

**Committee of Experts on the Transport of Dangerous Goods  
and on the Globally Harmonized System of Classification  
and Labelling of Chemicals**

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## Chapter 2

# LIMITATION OF DANGEROUS GOODS ON AIRCRAFT

*Parts of this Chapter are affected by State Variations CA 5, CA 9, GB 5,  
JP 23, NL 2, US 1, US 2, VC 4; see Table A-1*

### 2.1 DANGEROUS GOODS FORBIDDEN FOR TRANSPORT BY AIR UNDER ANY CIRCUMSTANCE

Any substance which, as presented for transport, is liable to explode, dangerously react, produce a flame or dangerous evolution of heat or dangerous emission of toxic, corrosive or flammable gases or vapours under conditions normally encountered in transport must not be carried on aircraft under any circumstance.

*Note.— Certain dangerous goods known to meet the description above have been included in the Dangerous Goods List (Table 3-1) with the word “Forbidden” shown in columns 2 and 3. It must be noted, however, that it would be impossible to list all dangerous goods which are forbidden for transport by air under any circumstance. Therefore, it is essential that appropriate care be exercised to ensure that no goods meeting the above description are offered for transport.*

### 2.2 EXCEPTIONS FOR DANGEROUS GOODS OF THE OPERATOR

2.2.1 The provisions of these Instructions do not apply to the following:

- a) articles and substances which would otherwise be classified as dangerous goods but which are required to be aboard the aircraft in accordance with the pertinent airworthiness requirements and operating regulations or that are authorized by the State of the Operator to meet special requirements;
- ≠ b) aerosols, alcoholic beverages, perfumes, colognes, safety matches and liquefied gas lighters carried aboard an aircraft by the operator for use or sale on the aircraft during the flight or series of flights, but excluding non-refillable gas lighters and those lighters liable to leak when exposed to reduced pressure;
- c) dry ice intended for use in food and beverage service aboard the aircraft.

2.2.2 Unless otherwise authorized by the State of the Operator, articles and substances intended as replacements for those referred to in 2.2.1 a) above, or articles and substances referred to in 2.2.1 a) which have been removed for replacement, must be transported in accordance with the provisions of these Instructions, except that when consigned by operators, they may

be carried in containers specially designed for their transport, provided such containers are capable of meeting at least the requirements for the packagings specified in these Instructions for the items packed in the containers.

2.2.3 Unless otherwise authorized by the State of the Operator, articles and substances intended as replacements for those referred to in 2.2.1 b) and c) above must be transported in accordance with the provisions of these Instructions.

### 2.3 DANGEROUS GOODS IN AIRMAIL

2.3.1 In accordance with the Universal Postal Union (UPU) Convention, dangerous goods as defined in these Instructions, with the exception of those listed below, are not permitted in the mail. National postal authorities should ensure that the provisions of the UPU Convention are complied with in relation to the transport of dangerous goods by air.

2.3.2 The following dangerous goods may be acceptable in mail for air carriage subject to the provisions of the national postal authorities concerned and these Instructions which relate to such material, except that the provisions concerning documentation (Part 5, Chapter 4) do not apply to the radioactive material described in b) below:

- a) infectious substances and solid carbon dioxide (dry ice) when used as a refrigerant for infectious substances; and
- ≠ b) radioactive material, the activity of which does not exceed one-tenth of that listed in Table 2-11.

### 2.4 DANGEROUS GOODS IN EXCEPTED QUANTITIES

#### 2.4.1 General

Small quantities of dangerous goods meeting the provisions of this paragraph are not subject to the other provisions of these Technical Instructions except for:

- a) the prohibition in airmail in 1;2.3;
- b) the definitions in 1;3;
- c) the classification and packing group criteria in Part 2;

- d) the loading restrictions in 7;2.1;
- e) the reporting of dangerous goods accidents, incidents and other occurrences in 7;4.4 and 4.5;
- f) the training requirements in Chapter 4; and
- g) in the case of radioactive material, the requirements for radioactive material in excepted packages in 2;7.7.1.2 and 2;7.9.1.

