## Shipping Special Quantities

**Introduction**

Very small amounts of certain dangerous goods can be shipped under a “special quantity” exception. This means that, depending on the amount being shipped, the package is exempt from many or all of the labeling, placarding, documentation, and packaging requirements that are normally associated with that material. Special quantity exceptions only apply to shipments of chemicals.

**DOT/Ground Transport**

*De Minimis*

When shipping a hazardous material using the following table, the materials in packing groups II and III are not subject to other hazardous materials requirements. Use the following requirements to determine if your package can be shipped using the de minimis exemption.

1. The maximum quantity of material per inner receptacle is limited to:

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| **De Minimis Quantities** |
| **Class** | **Division** | **Quantity per Inner Receptacle** | **Packing Group** |
| **3**—*Flammable Liquids* | 3 | 1 mL (0.03 ounce) | II and III |
| **4**—*Flammable Solids* | 4.1 / 4.2 / 4.3 | 1 g (0.04 ounce) | II and III |
| **5**—*Oxidizing Substances* | 5.1 | 1 g (0.04 ounce) | II and III |
| **6**—*Toxic Substances* **1** | 6.1 | 1 g (0.04 ounce) | II and III |
| **8**—*Corrosives* | 8 | 1 mL (0.03 ounce)1 g (0.04ounce) | II and III |
| **9**—*Miscellaneous Dangerous Goods* | 9 | 1 mL (0.03 ounce)1 g (0.04ounce) | II and III |
| 1 Biological materials do not have special quantity exceptions. Refer to “How-To-Guide” for Category A or B Biological Substances. |

1. Inner receptacles with removable closures (e.g., caps or lids) are secured closed with tape or similar.
2. Inner receptacles are securely packed with sufficient cushioning to prevent breakage and enough absorbent material to contain the entire contents of the receptacle.
3. The inside packaging is securely packed in a strong outer packaging.
4. The completed package is capable of sustaining a 1.8 meter (5.9 feet) drop test on all sides.
5. Placement of the material in the package or packing different materials in the package does not result in a violation of Title 49 CFR §173.21, *Forbidden materials and packages*.
6. The aggregate quantity of hazardous material per package does not exceed 100 grams (0.22 pounds) for solids or 100 milliliter (3.38 ounces) for liquids.
7. The gross mass of the completed package does not exceed 29 kilograms (64 pounds).
8. The package is not opened or otherwise altered until it is no longer in commerce.

*Small Quantity*

The following table lists the hazard class/division and amount of hazardous materials per inner receptacle that may be shipped via ground transportation (highway and railway) as a small quantity. To ship approved materials as a small quantity, the following conditions must be met.

1. The maximum quantity of material per inner receptacle or article is limited to:

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| **Small Quantities for Highway and Railway** |
| **Class** | **Division** | **Quantity per Inner Receptacle** | **Packing Group** | **Special Consideration** |
| **2**—*Gases* | 2.2 | 30 mL water capacity (1.8 cubic inches) | I, II and III | NA |
| **3**—*Flammable Liquids* | 3 | 30 mL (1 ounce) | I, II and III | Authorized liquid material |
| **4**—*Flammable Solids* | 4.1 | 30 g (1 ounce) | I, II and III | NA |
| 4.2 / 4.3 | 30 g (1 ounce) | II, III | NA |
| **5**—*Oxidizing Substances* | 5.1 / 5.2 | 30 mL/30 g (1 ounce) | I, II and III | NA |
| **6**—*Toxic Substances* 1 | 6.1 | 1 g (0.04 ounce) | I | Hazard Zone A or B materials 1 |
| **7**—*Radioactive Material* |  |   |   | Speak with your institutions Radiation Safety Officer before shipping any radioactive materials |
| **8**—*Corrosives* | 8 | 30 mL/30 g (1 ounce) | I, II and III | NA |
| **9**—*Miscellaneous Dangerous Goods* | 9 | 30 mL/30 g (1 ounce) | I, II and III | NA |
| 1 Hazard Zone A: LC50 less than or equal to 200 parts per million (ppm). Hazard Zone B: LC50 greater than 200 ppm and less than or equal to 1,000 ppm.2 Hazard Zones for class 6 toxic substances varies greatly depending on possible routes of exposure. |

1. Inner receptacles are not liquid-full at 55 °C (131 °F), and are constructed of plastic having a minimum thickness of no less than 0.2 millimeter (0.008 inch), or of earthenware, glass or metal.
2. Inner receptacles with removable closures (e.g., caps or lids) are securely closed with tape or similar.
3. Inner receptacles are securely packed with sufficient cushioning to prevent breakage and enough absorbent material to contain the entire contents of the receptacle.
4. The inside packaging is securely packed in a strong outer packaging.
5. The gross mass of the completed package does not exceed 29 kg (64 pounds).
6. The package is not opened or otherwise altered until it is no longer in commerce.
7. The shipper certifies conformance with this section by marking the outside of the package with the statement “This package conforms to 49 CFR 173.4 for domestic highway or rail transport only.”

