

Guidelines for Shipping Hazardous Materials, including Biological Materials

Hazardous Materials (Hazmat) shipping occurs when we need to move a chemical, product, sample, or anything that may be a hazardous material (known as Dangerous Goods by air or when shipping internationally) by air, ground, or sea.

The US Department of Transportation (DOT) defines a hazardous material as “a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous” [\[49 CFR 171.8\]](#)

Hazmat Shipping Examples:

Biological sample that may pose a risk of infection to humans or animals

OR

Biological sample with a flammable or corrosive chemical used as a preservative

How do we ship these materials safely and compliantly?

First and foremost consideration, **the shipper must be trained.**

If you are not trained and need help shipping something, please contact the Environmental Health and Safety Office at 408-924-2152 or email David Griffith at david.griffith@sjsu.edu

The Federal Aviation Administration (FAA) might call or visit SJSU if there are any issues with any hazmat shipment originating from SJSU. Ultimately, the result of FAA investigations may affect the ability for SJSU personnel to ship any hazardous materials on behalf of the University.

Fines for knowingly shipping hazmat illegally by air can result in \$250,000 in fines or 1 year in jail for individuals plus up to \$500k for organizations.

DOT hazmat training violations have a minimum fine of more than \$500 per person, per day. [\[49 CFR 107.329\(a\)\]](#)

Guidelines for Shipping Hazardous Materials, including Biological Materials

What rules apply

By AIR (International Standards): ICAO International Civil Aviation Organization (makes the rules) & IATA International Air Transport Association (operationalizes the ICAO)

By GROUND: USDOT/PHMSA (Pipeline & Hazardous Materials Safety Administration)

USDOT allows people to use ICAO rules for ground shipping when air transit is part of the transit process.

All commercial airlines require the use of IATA regulations

NEVER LEAVE a HAZMAT SHIPMENT UNATTENDED at a DROP BOX - hand off to driver or attendant at a carrier office

Main Concepts:

1. Who must be trained?
2. What are the required parts of training?
3. How often is recurrent training required?
4. What records must be maintained?
5. What are HAZMATs and what does SJSU normally ship
6. Documentation
7. International Shipping Considerations

1. Who must be trained?

If you intend to ship hazmat/dangerous goods, SJSU must ensure you are trained to do so. If you are not trained, you are not legally authorized to ship hazmat (both regulatory & SJSU policy)

This includes anyone who can affect the safety of the shipping process, anyone making a decision or doing one of the following jobs is considered a hazmat employee: classification of hazmat, selecting packaging, packing shipments, applying labels and marks, loading/unloading trucks, preparing shipping papers.

Guidelines for Shipping Hazardous Materials, including Biological Materials

2. What are the required parts of training?

Three required parts:

- General awareness (how your job affects shipping),
- Function specific training (training on your responsibilities),
- Security awareness (terrorism and security threats)

This is satisfied by the CITI (Collaborative Institute Training Initiative) Shipping and Transport of Regulated Biological Materials Training

3. How often is recurrent training required?

Training must be conducted every 2 years to satisfy IATA requirements

Training must be provided within 90 days of initial employment. Prior to initial training, a new employee or an employee that has added hazmat shipping to their job description may only complete shipments while directly supervised by someone who is already trained.

4. What records must be maintained?

The employer must maintain detailed records of training to demonstrate proof of employee training, including: hazmat employee's name, completion date of training, description or copy of the training materials, name and address of person performing the training, and a certification from the employer that a hazmat employee was trained and tested.

The employee should always have their up-to-date training certificates available in case the FAA requests documentation of training.