### 2.4.2 Applicability

2.4.2.1 Excepted quantities of dangerous goods may only be carried in accordance with the limitations and provisions contained in this paragraph and must meet all the applicable requirements of those parts of the Technical Instructions listed in 2.4.1 above.

2.4.2.2 Only dangerous goods which are permitted on passenger aircraft and which meet the criteria of the following classes, divisions and packing groups (if appropriate) may be carried under these provisions for dangerous goods in excepted quantities:

|              |  |
|--------------|--|
| Division 2.2 | Without subsidiary risk  |
| Class 3      | All packing groups   |
| Class 4      | Packing Groups II and III but excluding all self-reactive substances             |
| Division 5.1 | Packing Groups II and III  |
| Division 5.2 | Only when contained in a chemical kit or a first-aid kit                         |
| Division 6.1 | All substances other than those having an inhalation toxicity of Packing Group I |
| Class 8      | Packing Groups II and III but excluding UN Nos. 2803 and 2809                    |
| Class 9      | All substances and articles other than magnetized material                       |

Substances and articles in the above classes, divisions and packing groups may also be radioactive material in excepted packages.

*Note.— Many articles or substances, including the following, are NOT permitted under these excepted quantity provisions:*

- a) those forbidden for transport under any circumstance as provided for in 2.1;
- b) those permitted only by exemption or approval;
- c) those forbidden for transport on passenger aircraft in Table 3-1;
- d) those in Class 1 or Divisions 2.1, 2.3 or 6.2;
- e) other than for temperature sensing devices, dangerous goods contained within a device which is an integral part of an article or device which is not subject to these Instructions (e.g. mercury switches in electrical or other appliances).

### 2.4.3 Quantity limits

- a) Inner packagings. The maximum quantity of dangerous goods in each inner packaging must be limited to:
  - 1) 1 g or 1 mL for solids or liquids of Packing Group I or II in Division 6.1 or requiring a subsidiary risk toxic label;
  - 2) 30 g or 30 mL for solids or liquids other than those covered in 1) above; or
  - 3) for gases, the quantity contained in a receptacle with a water capacity of 30 mL;
- b) Outer packagings. The total net quantity of dangerous goods contained in each outer packaging must be limited to:
  - 1) for other than Divisions 2.2 and 5.2:
    - Packing Group I — 300 g or 300 mL;
    - Packing Group II — 500 g or 500 mL;
    - Packing Group III — 1 kg or 1 L;
  - 2) for Division 2.2 — 1 L; or
  - 3) for Division 5.2 — 500 g or 250 mL.

*Note.— The 1 L maximum quantity referred to in b) 2) above is intended to apply to the sum of the water capacities of each of the inner packagings contained in the outer packaging.*

### 2.4.4 Packing requirements

Packagings, including their closures, used for the transport of dangerous goods in excepted quantities must be of good quality. Packaging materials which may come into contact with the substance or article must not react dangerously with the substance or article and must not adversely affect its packaging functions. In addition:

- a) each inner packaging must be constructed of plastic having a minimum thickness of not less than 0.2 mm, or of glass, earthenware or metal. The materials of inner packagings must not contain substances which may react dangerously with the contents, form hazardous products or significantly weaken the packagings. The closure of each inner packaging with a removable closure must be held securely in place with wire, tape or other positive means. Any receptacle having a neck with moulded screw threads must have a leakproof threaded type cap completely resistant to the contents. Except for temperature sensing devices, inner packagings must not completely fill with liquid when at a temperature of 55°C;
- b) each inner packaging must be securely packed in an intermediate packaging with cushioning material. The intermediate packaging must completely contain the contents in case of breakage or leakage, regardless of package orientation. For liquid dangerous goods, the intermediate packaging must contain sufficient absorbent material to absorb the entire contents of the inner packaging. In such cases, the absorbent material may be the cushioning material. Dangerous goods must not react dangerously with cushioning and absorbent material or adversely affect their properties;

