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**COMMITTEE OF EXPERTS ON THE TRANSPORT OF
DANGEROUS GOODS AND ON THE GLOBALLY
HARMONIZED SYSTEM OF CLASSIFICATION
AND LABELLING OF CHEMICALS**

REPORT OF THE COMMITTEE OF EXPERTS
ON ITS THIRD SESSION

(Geneva, 14 December 2006)

Addendum

Annex 1

Amendments to the Recommendations on the Transport of Dangerous Goods
(Model Regulations)

This annex contains the amendments to the Recommendations on the Transport of Dangerous Goods (Model Regulations), fourteenth revised edition (ST/SG/AC.10/1/Rev.14), adopted by the Committee at its third session.

**AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF
DANGEROUS GOODS, MODEL REGULATIONS,
FOURTEENTH REVISED EDITION (ST/SG/AC.10/1/Rev.14)**

PART 1

Chapter 1.1

1.1.1.6 Insert the following new heading "*Transport of dangerous goods by post*".

In the first paragraph:

- replace "national postal authorities" with "appropriate national authorities" (twice),
- in the first sentence, replace "the mail" with "mail transported internationally",
- in the second sentence, insert "international" before "transport of dangerous goods",
- in the third sentence, insert "international" before "mail".

In (a), at the beginning, insert ", assigned to Category B (UN 3373) only," after "Infectious substances" and, at the end, replace "infectious substances" with "UN 3373".

Insert a new note at the end to read as follows:

"NOTE: The Acts of the Universal Postal Union do not apply to the domestic transport of dangerous goods by mail. Domestic transport of dangerous goods in the mail are subject to the provisions of the appropriate national authorities."

1.1.2 Delete the section. Renumber 1.1.3 as 1.1.2 and 1.1.3.1 as 1.1.2.1.

Consequential amendments:

2.0.4.2 and 3.1.2.6 Replace "1.1.3" with "1.1.2".

Chapter 1.2

1.2.1 Amend the definition of "*Competent authority*" to read as follows:

"Competent authority means any body or authority designated or otherwise recognized as such for any purpose in connection with these Regulations;"

In the definition of "*Freight container*", at the end, replace "see 2.7.2" with "a freight container may be used as a packaging" and add the following new paragraph at the end:

"A small freight container is that which has either any overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m³. Any other freight container is considered to be a large freight container."

Delete the note after the definition of "*Package*".

Amend the definition of "*Packaging*" to read as follows:

"*Packaging* means one or more receptacles and any other components or materials necessary for the receptacles to perform their containment and other safety functions."

Add the following new note after the definition of "Recycled plastics material":

"**NOTE:** *ISO 16103:2005 "Packaging – Transport packages for dangerous goods - Recycled plastics material", provides additional guidance on procedures to be followed in approving the use of recycled plastics material.*"

Insert the following new definitions in alphabetical order:

"*Animal material* means animal carcasses, animal body parts, or animal foodstuffs; "

"*Approval*

Multilateral approval, for the transport of Class 7 material, means approval by the relevant competent authority of the country of origin of the design or shipment, as applicable, and also, where the consignment is to be transported through or into any other country, approval by the competent authority of that country. The term "through or into" specifically excludes "over", i.e. the approval and notification requirements shall not apply to a country over which radioactive material is carried in an aircraft, provided that there is no scheduled stop in that country;

Unilateral approval, for the transport of Class 7 material, means an approval of a design which is required to be given by the competent authority of the country of origin of the design only;"

"*Confinement system*, for the transport of Class 7 material, means the assembly of fissile material and packaging components specified by the designer and agreed to by the competent authority as intended to preserve criticality safety;"

"*Containment system*, for the transport of Class 7 material, means the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during transport;"

"*Criticality safety index (CSI) assigned to a package, overpack or freight container containing fissile material*, for the transport of Class 7 material, means a number which is used to provide control over the accumulation of packages, overpacks or freight containers containing fissile material;"

"*Design*, for the transport of Class 7 material, means the description of special form radioactive material, low dispersible radioactive material, package or packaging which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation;"

"*Exclusive use*, for the transport of Class 7 material, means the sole use, by a single consignor, of a conveyance or of a large freight container, in respect of which all initial, intermediate and final loading and unloading is carried out in accordance with the directions of the consignor or consignee;"

"*Maximum normal operating pressure*, for the transport of Class 7 material, means the maximum pressure above atmospheric pressure at mean sea-level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions in the absence of venting, external cooling by an ancillary system, or operational controls during transport;"

"*Radiation level*, for the transport of Class 7 material, means the corresponding dose rate expressed in millisieverts per hour;"

"*Radioactive contents*, for the transport of Class 7 material, mean the radioactive material together with any contaminated or activated solids, liquids, and gases within the packaging;"

"*Transport index (TI) assigned to a package, overpack or freight container, or to unpackaged LSA-I or SCO-I*, for the transport of Class 7 material, means a number which is used to provide control over radiation exposure;"

Chapter 1.4

Table 1.4.1 Add a new fourth line for Class 1, Division 1.4, to read as follows:

"Class 1, Division 1.4 UN Nos. 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456 and 0500".

