

Hazardous Materials Shipping

The Department of Environmental Health and Safety (EHS) is available to assist faculty, staff, and students when shipping hazardous materials. If you have any questions please feel to contact us at 216-368-2907.

Hazardous Materials Transportation Regulations

In order to protect people, the environment, and property the transport of hazardous materials is heavily regulated by two distinct organizations.

The [Department of Transportation](#) (DOT): Through the Pipeline and Hazardous Material Safety Administration (PHMSA) the DOT oversees the safe transport of more than one million packages daily via ground, air, rail, and boat domestically.

The [International Air Transport Association](#) (IATA): Formed by nearly 250 airlines worldwide this organization created the *Dangerous Goods Regulations* which provide guidelines for the transportation of hazardous material by air only. These regulations are typically more restrictive than DOT regulations and must be followed when material is being shipped using common carriers such as Fed Ex, DHL, and World Couriers.

These organizations have developed requirements for all aspects of hazardous materials transportation including:

- for shippers of hazardous material
 - Hazardous material classification
 - Specific packaging requirements
 - Labeling and marking of packages
 - Shipping papers
 - Transport security
- For transporters of hazardous material
 - Loading and unloading trucks, rail cars, ships, and airplanes
 - Transferring of hazardous material from one container to another
 - Transport security

Persons that are receivers, or consignee, of hazardous materials are exempt from all transport regulations. Please note that this does not include Case Material Support personnel or any Case employees who transport hazardous material around campus. This exemption only applies to the laboratory personnel receiving the package.

Hazardous Material Shipper's Training

In order for a person to ship hazardous materials or dangerous goods by any means, they must receive formal training from the EHS office. Shipper's training is currently offered on the 4th Wednesday of each month at 9:00 a.m.

YOU MUST CALL AHEAD OF TIME TO SCHEDULE AT 216.368.2907.

Prior to attending a hazardous material shipping class faculty, staff, and students must have taken and be current for either *Laboratory Safety and Regulated Chemical* training or *Hazard Communications* training and, if applicable, *Blood borne Pathogens* training. All trainings can be scheduled through the EHS office by calling 368-2907.

For persons already trained to ship hazardous material, remember that recurrent training is required within 2 years of the original training. This is because transportation regulations are frequently being changed and updated.

When shipping hazardous materials, you must properly fill out the [Shipper's Declaration for Dangerous Goods](#). The Shipper's Declaration must be typed (except for signature) and printed *in color* (with red striped borders). This is part of the training.

Classification of Hazardous Materials

Hazardous Materials are classified according to a chemical's physical properties (flashpoint, reactivity, etc.), toxicity, radioactivity, and ability to cause harm or irritation. The hazardous materials classifications and labels associated with each class or division are shown below;



