



**WORKING PAPER**

**DANGEROUS GOODS PANEL (DGP)**

**TWENTY-FIRST MEETING**

**Montréal, 5 to 16 November 2007**

**Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2009-2010 Edition**

**DRAFT AMENDMENTS OF THE TECHNICAL INSTRUCTIONS TO ALIGN TO THE UN RECOMMENDATIONS — PART 5**

(Presented by the Secretary)

**SUMMARY**

Below are the draft amendments to Part 5, Chapters 1, 2, 3 and 4 to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals at its third session (Geneva, 15 December 2006) and as modified by the decisions of WG/06 and WG/07.

The DGP is invited to agree to the draft amendments in this working paper.

---

Reference for amendments to Part 5: DGP-WG/07-WP/6, unless otherwise indicated.

---

**Part 5**

**SHIPPER'S RESPONSIBILITIES**

**Chapter 1**

**GENERAL**

...

**1.1 GENERAL REQUIREMENTS**

Before a person offers any package or overpack of dangerous goods for transport by air that person must ensure that:

...

## DGP-WG/06-WP/25:

- ~~g) proper shipping names, UN numbers, labels, "limited quantities" (when applicable) and special handling instructions appearing on the interior packages are clearly visible or reproduced on the outside of the overpack (for an overpack containing packages of radioactive material, see 3.2.6);~~
- ~~h) packaging specification markings need not be reproduced on the overpack. The overpack marking is an indication that packages contained within comply with prescribed specifications;~~
- ~~i) the dangerous goods are not included in any freight container/unit load device except for radioactive material as specified in 7.2.9 (subject to the approval of the operator, this does not apply to a unit load device containing consumer commodities prepared according to Packing Instruction 910 or dry ice used as a refrigerant for other than dangerous goods when prepared according to Packing Instruction 904 or magnetized material when prepared according to Packing Instruction 902);~~
- ~~j) before a package or overpack is reused, all inappropriate dangerous goods labels and markings are removed or completely obliterated; and~~
- ~~ki) each package contained within an overpack is properly packed, marked, labelled and is free of any indication that its integrity has been compromised and in all respects is properly prepared as required in these Instructions. The "overpack" marking [described in 2.4.9 a\)](#) is an indication of compliance with this requirement. The intended function of each package must not be impaired by the overpack.~~

*Note.— For cooling purposes, an overpack may contain dry ice, provided that the overpack meets the requirements of Packing Instruction 904.*

...

## 1.2 GENERAL PROVISIONS FOR CLASS 7

*Editorial Note.— Paragraph 1.2.1 below is moved to 9.1.7, 9.1.8:*

### 1.2.1 Requirements before shipments

#### 1.2.1.1 ~~First shipment of a package~~

~~Before the first shipment of any package, the following requirements must be fulfilled:~~

- ~~a) If the design pressure of the containment system exceeds 35 kPa (gauge), it must be ensured that the containment system of each package conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;~~
- ~~b) For each Type B(U), Type B(M) and Type C package and for each package containing fissile material, it must be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the confinement system, are within the limits applicable to or specified for the approved design;~~
- ~~c) For packages containing fissile material, where, in order to comply with the requirements of 6.7.10.1 neutron poisons are specifically included as components of the package, checks must be performed to confirm the presence and distribution of those neutron poisons.~~

#### 1.2.1.2 ~~Each shipment~~

~~Before each shipment of any package, the following requirements must be fulfilled:~~

- ~~a) For any package it must be ensured that all the requirements specified in the relevant provisions of these Instructions have been satisfied;~~
- ~~b) It must be ensured that lifting attachments which do not meet the requirements of 6.7.1.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6.7.1.3;~~
- ~~c) For each package requiring competent authority approval, it must be ensured that all the requirements specified in the approval certificates have been satisfied;~~

- ~~— d) Each Type B(U), Type B(M) and Type C package must be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received unilateral approval;~~
- ~~— e) For each Type B(U), Type B(M) and Type C package, it must be ensured by inspection and/or appropriate tests that all closures, valves, and other openings of the containment system through which the radioactive contents might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of 6;7.7.7 and 6;7.9.3 were made;~~
- ~~— f) For each special form radioactive material, it must be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Instructions have been satisfied;~~
- ~~— g) For packages containing fissile material, the measurement specified in 6;7.10.4 b) and the tests to demonstrate closure of each package as specified in 6;7.10.7 must be performed where applicable;~~
- ~~— h) For each low dispersible radioactive material, it must be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Instructions have been satisfied.~~

### **1.2.21 Approval of shipments and notification**

#### **1.2.21.1 General**

In addition to the approval for package designs described in Part 6, Chapter 4, multilateral shipment approval is also required in certain circumstances (1.2.21.2 and 1.2.21.3). In some circumstances it is also necessary to notify competent authorities of a shipment (1.2.21.4).