Division 5.1: Amend the second entry to read as follows:

"Division 5.1 perchlorates, ammonium nitrate, ammonium nitrate fertilisers and ammonium nitrate emulsions or suspensions or gels, in bulk".

Chapter 1.5

Add a new Chapter 1.5 to read as follows:

"CHAPTER 1.5

GENERAL PROVISIONS CONCERNING CLASS 7

1.5.1 Scope and application

1.5.1.1 These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material. These regulations are based on the IAEA Regulations for the Safe Transport of Radioactive Material (2005 Edition), Safety Standards Series No. TS-R-1, IAEA, Vienna (2005). Explanatory material on TS-R-1 can be found in "Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1996 Edition)¹", Safety Standard Series No. TS-G-1.1 (ST-2), IAEA, Vienna.

1.5.1.2 The objective of these Regulations is to protect persons, property and the environment from the effects of radiation during the transport of radioactive material. This protection is achieved by requiring:

- (a) Containment of the radioactive contents;
- (b) Control of external radiation levels;
- (c) Prevention of criticality; and
- (d) Prevention of damage caused by heat.

These requirements are satisfied firstly by applying a graded approach to contents limits for packages and conveyances and to performance standards applied to package designs depending upon the hazard of the radioactive contents. Secondly, they are satisfied by imposing requirements on the design and operation of packages and on the maintenance of packagings, including a consideration of the nature of the radioactive contents. Finally, they are satisfied by requiring administrative controls including, where appropriate, approval by competent authorities.

1.5.1.3 These Regulations apply to the transport of radioactive material by all modes on land, water or in the air, including transport which is incidental to the use of the radioactive material. Transport comprises all operations and conditions associated with and involved in the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, transport including in-transit storage, unloading and receipt at the final destination of loads of radioactive material and packages.

¹ *A revised edition is likely to be published by IAEA in 2007.*

A graded approach is applied to the performance standards in these Regulations that is characterized by three general severity levels:

- (a) Routine conditions of transport (incident free);
- (b) Normal conditions of transport (minor mishaps);
- (c) Accident conditions of transport.

1.5.1.4 These Regulations do not apply to:

- (a) Radioactive material that is an integral part of the means of transport;
- (b) Radioactive material moved within an establishment which is subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;
- (c) Radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;
- (d) Radioactive material in consumer products which have received regulatory approval, following their sale to the end user;
- (e) Natural material and ores containing naturally occurring radionuclides which are either in their natural state, or have only been processed for purposes other than for extraction of the radionuclides, and which are not intended to be processed for use of these radionuclides provided the activity concentration of the material does not exceed 10 times the values specified in 2.7.2.2.1 (b), or calculated in accordance with 2.7.2.2.2 to 2.7.2.2.6;
- (f) Non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the limit set out in the definition for "contamination" in 2.7.1.2.

1.5.1.5 *Specific provisions for the transport of excepted packages*

1.5.1.5.1 Excepted packages which may contain radioactive material in limited quantities, instruments, manufactured articles and empty packagings as specified in 2.7.2.4.1 may be transported under the following conditions:

- (a) The applicable requirements specified in Chapter 1.3, 2.0.3.2, 2.7.2.4.1.2 to 2.7.2.4.1.6 (as applicable), 4.1.9.1.2, 5.2.1.1, 5.2.1.2, 5.2.1.5.1 to 5.2.1.5.3, 5.4.1.4.1 (a) and 7.1.8.5.2;
- (b) The requirements for excepted packages specified in 6.4.4;

- (c) If the excepted package contains fissile material, one of the fissile exceptions provided by 2.7.2.3.5 shall apply and the requirement of 6.4.7.2 shall be met; and
- (d) The requirements in 1.1.1.6 if transported by post.

1.5.1.5.2 The following provisions do not apply to excepted packages and the controls for transport of excepted packages: Chapter 1.4, 2.7.4.1, 2.7.2.3.3.2, 4.1.9.1.3, 4.1.9.1.4, 4.1.9.1.6, 4.1.9.1.7, 5.1.3.2, 5.2.2.1.12.1, 5.4.1.5.7.1, 5.4.1.5.7.2, 5.4.1.6, 6.4.6.1, 7.1.7.5.1, 7.1.7.5.3 to 7.1.7.5.5, 7.1.8.1.1, 7.1.8.1.3, 7.1.8.3.1, 7.1.8.6.1 and section 7.2.4.

