



Shipment of Dangerous Goods using Small Quantity Exemptions

A supplement to the UO Shipment of Hazardous Materials Manual

I. Introduction

Regulation acknowledges that the paperwork burden associated with compliance may outweigh the actual hazard present when shipping very small quantities of materials. Exceptions do exist. This document describes the applicability of de minimus and small quantities exceptions, and requirements that must still be addressed under each provision. It does not substitute for required training or the full text of the applicable Regulation.

For domestic ground transportation, 49 CFR §173.4 excludes small quantities of certain hazardous materials from many of the requirements of the U.S. DOT Hazardous Materials Regulations. For domestic and international air transportation the International Air Transport Association (IATA) Dangerous Goods Regulations (DGR) excludes small quantities of certain hazardous materials from certain requirements through either De Minimus or Excepted Quantities provisions.

Hazardous materials within the context of shipping, also known as Dangerous Goods, are defined as “articles or substances which are capable of posing a risk to health, safety, property or the environment and which are shown the the list of dangerous goods in Dangerous Goods Regulation or which are classified according to Dangerous Goods Regulation”. This definition may vary from other definitions of hazardous materials in other regulatory context.

II. Training

Anyone offering Dangerous Goods for transport must first receive training. Those wishing to ship hazardous materials according to the exceptions in 49 CFR §173.4, or IATA, must receive personal training from EHS. Call EHS at 346-3192 to schedule a shipping training.

III. Applicability

A. Domestic Ground Shipments

1. Shipping companies

The small quantity exceptions in 49 CFR 173.4 may be utilized when shipping materials with UPS, FedEx Ground, or overland freight



carriers. The small quantity exceptions do not apply to materials sent through U.S. mail. The U.S. Postal Service will only ship hazardous materials packaged for retail sale.

2. Materials with small quantity exceptions

The materials covered include:

- Nonflammable, nontoxic gas (Division 2.2);
- Aerosols without a subsidiary hazard (Class 2);
- Flammable liquids (Class 3);
- Flammable solids (Division 4.1);
- Spontaneously combustible materials (Division 4.2, Packing Group II and III);
- Dangerous when wet materials (Division 4.3, Packing Group II and III);
- Oxidizers (Division 5.1 and 5.2);
- Toxic substances (Division 6.1);
- Radioactive materials (Class 7);
- Corrosives (Class 8); and
- Certain miscellaneous hazardous materials (Class 9).

3. Materials with no exceptions

Materials for which there are no exceptions to DOT regulations include:

- Explosives (Class 1);
- Flammable and Toxic gases (Division 2.1 and 2.3);
- Spontaneously combustible materials (Division 4.2, Packing Group I);
- Dangerous when wet materials (Division 4.3, Packing Group I);
- Infectious substances (Division 6.2); and
- Lithium batteries and cells (Class 9).

Shipment of the following materials requires assistance from EHS:

- Organic Peroxides (Division 5.2);
- Materials poisonous by inhalation (Division 6.1);
- Lithium batteries and cells (Class 9);
- Chemical waste; and
- Radioactive materials (Class 7).



B. Air Shipments (Domestic or International)

1. Shipping companies

IATA exemptions may be utilized with any air operator. Some foreign states and operators have specific requirements that may impact the applicability of any exemption. These are described within the state and operator variations, section 2.8 IATA DGR.

2. Materials with exceptions

The materials that may be shipped as IATA De Minimus or Excepted Quantities include:

- Non-flammable, non-toxic gases (Division 2.2) without subsidiary risks;
- Flammable liquids (Class 3);
- Flammable solids (Class 4) Packing Groups II and III;
- Oxidizing substances (Division 5.1) Packing Groups II and III;
- Organic peroxides (Division 5.2) only when a kit component;
- Toxic substance (Division 6.1);
- Corrosive substances (Class 8);
- Miscellaneous dangerous goods (Class 9) and all articles.

Materials are assigned to Excepted Quantity Codes (E0, E1, E2, E3, E4 and E5). The complete listing of codes is found at IATA DGR 2.6.2.2, and related to materials by the IATA DGR 4.2 List of Dangerous Goods.