**IATA/Air Transport**

*Excepted Quantity (IATA/Air Transport)*

Dangerous goods that are shipped in small quantity by ground can be shipped as an excepted quantity by air. Shipping hazardous materials as an excepted quantity eliminates some of the paper work requirements such as the Shippers Declaration of Dangerous Goods form. Dangerous goods in excepted quantities are not permitted in checked luggage, carry-on baggage or in the general mail. Use the following label to indicate that a package is containing an Expected Quantity. There is space to add the primary hazard class, division and the name of the shipper or consignee if applicable.



Each material listed in the List of Dangerous Goods found in the IATA DGR has an EQ Code that indicates whether or not it can be shipped as an Excepted Quantity and in what amounts.



Use the following table to determine what amount per inner packaging and amount per total package may be shipped as an Excepted Quantity based on the material’s EQ code.

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| **Code** | **Maximum Net Quanity Per Inner Packaging** | **Maximum Net Quantity Per Outer Packaging** |
| E0 | Not permitted as Excepted Quantity |
| E1 | 30 g / 30 mL | 1 kg / 1 L |
| E2 | 30 g / 30 mL | 500 g / 500 mL |
| E3 | 30 g / 30 mL | 300 g / 300 mL |
| E4 | 1 g / 1 mL | 500 g / 500 mL |
| E5 | 1 g / 1 mL | 300 g / 300 mL |

For gases the volume indicated for inner packaging refers to the water capacity of the inner receptacle and the outer packaging is the combined water weight of all inner packaging within a single outer packaging.

If there are different Excepted Quantity materials with different codes within the same outer package then the outer package must be limited to the most restrictive.

Shipping Excepted Quantities must follow the packing instructions listed below.

1. Inner receptacles are constructed of plastic having a minimum thickness of no less than
0.2 mm (0.008 inch), or of earthenware, glass or metal.
2. Inner receptacles with removable closures (e.g., caps or lids) are securely closed with tape or similar.
3. Any receptacle with a neck with screw threads must have a leak proof threaded cap.
4. The closure must be resistant to the material being shipped.
5. Each inner package must be packed in an intermediate packaging with cushioning material so that under normal conditions they cannot break, be punctured or leak its contents.
6. The intermediate packaging must completely contain the contents of the inner packing in case of breakage, leakage regardless of package orientation.
7. For liquids there needs to be enough absorbent material to absorb the entire contents of inner packaging. Absorbent material can also be used as cushioning material.
8. Dangerous goods must not react with cushioning, absorbent or packaging materials.
9. Intermediate packaging must be securely packaged in a strong rigid outer packaging (e.g., wood or fiberboard).
10. Package must be large enough that all the necessary markings are present.
11. A package containing dangerous goods in excepted quantities must not contain other dangerous goods that require a shipper’s declaration.
12. When shipping a package with an excepted quantity dangerous good that is packed with dry ice refer to the “How to Dry Ice Guide” for proper packing instructions.
13. Inner packaging must be filled 95% of their capacity for solids and 98% capacity for liquids with packing material to prevent breakage or spillage.
14. Packages must withstand a drop test from a height of 1.8 meters (5.9 feet) on all sides.
15. Shipper’s Declaration for Dangerous Goods is not required.
16. If a bill of lading or an air waybill accompanies dangerous goods in Excepted Quantities, it must include that phrase “Dangerous Goods in Excepted Quantities” and indicate the number of packages.

*Limited Quantities*

Many hazardous chemicals can be safely transported when in limited quantities and in appropriate packaging.

**Packaging:** UNPOP packaging is not required for Limited Quantity Shipments. Packaging must be of appropriate durability for its intended use. Triple Packaging is required.