- c) the intermediate packaging must be securely packed in a strong, rigid outer packaging (wooden, fibreboard or other equally strong material);
- d) the complete package must be capable of withstanding the tests specified under 2.4.5;
- e) dangerous goods in excepted quantities must not be packed together in the same outer packaging if they react dangerously with each other and cause:
  - 1) combustion and/or evolution of considerable heat;
  - 2) evolution of flammable, toxic or asphyxiant gases;
  - 3) the formation of corrosive substances; or
  - 4) the formation of unstable substances;
- f) when different dangerous goods are contained in one outer packaging, the quantities of different dangerous goods contained in one outer packaging must be calculated using the formula:

$$\frac{n_1}{M_1} + \frac{n_2}{M_2} + \frac{n_3}{M_3} + \dots + \frac{n_x}{M_x} \leq 1$$

where  $n_1, n_2, \dots$ , are the net quantities of the different dangerous goods contained in the same outer packaging and  $M_1, M_2, \dots$ , are the maximum net quantities permitted for the appropriate packing group by 2.4.3 b). However, the following dangerous goods do not need to be taken into account in the calculation:

- 1) carbon dioxide, solid (dry ice), UN 1845;
- 2) those with the same UN number, packing group and physical state (i.e. solid or liquid), provided they are the only dangerous goods in the package and the total net quantity does not exceed the maximum net quantity according to 2.4.3 b);
- g) each package must be of such size that there is adequate space to apply all necessary markings; and
- h) overpacks may be used and may also contain packages of dangerous goods or goods not subject to these Instructions provided there are no packages enclosing different substances that might react dangerously with each other.

#### 2.4.5 Package tests

2.4.5.1 Tests must be carried out on packages prepared as if for transport. Inner packagings must be filled to not less than 95 per cent of their capacity for solids or 98 per cent for liquids. The substances to be transported in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it must have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. In the drop tests for liquids, when another substance is used, its relative density (specific gravity) and viscosity should be similar to those of the substance to be transported.

2.4.5.2 The complete package, as demonstrated by testing, must be capable of withstanding, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

- a) the following free drops onto a rigid, non-resilient flat and horizontal surface from a height of 1.8 m:
  - 1) for a packaging with six sides (i.e. a box shape):
    - one drop flat on the bottom;
    - one drop flat on the top;
    - one drop flat on the long side;
    - one drop flat on the short side; and
    - one drop on a corner at the junction of three intersecting edges;
  - 2) for a cylindrical packaging (i.e. a drum shape):
    - one drop diagonally on the chime or on a circumferential seam or an edge; and
    - one drop on the weakest part not tested by the first drop, e.g. a closure.

*Note.— Each of the above tests may be performed on different but identical packages.*

- b) a force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the test sample).

#### 2.4.6 Marking and certification

2.4.6.1 Each package prepared according to these provisions must be durably and legibly marked with the words “Dangerous goods in excepted quantities” and with the name and address of the shipper. If the package is included in an overpack, these markings must be clearly visible or appear on the overpack.

2.4.6.2 Each package prepared according to these provisions must be accompanied by a statement certifying that the package has been prepared in accordance with the provisions for dangerous goods in excepted quantities. This statement may be attached to or printed on the outside of the package.

2.4.6.3 In addition to the languages which may be required by the State of Origin, English should be used.

#### 2.4.7 Marking of air waybill

When an air waybill is issued it must contain the words “Dangerous goods in excepted quantities” and when excepted radioactive material is involved, the additional words “Radioactive material, excepted package ...” as required in 5:4.3 as appropriate.

#### 2.4.8 Baggage and airmail

Dangerous goods in excepted quantities are not permitted in or as checked or carry-on baggage nor in the mail.

### 2.5 EXCEPTIONS FOR DANGEROUS GOODS PACKED IN LIMITED QUANTITIES

Dangerous goods packed in limited quantities are excepted from certain provisions of these Instructions subject to the conditions laid down in Part 3, Chapter 4.