1.5.2 Radiation protection programme

1.5.2.1 The transport of radioactive material shall be subject to a radiation protection programme which shall consist of systematic arrangements aimed at providing adequate consideration of radiation protection measures.

1.5.2.2 Protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed, and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account, and doses to persons shall be below the relevant dose limits. A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities.

1.5.2.3 The nature and extent of the measures to be employed in the programme shall be related to the magnitude and likelihood of radiation exposures. The programme shall incorporate the requirements in 1.5.2.2, 1.5.2.4 to 1.5.2.7. Programme documents shall be available, on request, for inspection by the relevant competent authority.

1.5.2.4 For occupational exposures arising from transport activities, where it is assessed that the effective dose:

- (a) Is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring shall be conducted;
- (b) Is likely to exceed 6 mSv in a year, individual monitoring shall be conducted.

When individual monitoring or workplace monitoring is conducted, appropriate records shall be kept.

***NOTE:** For occupational exposures arising from transport activities, where it is assessed that the effective dose is most unlikely to exceed 1mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record keeping need be required.*

1.5.2.5 In the event of accidents or incidents during the transport of radioactive material, emergency provisions, as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment. Appropriate guidelines for such provisions are contained in "Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material", Safety Standard Series No. TS-G-1.2 (ST-3), IAEA, Vienna (2002).

1.5.2.6 Emergency procedures shall take into account the formation of other dangerous substances that may result from the reaction between the contents of a consignment and the environment in the event of an accident.

1.5.2.7 Workers shall receive appropriate training concerning the radiation hazards involved and the precautions to be observed in order to ensure restriction of their exposure and that of other persons who might be affected by their actions.

1.5.3 Quality assurance

1.5.3.1 Quality assurance programmes based on international, national or other standards acceptable to the competent authority shall be established and implemented for the design, manufacture, testing, documentation, use, maintenance and inspection of all special form radioactive material, low dispersible radioactive material and packages and for transport and in-transit storage operations to ensure compliance with the relevant provisions of these Regulations. Certification that the design specification has been fully implemented shall be available to the competent authority. The manufacturer, consignor or user shall be prepared to provide facilities for competent authority inspection during manufacture and use and to demonstrate to any cognizant competent authority that:

- (a) The manufacturing methods and materials used are in accordance with the approved design specifications; and
- (b) All packagings are periodically inspected and, as necessary, repaired and maintained in good condition so that they continue to comply with all relevant requirements and specifications, even after repeated use.

Where competent authority approval is required, such approval shall take into account and be contingent upon the adequacy of the quality assurance programme.

1.5.4 Special arrangement

1.5.4.1 Special arrangement shall mean those provisions, approved by the competent authority, under which consignments which do not satisfy all the requirements of these Regulations applicable to radioactive material may be transported.

1.5.4.2 Consignments for which conformity with any provision applicable to Class 7 is impracticable shall not be transported except under special arrangement. Provided the competent authority is satisfied that conformity with the Class 7 provisions of these Regulations is impracticable and that the requisite standards of safety established by these Regulations have

been demonstrated through alternative means the competent authority may approve special arrangement transport operations for single or a planned series of multiple consignments. The overall level of safety in transport shall be at least equivalent to that which would be provided if all the applicable requirements had been met. For international consignments of this type, multilateral approval shall be required.

1.5.5 Radioactive material possessing other dangerous properties

1.5.5.1 In addition to the radioactive and fissile properties, any subsidiary risk of the contents of a package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall also be taken into account in the documentation, packing, labelling, marking, placarding, stowage, segregation and transport, in order to be in compliance with all relevant provisions for dangerous goods of these regulations.

1.5.6 Non-compliance

1.5.6.1 In the event of a non-compliance with any limit in these Regulations applicable to radiation level or contamination,

- (a) The consignor shall be informed of the non-compliance
 - (i) by the carrier if the non-compliance is identified during transport; or
 - (ii) by the consignee if the non-compliance is identified at receipt;
- (b) The carrier, consignor or consignee, as appropriate, shall:
 - (i) take immediate steps to mitigate the consequences of the non-compliance;
 - (ii) investigate the non-compliance and its causes, circumstances and consequences;
 - (iii) take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance; and
 - (iv) communicate to the relevant competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken; and
- (c) The communication of the non-compliance to the consignor and relevant competent authority(ies), respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing."