#### **1.2.21.2 Shipment approvals**

Multilateral approval must be required for:

- a) The shipment of Type B(M) packages not conforming with the requirements of 6;7.6.5;
- b) The shipment of Type B(M) packages containing radioactive material with an activity greater than 3000 A<sub>1</sub> or 3000 A<sub>2</sub>, as appropriate, or 1000 TBq, whichever is the lower;
- c) The shipment of packages containing fissile materials if the sum of the criticality safety indexes of the packages in a single freight container or in an aircraft exceeds 50; and

except that a competent authority may authorize transport into or through its country without shipment approval, by a specific provision in its design approval (see 1.2.32.1).

#### **1.2.21.3 Shipment approval by special arrangement**

Provisions may be approved by a competent authority under which a consignment, which does not satisfy all of the applicable requirements of these Instructions may be transported under special arrangement (see 1;1.4.4).

#### **1.2.12.4 Notifications**

Notification to competent authorities is required as follows:

...

### **1.2.32 Certificates issued by the competent authority**

1.2.23.1 Certificates issued by the competent authority are required for the following:

- a) Designs for:
  - i) special form radioactive material;
  - ii) low dispersible radioactive material;
  - iii) packages containing 0.1 kg or more of uranium hexafluoride;
  - iv) all packages containing fissile material unless excepted by 6;7.10.2;

- v) Type B(U) packages and Type B(M) packages;
- vi) Type C packages;
- b) Special arrangements;
- c) Certain shipments (1.2.2.1.2).

The certificates must confirm that the applicable requirements are met, and for design approvals, must attribute to the design an identification mark.

The package design and shipment approval certificates may be combined into a single certificate.

Certificates and applications for these certificates must be in accordance with the requirements in 6;7.22.

---

*Editorial Note.*— Second sentence of 1.2.3.2 below is moved to 4;9.1.9:

---

~~1.2.3.2~~ The consignor must be in possession of a copy of each applicable certificate. ~~The consignor must also have a copy of any instructions with regard to the proper closing of the package and any preparation for shipment before making any shipment under the terms of the certificates.~~

1.2.3.3 For package designs where a competent authority issued certificate is not required, the consignor must, on request, make available for inspection by the relevant competent authority, documentary evidence of the compliance of the package design with all the applicable requirements.

---

*Editorial Note.*— Paragraph 1.2.3 below is moved from 2;7.6:

---

### ~~7.6~~ 1.2.3 Determination of transport index (TI) and criticality safety index (CSI)

#### ~~7.6.1~~ 1.2.3.1 Determination of transport index

~~7.6.1.1~~ 1.2.3.1.1 The transport index (TI) for a package, overpack or freight container, must be the number derived in accordance with the following procedure:

- a) Determine the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, overpack, or freight container. The value determined must be multiplied by 100 and the resulting number is the transport index. For uranium and thorium ores and their concentrates, the maximum radiation level at any point 1 m from the external surface of the load may be taken as:
  - 0.4 mSv/h for ores and physical concentrates of uranium and thorium;
  - 0.3 mSv/h for chemical concentrates of thorium;
  - 0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride;
- b) For freight containers, the value determined in step a) above must be multiplied by the appropriate factor from Table ~~2-44~~ 5-1;
- c) The value obtained in steps a) and b) above must be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero.

~~7.6.1.2~~ 1.2.3.1.2 The transport index for each overpack or freight container must be determined as either the sum of the transport indices of all the packages contained, or by direct measurement of radiation level, except in the case of non-rigid overpacks for which the transport index must be determined only as the sum of the transport indices of all the packages.

#### ~~7.6.2~~ Determination of criticality safety index (CSI)

~~7.6.2.1~~ The criticality safety index (CSI) for packages containing fissile material must be obtained by dividing the number 50 by the smaller of the two values of N derived in 6;7.10.11 and 6;7.10.12 (i.e.  $CSI = 50/N$ ). The value of the criticality safety index may be zero, provided that an unlimited number of packages is subcritical (i.e. N is effectively equal to infinity in both cases).

**Table 2-445-1. Multiplication factors for freight containers**

Size of load*	Multiplication factor
size of load $\leq 1 \text{ m}^2$	1
$1 \text{ m}^2 < \text{size of load} \leq 5 \text{ m}^2$	2
$5 \text{ m}^2 < \text{size of load} \leq 20 \text{ m}^2$	3
$20 \text{ m}^2 < \text{size of load}$	10

\* Largest cross-sectional area of the load being measured.

~~7.6.2.2~~1.2.3.1.3 The criticality safety index for each overpack or freight container must be determined as the sum of the CSIs of all the packages contained. The same procedure must be followed for determining the total sum of CSIs in a consignment or aboard an aircraft.