Class 1
Divisions 1.1-1.6



Division 2.1



Division 2.2



Division 2.3



Class 3



Division 4.1



Division 4.2



Division 4.3



Division 5.1



Division 2.1



Division 6.1



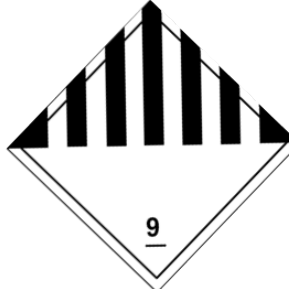
Division 6.2



Class 7



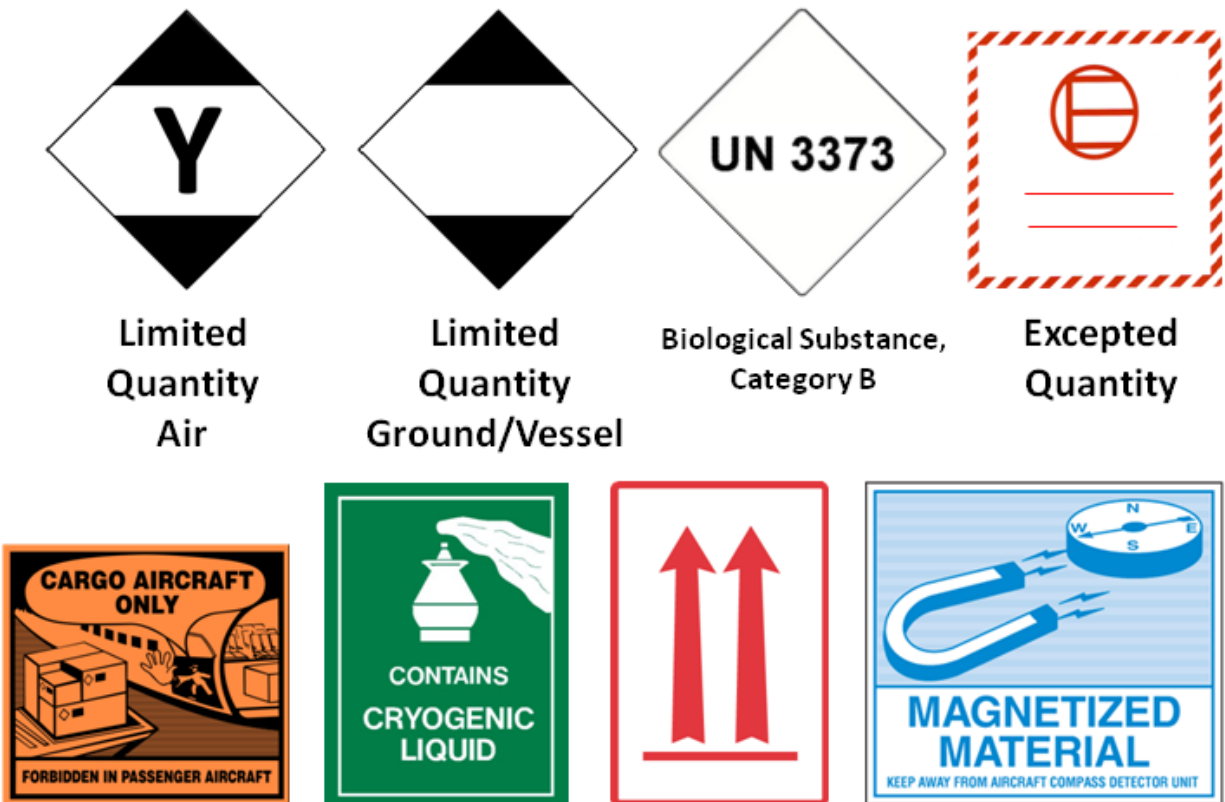
Class 8



Class 9

Most of these labels are available at the EHS office for all approved hazardous materials shippers.

There are also required handling labels which must be used when regulations apply. Some of the required handling labels are shown below.



Packages Containing Dry Ice

Dry ice is considered a Class 9 Miscellaneous Hazardous Material when transported by air. Dry ice may present an explosion hazard if not packaged correctly and/or a suffocation hazard if too much stored in a cargo hold of an airplane. This is due to the sublimation of solid carbon dioxide to a gas. Prior to sending any packages containing dry ice, all persons are required to have completed the on-line [Dry Ice Shipper's Training](#) and received written approval from a EHS Safety Specialist.

Shipments of Infectious Material

Infectious material is highly regulated by both the DOT and IATA due to the risk that the material poses to the general public. Infectious material requires very specific packaging and labeling to ensure the public is protected. If you intend on shipping material which known to be or suspected of causing disease in humans or animals you **MUST** be formally trained by EHS. If you do not know if the material you are shipping is infectious, contact a EHS representative for assistance.

Category A Infectious substances

Category A, infectious substances are considered the most dangerous, and are treated with a high level of precaution. These are pathogens which, when exposed to a human or animal, will cause permanent disability and/or death. Examples of these include:

Affecting Humans	Affecting Animals
<i>Bacillus anthracis</i> <i>Escherichia coli</i> , verotoxigenic Hepatitis B virus Marburg virus <i>Mycobacterium tuberculosis</i>	African swine fever virus Foot and mouth disease virus Sheep-pox virus

The examples above in no way encompass all Category A substances

Category B, Biological Substance

DOT and IATA defines a Category B, Biological Substance as, "An infectious substance which does not meet the criteria for inclusion in Category A". If the material you are shipping is infectious, but not to the point of causing permanent disability and/or death, that material should be classified as Category B, Biological Substance.

Exceptions applicable to Case Shippers

The following types of material are not subject to the requirements associated with shipping Infectious Substances:

- Material that does not contain an infectious substance or is unlikely to cause disease in humans and/or animals. **This does not include chemicals or radiological material.**
- Non-infectious biological materials from humans, animals, or plants.
 - Cells, tissue cultures, DNA, RNA, or other genetic elements.
- These materials are exempt from many regulations, but are still required to be packaged in a very specific manner. If you ship any of these items you must read and understand instructions for *Triple Packaging*.

- Dried blood spots or specimens for fecal occult blood detection which have been placed on an absorbent material or other material.
- Material containing pathogens that have been neutralize or inactivated.
 - Although the pathogen is inactivated the material may still be regulated. For example, Formaldehyde will neutralize most pathogens but is itself a regulated material.

Exempt Specimens

According to the DOT and IATA regulations, specimens where there is a minimal likelihood that pathogens are present are not subject to many of the shipping regulations. This includes; blood, blood components, excreta, secretta, tissue, tissue fluid swabs, urine, and/or body parts that have been collected from a human or animal being transported for the purpose of research, diagnosis, investigation, or disease treatment/prevention.

