 - 2) UN2814 (or UN2900) label with the total weight of specimens inside the package.
 - 3) A CDC Infectious Substance label (with the CDC's emergency response phone number)
 - 3) The name and phone number of an emergency contact familiar with the shipment in case of spills. This phone number must be monitored 24 hours a day, 7 days a week for Category A infectious substances.
3. Questions about proper procedures should be referred to EH&S.

Examples of Infectious Substances Included in Category A

Bacillus anthracis (cultures only)
Brucella abortus (cultures only)
Brucella melitensis (cultures only)
Brucella suis (cultures only)
Burkholderia pseudomalli ñ Pseudomonas pseudomallei (cultures only)
Burkholderia mallei-Pseudomonas allei ñ
Chlamydia pistaci-avia strains (cultures only)
Clostridium botulinum (cultures only)
Coccidioides immitis (cultures only)
Coxiella burnetii (cultures only)
Crimean-Congo hemorrhagic fever virus
Dengue virus (cultures only)
Eastern equine encephalitis virus (cultures only)
Ebola virus
Escherichia coli, verotoxigenic (cultures only)
Flexal virus
Francisella tularensis (cultures only)
Glaser (cultures only)
Guanarito virus
Hantaan virus
Hantaviruses causing hantavirus pulmonary syndrome
Hendra virus
Hepatitis B virus (cultures only)
Herpes B virus (cultures only)
Human immunodeficiency virus (cultures only)
Highly pathogenic avian influenza virus (cultures only)
Japanese Encephalitis virus (cultures only)
Junin virus
Kyasanur Forest disease virus
Lassa virus
Machupo virus
Marburg virus
Monkeypox virus
Mycobacterium tuberculosis (cultures only)
Nipah virus
Omsk hemorrhagic fever virus
Poliovirus (cultures only)
Rabies virus
Rickettsia prowazekii (cultures only)
Rickettsia rickettsii (cultures only)
Rift Valley fever virus
Russian spring-summer encephalitis virus (cultures only)
Sabia virus
Shigella dysenteriae type 1 (cultures only)
Tick-borne encephalitis virus (cultures only)
Variola virus
Venezuelan equine encephalitis virus
West Nile virus (cultures only)
Yellow fever virus (cultures only)
Yersinia pestis (cultures only)