---

*Editorial Note.*— Paragraphs 1.2.3.1.4 moved from current 2;7.8.4 and 7.8.5:

---

~~7.8.4~~1.2.3.1.4 Packages and overpacks must be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 2-455-2 and with the following requirements:

- a) for a package or overpack, both the transport index and the surface radiation level conditions must be taken into account in determining which is the appropriate category. Where the transport index satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, the package or overpack must be assigned to the higher category. For this purpose, category I-WHITE must be regarded as the lowest category;
- b) the transport index must be determined following the procedures specified in ~~7.6.1.1~~1.2.3.1.1 and ~~7.6.1.2~~1.2.3.1.2;
- c) if the surface radiation level is greater than 2 mSv/h, the package or overpack must be transported under exclusive use and under the provisions of 7;2.9.5.3; as appropriate;
- ≠ d) a package transported under a special arrangement must be assigned to category III-YELLOW ~~except under the provisions of 7.8.5~~ except when otherwise specified in the competent authority approval certificate of the country of origin of design (see 2;7.2.4.6);
- ≠ e) an overpack which contains packages transported under special arrangement must be assigned to category III-YELLOW ~~except under the provisions of 7.8.5~~ when otherwise specified in the competent authority approval certificate of the country of origin of design (see 2;7.2.4.6).

~~7.8.5~~ In case of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, assignment to the category as required in 7.8.4 must be in accordance with the certificate of the country of origin of design.

**Table 2-455-2. Categories of packages and overpacks**

Conditions		
Transport index	Maximum radiation level at any point on external surface	Category
0*	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1*	More than 0.005 mSv/h but not more than 0.5 mSv/h	II-YELLOW
More than 1 but not more than 10	More than 0.5 mSv/h but not more than 2 mSv/h	III-YELLOW
More than 10	More than 2 mSv/h but not more than 10 mSv/h	III-YELLOW**

\* If the measured transport index is not greater than 0.05, the value quoted may be zero in accordance with 7.6.1.1 c).

\*\* Must be transported under exclusive use and special arrangement.

## 1.6 EMPTY PACKAGINGS

1.6.1 Other than for Class 7, a packaging which previously contained dangerous goods must be identified, marked, labelled and placarded as required for those dangerous goods unless steps such as cleaning, purging of vapours or refilling with a non-dangerous substance are taken to nullify any hazard.

1.6.2 Before an empty packaging which had previously contained an infectious substance is returned to the shipper, or sent elsewhere, it must be thoroughly disinfected or sterilized to nullify any hazard and any label or marking indicating that it had contained an infectious substance must be removed or obliterated.

1.6.3 Packagings used for the transport of radioactive material must not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm<sup>2</sup> for all other alpha emitters.

...

## Chapter 2

### PACKAGE MARKINGS

...

---

DGP-WG/06-WP/43:

---

#### 2.4.1 Marking with proper shipping name and UN number

...

#### 2.4.10 Additional M markings of packages containing dangerous goods in limited quantities

...

---

DGP-WG/06-WP/25, DGP-WG/07-WP/6

---

#### 2.4.9 Marking of overpacks

An overpack must be marked with the word "Overpack", with the proper shipping name, UN number, and special handling instructions appearing on interior packages for each item of dangerous goods contained in the overpack unless markings and labels representative of all dangerous goods in the overpack are visible, except as required in 3.2.6, and 3.5.1 h) to i). Packaging specification markings must not be reproduced on the overpack.

...

## Chapter 3

### LABELLING

...

#### 3.2 APPLICATION OF LABELS

3.2.6 Except as provided for large freight containers in accordance with when enlarged labels are used in accordance with 3.6, each package, overpack and freight container containing radioactive material must bear at least two labels which conform to Figures 5-17, 5-18 and 5-19 as appropriate according to the category (see 2.7.8.4 5:1.2.3.1.4) of that package, overpack or freight container. Labels must be affixed to two opposite sides on the outside of the package or on the outside of all four sides of the freight container. Each overpack containing radioactive material must bear at least two labels on opposite sides of the outside of the overpack. In addition, each package, overpack and freight container containing fissile material, other than fissile material excepted under the provisions of 6.7.10.2 must bear labels which conform to the model shown in Figure 5-20; such labels, where applicable, must be affixed adjacent to the labels for radioactive material. Labels

must not cover the markings specified in Chapter 2. Any labels which do not relate to the contents must be removed or covered.

...