Under USDOT rules, a hazmat employer must keep all current training records for each hazmat employee for 90 days after their employment ends. In addition, training records dating back at least three years must be available upon request. [49 CFR 172.704(d)]

Guidelines for Shipping Hazardous Materials, including Biological Materials

5. Nine Categories of Hazardous Materials (Hazmat) / Dangerous Goods

Hazard classes with some subcategories, called divisions, pose one or more hazards during transportation:

Hazard Class 1 – Explosives

Hazard Class 2 – Gasses

Hazard Class 3 – Flammable Liquids

Hazard Class 4 – Flammable Solids

Hazard Class 5 – Oxidizing Substance and Organic Peroxide

Hazard Class 6 – Poisonous/Toxic and Infectious Substance (Divisions: 6.1, 6.2)

Hazard Class 7 – Radioactive Material

Hazard Class 8 – Corrosive Material

Hazard Class 9 – Miscellaneous Hazardous Material

You must comply with all applicable USDOT and/or IATA rules and regulations when shipping the preceding hazard classes by air, ground, or sea.

The most common hazards shipped by the SJSU College of Science:

Division 6.1 – Toxic substances

Substances that in relatively small quantities, are able by a single action or by an action of short duration to cause damage to human health, or death by inhalation, absorption, or ingestion.

Subdivision 6.2 – Infectious substances (known or expected to contain biological material that may cause illness in humans or animals.(Categories A & B, GMMO/GMO, Exempt Specimens)

Guidelines for Shipping Hazardous Materials, including Biological Materials

Category A Infectious Substances are infectious substances which are transported in a form that, when exposure to them occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. UN2814/2900

Examples (mainly cultures): *Clostridium botulinum*, Hepatitis B virus, *E. coli*, (verotoxigenic), West Nile virus

Biological Substances Category B are infectious substances which do not meet the criteria for inclusion in Category A.

Genetically Modified Organisms/Microorganisms (UN3245)

Biological material that does not meet the requirements of Category B.

Examples: Viable transgenic plants and seeds, recombinant *C. elegans*, *E. coli* K12, zebrafish embryos.

Exempt human/animal specimens Specimens that are NOT LIKELY to have a pathogen present. Professional judgment must be used; if you suspect the specimen may contain an infectious substance, it must be shipped according to the more stringent standard.

Examples: Specimens (blood, urine, tissue) being sent for medical testing such as antibody detection, Blood taken from healthy patients that is not suspected to contain an infectious pathogen but sent for testing; Human plasmid samples (i.e. recombinant plasmids that have had human DNA sequences inserted into them)

Non-Regulated Biological Material - Non-infectious bacteria/yeast/fungi, non-recombinant plasmids, extracted DNA/RNA from non-pathogenic microorganisms, synthetic nucleic acids, purified/extracted proteins.

Class 9 – Hazardous materials that do not fit into any other hazard class but pose a danger to people, property, or environment or may interfere with the flight crew operations

Guidelines for Shipping Hazardous Materials, including Biological Materials

Examples:

Dry Ice (UN1845) with biological specimens. Dry Ice (frozen carbon dioxide) is a hazmat that sublimates into gas.

Liquid Nitrogen is a hazardous material / dangerous good when shipping (unless shipped in specifically designed liquid nitrogen dry shippers)

Chemical Preservatives with biological specimens

Biological specimens containing chemical preservatives such as ethanol, formaldehyde, or formalin. Depending on quantities and concentrations, they may be regulated as Excepted Quantities, Limited Quantities, or fully regulated. Consult with EHS

6. Documentation

Shipping Documentation is based on characteristics of the hazmat and associated packaging instructions; May require a Freight Forwarder who serves as the middle person between shippers and transporters and provide specific guidance on documentation requirements.

Common documents used for shipping internationally: Itemized List of Contents, Commercial Invoice, Air Waybills, Import (CDC, USDA, APHIS) & Export Permits based on the country of origin, Safety data sheets (MSDS) as appropriate.

7. International Shipping Considerations

Export controls - US Department of Commerce's Export Administration Regulations (EAR), the Department of State's International Traffic in Arms Regulations (ITAR), and the regulations administered by the Treasury Department's Office of Foreign Assets Control (OFAC).