3. Materials with no exceptions

Materials for which there are no exceptions to IATA regulations include:

- Explosives (Class 1);
- Flammable and Toxic Gases (Division 2.1 and 2.2);
- Infectious substances (Division 6.2);
- Primary lithium (non-rechargeable batteries, Class 9) UN 3090 and UN 3091;
- Non-flammable, non-toxic gases (Division 2.2) of UN 1950, UN 2037, UN 2073, UN 2857 and UN 3164;
- Flammable liquids (Class 3) of Packing Group I with subsidiary risk, and UN 1204, UN 2059 and UN 3473;
- Flammable solids (Class 4) of Packing Group I, self-reactive nature, and UN 2555, UN 2556, UN 2557, UN 2907, UN 3292 and UN 3476;
- Oxidizing substances (Division 5.1) of Packing Group I;



- Toxic substance (Division 6.1) of Packing Group I with inhalation toxicity;
- Corrosive substance (Class 8) of Packing Group I, and UN 1774, UN 2794, UN 2795, UN 2800, UN 2803, UN 2809, UN 3028, UN 3477 and UN 3506; and
- Miscellaneous dangerous substances (Class 9) carbon dioxide (solid), genetically modified organisms, genetically modified microorganisms, and lithium ion and lithium metal batteries.

Shipment of these, and the following, materials requires assistance from EHS:

- Organic Peroxides;
- Materials poisonous by inhalation;
- Lithium batteries (within equipment, and spares);
- Chemical waste; and
- Radioactive materials.

IV. Summary Requirements

A. 49 CFR §173.4 Small Quantities (domestic ground transportation)

Materials covered by the small quantity exceptions are exempt from all other requirements of 49 CFR when they are shipped according to ten requirements outlined in paragraph (a) of the provision. Briefly, these requirements are:

- Inner receptacle contains not more than:

Material	Net quantity per inner receptacle
Authorized liquids	30 mL
Authorized solids	30 g
Division 6.1, PG I, Hazard Zone A or B materials	1 g
Class 7 radioactive materials	Activity requirements of §173.421-426
Division 2.2 gases	30 mL water capacity

- Inner receptacle is at least 0.2 mm thick and is not liquid full at 55 °C;
- Closure of inner receptacle is positively secured;
- Chemically compatible absorbent and/or cushioning;
- Inner receptacle is secured in outer packaging;
- Packaging must pass a drop test and compressive load test;
- Package must not contain forbidden materials (49 CFR 172.101);



- Package does not exceed 29 kg;
- Package is not opened or altered during transportation;
- Package is marked with the statement, “**This package conforms to 49 CFR 173.4 for domestic highway or rail transport only.**”; and
- Lithium batteries and cells must be shipped as fully regulated Dangerous Goods.

Drop test: The package must sustain free drops made from a height of 1.8 m (5.9 feet) directly onto a solid unyielding surface without breakage or leakage of internal containers and without reduction in the effectiveness of the package from replicating success in this test. Drops include flat onto package top, bottom, sides, as well as a corner junction.

Compressive load test: Applicable when shipping multiple identical packages concurrently; contact EHS for assistance.

B. IATA DGR De Minimus Quantities (air transportation)

Dangerous goods assigned codes E1, E2, E4, or E5 are not subject to IATA regulation when carried as cargo provided:

- Maximum net quantity of material per inner packaging is limited to 1 mL for liquids and gases, and 1 g for solids;
- Each inner packaging must be leak proof and securely packed in an outer packaging with cushioning and absorbent material so that in normal conditions of transport, they cannot break, be punctured, or leak their contents out of the outer packaging;
- Each outer packaging must be documented to survive a drop test from 1.8 m (5.9 feet), and a 24 hour compressive load equivalent to the total mass of equivalent packages stacked to a height of 3 m (9.8 feet); and
- The maximum net quantity of dangerous goods per outer packaging does not exceed 100 mL for liquids and gases, and 100 g for solids.

C. IATA DGR Excepted Quantities (air transportation)

Small quantities of dangerous goods assigned codes E1, E2, E3, E4, or E5 are only subject to the following provisions within IATA Regulation: training requirements, dangerous goods in air mail requirements, classification and packing group criteria, packaging requirements, loading restrictions, accident and incident reporting, and radioactive materials shipping requirements. For full text of these requirements, see IATA DGR 2.6. A summary of these requirements follows.