While exempt specimens are exempt form requirements, they must be *Triple Packed* and must be marked;

EXEMPT HUMAN SPECIMENS (for human specimens) OR
EXEMPT ANIMAL SPECIMENS (for animal specimens)

written legibly and in English on a vertical edge of the outmost container, not on the top or bottom of the container.

[Shipping exempt specimens](#)

Samples containing Formaldehyde

Solutions that are fixed with formaldehyde solutions are still regulated by DOT and IATA. While any infectious agent may be neutralized, formaldehyde itself is a flammable and corrosive liquid which may be regulated..

If your laboratory ships samples containing formaldehyde you may need formal training. Please refer to the chart below for guidance.

Percent Formaldehyde in Solution	Proper Shipping Name	Training Required
≥25% Formaldehyde	Formaldehyde Solution	YES
≥10.0% but 25<%	Aviation Regulated Liquid, n.o.s.	YES
< 10.0%	<i>Not Regulated</i>	NO

10% neutral buffered Formalin, which is commonly used as a tissue fixative, contains about 3.7% formaldehyde when in solution.

Remember if you are sending any packages containing dry ice and/or human or animal you must receive hazardous materials shipping training.

Triple Packaging

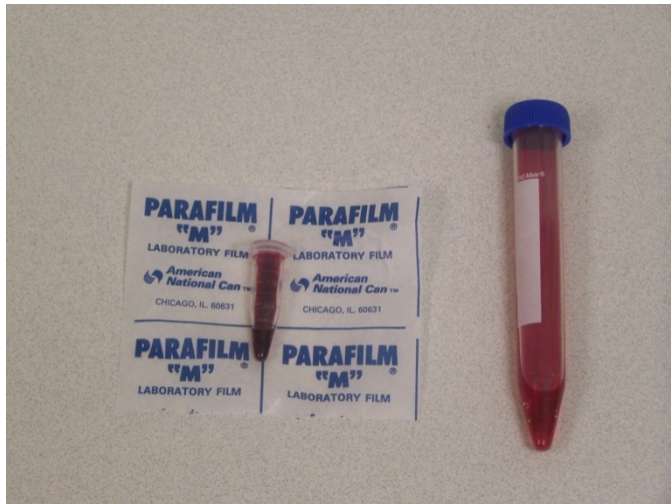
All infectious material (Category A or B) and exempt human specimens packaging must meet the following conditions to comply with DOT and IATA regulation:

- 1) Leak proof, sift proof primary receptacle;
- 2) Leak proof , sift proof secondary receptacle with visible biohaz;
- 3) Outer packaging that is appropriate for the material being shipped (capacity, strength, etc) and at least one surface must have with minimum dimensions of 100mm x 100mm.

If the material being shipped is a liquid, there must be absorbent material placed between the primary receptacle and secondary receptacle. Enough absorbent material must be used, so that if an accident were to occur, all liquid would be absorbed.

Finally, if many fragile receptacles are used for primary packages they must be secured or wrapped in a manner that prevents contact.

Below you will find an examples of material used for triple packaging;



Primary Receptacles:

Eppendorf tube (parafilm should be used on these to prevent accidental opening)

Highly Recommended are Tubes with screw-top lids



Secondary Receptacles:

Plastic container with screw tip lid

Plastic bags with Ziploc seal

Don't forget bio-labels

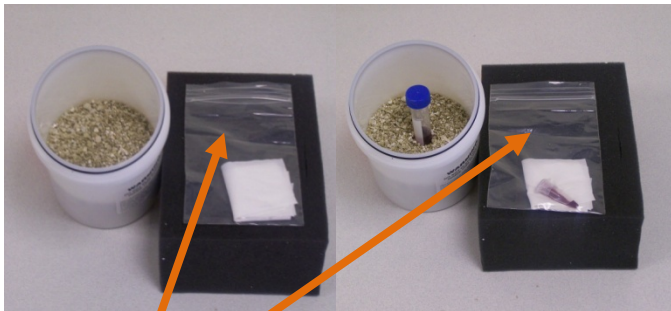


Absorbent material:

Kimwipes

Vermiculite

Paper towels



Absorbant material must be between the secondary and primary receptacle. Be sure to use enough material to absorb all liquid in primary container.



Material is then placed in a sturdy outer container. The container on the left should be filled with packing peanuts or paper to secure the item. The material on the right should be pushed into the wet/dry ice to prevent movement.

Informational Websites

- [Department of Transportation \(DOT\)](#)
- [International Air Transport Association \(IATA\)](#)
- [American Biological Safety Association Risk Group Classification](#)
- [WHO Biosafety Manual](#)