**Labeling:** Marking the package with a black and white diamond label with a “Y” indicates that the package is in compliance with IATA DGR regulations and can be shipped via passenger aircraft.

* Black and white diamond sticker with a “Y”

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A package marked with a black and white diamond without a “Y” indicates the package can be shipped in limited quantities by ground or water.

* Black and white diamond sticker with appropriate UN number



In addition to the Limited Quantity Label, all Limited Quantity shipments must be labeled with the Proper Shipping Name and UN ID number. Hazard Class diamonds are not required.

**Documentation:** A Shipper’s Declaration Form and a waybill are required for Limited Quantity Shipments.

The only goods which are permitted on passenger aircraft which meet the requirements set forth in the Limited Quantities for Passenger Air Craft table may be brought on board as a dangerous good in a limited quantity.

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| **Limited Quantities for Passenger Air Craft** |
| **Class** | **UN #** | **Division** | **Packing Group** | **Special Consideration** |
| **2**—*Gases* | 1950 | 2.1 / 2.2 | NA | NA |
| 2037 | 2.1 / 2.2 | NA | No subsidiary hazard |
| **3**—*Flammable Liquids* | NA | NA | II and III | NA |
| **4**—*Flammable Solids* | NA | 4.1 | II and III | Excluding self-reactives regardless of packing group |
| 4.3 | II and III | NA |
| **5**—*Oxidizing Substances* | NA | 5.1 | II and III | NA |
| 5.2 | NA | Organic peroxides only when contained in a chemical kit or first aid kit |
| **6**—*Toxic Substances* | NA | 6.1 | II and III | NA |
| **8**—*Corrosives* | NA | NA | II and III | Not including UN 2794, UN 2795, UN 2803, UN 2809 and UN 3028 |
| **9**—*Miscellaneous Dangerous Goods* | NA | NA | NA | Only the following class 9 substances: Dibromodifluoromethane (UN1914), Benzaldehyde (UN 1990), Ammonium nitrate fertilizers (UN 2071), Environmentally hazardous substance, solid, n.o.s. (UN 3077), Environmentally hazardous substance, liquid, n.o.s. (UN 3082), Chemical kit or first aid kit (UN3316), Aviation regulated liquid n.o.s. (UN3334), Aviation regulated solid, n.o.s. (UN 3335) |
| NA not applicablen.o.s. not otherwise specified |

*A note on shipping formaldehyde:*

Formaldehyde and formaldehyde solutions such as formalin are commonly shipped by researchers as part of biological shipments. The concentration and flashpoint of the formaldehyde being shipped determines whether or not it is a hazardous material and what hazard class it should be shipped under.

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| **Solution (% by volume)** | **Hazardous (Y/N)** | **UN#** | **Hazard Class** | **Proper Shipping Name** |
| ≥25% formaldehyde, flashpoint ≥60 °C | Y | 1198 | 3(8) | Formaldehyde solution, flammable |
| ≥25% formaldehyde, flashpoint <60 °C | Y | 2209 | 8 | Formaldehyde solution |
| ≥10% but <25% formaldehyde | Y | 3334 | 9 | Aviation regulated liquid, n.o.s. |
| <10% formaldehyde | N | NA | NA | NA |
| ≥ greater than or equal to< less than°C degrees Celsiusn.o.s. not otherwise specifiedNA not applicable |

Formaldehyde or formalin may be considered a class 3, 8, or 9 hazard, depending on the concentration of formaldehyde in the solution and whether or not the solution is flammable. Reference the above table to determine whether your solution must be shipped as a dangerous good.

Check the Safety Data Sheet (SDS) for your solution to find the flashpoint and concentration. You should have an SDS for any hazardous chemical in your laboratory. If you need a SDS, you can check with the vendor that you purchased the chemical from or an online SDS database.

If you are shipping formalin solution that is less than 10% formaldehyde by volume, it is not considered a “dangerous good” for shipping purposes. Your shipment must still be packaged in sealed, leak-proof containment, and your secondary packaging should contain enough absorbent material to completely absorb the contents of the inner packaging. Your bill of lading/air waybill should contain a description of what you are shipping (e.g., 10% buffered formalin) and the words “non-hazardous.” If you are preparing an international shipment, this information must also be included on the commercial invoice.

If your solution contains 10% or greater formaldehyde, it is classified as a Dangerous Good under the Dangerous Goods Regulations (DGR). Check the DGR to determine what amount can be shipped as an Excepted Quantity or Limited Quantity.