1. Classification Requirement

Dangerous goods must be classified according to class and division according to Regulation guidelines. Classification must be based on listing within the Regulation. If a material is not listed by name then a generic or n.o.s. (not otherwise specified) proper shipping name must be selected from IATA DGR Table 4.1.A that most accurately describes the substance. Classification results in quantity limitations as follows:

EQ Code	Maximum net quantity 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

2. Packaging Requirements

- Inner packages must strong, leak-proof, and have secured closures;
- Each inner package must be within a leak-proof intermediate package complete with cushioning and absorbent material;
- Intermediate packaging must be securely packed in a strong outer packaging (wood, fibreboard, or equivalent).
- The complete package must be documented to survive a drop test from 1.8 m (5.9 feet), and a 24 hour compressive load equivalent to the total mass of equivalent packages stacked to a height of 3 m (9.8 feet);
- The package must be of adequate size to apply all necessary markings on a package face;
- Overpacks may be used and may contain packages with or without other dangerous goods; and
- An Excepted Quantities package must not contain any dangerous goods that require a Shipper's Declaration.
 - Dry Ice is allowed within Excepted Quantities packages when the requirements of Packing Instruction 954 are met.



3. Marking Requirements

A 100 mm x 100 mm Excepted Quantity packaging mark is required. The mark must indicate the primary hazard class, and division when assigned, of each dangerous goods contained in the package. When the name of the shipper is not legibly shown elsewhere on the package, this information must also be included within the marking. An example for a flammable liquid (Class 3) is provided for review.



An overpack must display all required markings, and the word “overpack”, unless the markings on internal packages are clearly visible.

4. Documentation

Accompanying bills of lading, or air waybills, must include the statement “Dangerous Goods in Excepted Quantities”. A Shipper’s Declaration of Dangerous Goods is not required.

5. Handling

Transport operator requirements include loading restrictions, and reporting of dangerous goods accidents, incidents and other occurrences.

V. Resources

UO Environmental Health and Safety, <http://ehs.uoregon.edu/HazMatShipping>

49 CFR 173.4, <http://www.ecfr.gov>

IATA Dangerous Goods Regulations, <http://www.iata.org/publications/dgr/Pages/index.aspx>



Package Markings: www.shippinglabels.com; www.labelmaster.com

Appendix A – Exempt Quantity’s Training Certification

After reading the UO Guide to Shipment of Dangerous Goods using Small Quantity Exemptions, fill out this form using available resources within the Guide. EHS will review the completed form with you and, upon successful completion, will certify training requirements for this specific function have been met. The certification will expire after two years.

- 1) Small quantity exemptions allow shipment of certain Dangerous Goods without meeting many of the detailed requirements of the full text of DOT and IATA regulation?
 - a) True
 - b) False

- 2) Which of the following labels/markings must appear on a package containing materials meeting the small quantity exemption? Check all that apply.

<input type="checkbox"/> Class 9 hazard label	<input type="checkbox"/> This package conforms to 49 CFR 173.4 for domestic highway or rail transport only.
<input type="checkbox"/> Class 8 hazard label	<input type="checkbox"/> UN3245

- 3) Lithium batteries and cells may be shipped using small quantity exemptions?
 - a) True
 - b) False

- 4) De Minimus quantities that fully exempt air shipments from the Dangerous Goods Regulations exist for which Excepted Quantity Codes within IATA DGR 4.2 (List of Dangerous Goods)? Check all that apply.

<input type="checkbox"/> E0	<input type="checkbox"/> E2	<input type="checkbox"/> E4
<input type="checkbox"/> E1	<input type="checkbox"/> E3	<input type="checkbox"/> E5

- 5) What is the marking requirement for Excepted Quantities shipped by air? Check all that apply.

<input type="checkbox"/> A 100mm x 100mm packaging mark	<input type="checkbox"/> Hazard class division, when assigned
<input type="checkbox"/> The primary hazard class	<input type="checkbox"/> The statement “Dangerous Goods in Excepted Quantities”
<input type="checkbox"/> The shipper’s name	

- 6) For low hazard liquid materials classified into air shipments Exempted Quantity Code E1, the maximum net quantity per inner packaging is 30 mL and the maximum net quantity per outer packaging is 1 L:
 - a) True
 - b) False

- 7) Authorized liquids shipped domestic ground have a maximum net quantity per inner receptacle of 30 mL, and 29 kg maximum package weight. An “authorized liquid” includes Division 6.2 materials?
 - a) True
 - b) False

I understand the hazards associated with small quantities of Dangerous Goods, and shipping requirements as outlined in the Small Quantity Exemptions guide found at <http://ehs.uoregon.edu/HazMatShipping>.

Print Name:		Email:	
Signature:		Date:	
Phone:		UO ID#:	
Please return in campus mail to EHS,72 Onyx Bridge.			