### 3.5 LABEL SPECIFICATIONS

#### 3.5.1 Class hazard label specifications

3.5.1.1 Class hazard labels must conform to the following specifications:

- a) They must be in the form of a square with minimum dimensions of 100 mm × 100 mm, set at an angle of 45° (diamond shaped) except that labels of 50 mm × 50 mm may be used on packages containing infectious substances where the packages are of dimensions such that they can only bear smaller labels. The labels must have a line of the same colour as the symbol, 5 mm inside the edge and running parallel to it. They must have a line 5 mm inside the edge and running parallel with it. In the upper half of a label the line must have the same colour as the symbol and in the lower half it must have the same colour as the figure in the bottom corner. Labels are divided into halves. With the exception of Divisions 1.4, 1.5 and 1.6, the upper half of the label is reserved for must contain the pictorial symbol and the lower half for texts and must contain the class or division number (and for goods of Class 1, and the compatibility group letter) as appropriate. The label may include text such as the UN number or words describing the hazard class or division (e.g. "flammable") in accordance with f) provided the text does not obscure or detract from the other required label elements.
- b) The symbols, texts and numbers must be shown in black on all labels except:
  - 1) the Class 8 label, where the text (if any) and class number must appear in white;
  - 2) labels with entirely green, red or blue backgrounds, where they may be shown in white; and
  - 3) the Division 5.2 label, where the symbol may be shown in white.
- c) Except for Divisions 1.4, 1.5 and 1.6, labels for Class 1 show in the lower half the division number and compatibility group letter for the substance or article. Labels for Divisions 1.4, 1.5 and 1.6 must show in the upper half the division number and in the lower half the compatibility group letter.
- d) Cylinders for Class 2 may, on account of their shape, orientation and securing mechanisms for transport, bear labels representative of those specified in this chapter, which have been reduced in size, according to ISO 7225:49942005, for display on the non-cylindrical part (shoulder) of such cylinders. Labels may overlap to the extent provided for by ISO 7225:49942005 "Gas cylinders — Precautionary labels"; however, in all cases the labels representing the primary hazard and the numbers appearing on any label must remain fully visible and the symbols recognizable.

...

---

DGP-WG/07-WP/42:

---

#### 3.5.2 Handling label specifications

An illustration of each of the handling labels showing the approved design and colour is given in Figures 5-23 to 5-25 and Figures 5-27 to 5-29. The minimum label dimensions are shown in the figures; however:

- a) labels having dimensions not smaller than half of those indicated may be used on packages containing infectious substances when the packages are of dimensions such that they can only bear smaller labels; and
- b) orientation labels, may meet the specification of either Figure 5-25 or ISO Standard 780-1985.

...

#### *Labelling of radioactive material*

- h) Each label conforming to Figures 5-17, 5-18 and 5-19 must be completed with the following information:
  - 1) Contents:
    - A) except for LSA-I material, the name(s) of the radionuclide(s) as taken from Table 2-12, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent

the space on the line permits. The group of LSA or SCO must be shown following the name(s) of the radionuclide(s). The terms "LSA-II", "LSA-III", "SCO-I" and "SCO-II" must be used for this purpose;

- B) for LSA-I material, the term "LSA-I" is all that is necessary; the name of the radionuclide is not necessary;
- 2) Activity: The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol. For fissile material, the mass of fissile material in units of grams (g), or multiples thereof, may be used in place of activity;
  - 3) For overpacks and freight containers the "contents" and "activity" entries on the label must bear the information required in 3.5.1.1 g) 1 A) and B), respectively, totalled together for the entire contents of the overpack or freight container except that on labels for overpacks or freight containers containing mixed loads of packages containing different radionuclides, such entries may read "See Transport Documents";
  - 4) Transport index: ~~See 2.7.6.1.1 and 2.7.6.1.2~~ The number determined in accordance with 1.2.3.1.1 and 1.2.3.1.2. (No transport index entry is required for category I-WHITE.)

...

---

DGP-WG/07-WP/34:

---

Replace Figure 24 with the following:

---



Colour: black on orange  
Dimensions: 120 mm × 110 mm

*Note.— Figure 5-24 as contained in the 2007-2008 Edition of these Instructions may continue to be used until 31 December 2010.*

**Figure 5-24. Cargo aircraft only**

...



## Chapter 4

### DOCUMENTATION

...

---

DGP-WG/07-WP/63:

---

#### 4.1.5 Information required in addition to the dangerous goods description

In addition to the dangerous goods description the following information must be included after the dangerous goods description on the dangerous goods transport document.

##### 4.1.5.1 *Quantity of dangerous goods, number and type of packagings*

...

UN packaging codes may only be used to supplement the description of the kind of package (e.g. one fibreboard box (4G)). Where the letter “G” follows the quantity in column 10 or 12 of Table 3-1 the gross mass of each package must be indicated, rather than the net quantity; and:

...

- e) for items where “No Limit” is shown in column 10 or 12 the quantity shown should must be the net mass or volume of the for substances, ~~except for UN 2800, UN 2807, UN 3072, UN 3166 and UN 3171 where the quantity shown should be the gross mass of the article (e.g. UN 2964, UN 3291). For articles (e.g. UN 2794, UN 2800, UN 2990, UN 3166) the quantity must be the gross mass, followed by the letter G.~~

...

— END —