PART 2**Chapter 2.1**

2.1.3.5.2 In Note 2, replace "*firework types and/or sub-divisions by the specification*" with "*fireworks specified*".

2.1.3.5.5 The amendment to the heading of the table does not apply to the English version.

In the table, against "Shell, spherical or cylindrical / preloaded mortar, shell in mortar", insert new third entry as follows:

Specification	Classification
colour shell: > 25% flash composition as loose powder and/or report effects	1.1G

Amend Note 2 to read as follows:

"NOTE 2: "Flash composition" in this table refers to pyrotechnic compositions in powder form or as pyrotechnic units as presented in the fireworks, that are used to produce an aural effect, or used as a bursting charge or lifting charge, unless the time taken for the pressure rise is demonstrated to be more than 8 ms for 0.5 g of pyrotechnic composition in Test Series 2(c)(i) "Time/pressure test"."

Chapter 2.2

2.2.2.1 (b) (ii) At the end after "does", add ". The oxidizing ability shall be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:1996 and ISO 10156-2:2005)".

2.2.2.3 Amend to read as follows:

"2.2.2.3 Gases of Division 2.2 are not subject to these Regulations if they are transported at a pressure of less than 200 kPa at 20 °C and are not liquefied or refrigerated liquefied gases."

2.2.3 (d) At the end, add "(see ISO 10156:1996 and ISO 10156-2:2005)".

Chapter 2.3

2.3.2.5 Insert "or environmentally hazardous" at the end of the second indent.

Chapter 2.4

2.4.2.4.1 Replace "and UN 3380" with ", UN 3380 and UN 3474".

Chapter 2.5

2.5.3.2.4 In the table, amend the entries listed below as follows:

Organic peroxide		Column	Amendment
tert-AMYLPEROXY-3,5,5-TRIMETHYLHEXANOATE		Packing method	Replace "OP5" with "OP7"
		Number	Replace "3101" with "3105"
DICUMYL PEROXIDE (Concentration > 52-100)	(1 st row)	Inert solid	Delete "≤ 57"
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE (Concentration ≤ 62 as a stable dispersion in water)	(3 rd row)	Number	Replace "3117" with "3119"
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE (Concentration ≤ 52 as a stable dispersion in water)	(4 th row)	Delete	

Insert the following new entries:

Organic peroxide	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
tert-AMYL PEROXYNEODECANOATE	≤ 47	≥ 53				OP8	0	+ 10	3119	
tert-BUTYL PEROXY 3,5,5-TRIMETHYLHEXANOATE	≤ 42			≥ 58		OP7			3106	
CUMYL PEROXYNEODECANOATE	≤ 87	≥ 13				OP7	- 10	0	3115	
2,2-DI-(tert-AMYLPEROXY)-BUTANE	≤ 57	≥ 43				OP7			3105	
1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE	≤ 72		≥ 28			OP5			3103	30)
1,1-DI-(tert-BUTYLPEROXY)-CYCLOHEXANE + tert-BUTYL PEROXY-2-ETHYLHEXANOATE	≤ 43 + ≤ 16	≥ 41				OP 7			3105	
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	≤ 90		≥ 10			OP5			3103	30)
DI-2,4-DICHLOROBENZOYL PEROXIDE	≤ 52 as a paste					OP8	+ 20	+ 25	3118	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 77	≥ 23				OP 7	- 5	+ 5	3115	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 52 as a stable dispersion in water					OP 8	- 5	+ 5	3119	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 52	≥ 48				OP 8	- 5	+ 5	3117	
METHYL ISOPROPYL KETONE PEROXIDE(S)	See remark 31)	≥ 70				OP8			3109	31)
3,3,5,7,7-PENTAMETHYL-1,2,4-TRIOXEPANE	≤ 100					OP8			3107	

After the table, add the following new notes:

"30) *Diluent type B with boiling point > 130 °C.*

31) *Active oxygen ≤ 6.7%.*".

Chapter 2.6

2.6.3.2.3.6 Renumber existing NOTE as NOTE 1.

In NOTE 1 (existing NOTE), add "*in the absence of any concern for infection (e.g. evaluation of vaccine induced immunity, diagnosis of autoimmune disease, etc.)*" after "*antibody detection in humans or animals*".

Add a new NOTE 2 to read as follows:

"**NOTE 2:** *For air transport, packagings for specimens exempted under this paragraph shall meet the conditions in (a) to (c).*".

2.6.3.5.2 Add at the end, before the note: "For the assignment, international, regional or national waste catalogues may be taken into account."

2.6.3.6.2 Amend the first sentence to read as follows:

"Animal material affected by pathogens of Category A or which would be assigned to Category A in cultures only, shall be assigned to UN 2814 or UN 2900 as appropriate."

Delete the second sentence.

Chapter 2.7

Amend Chapter 2.7 to read as follows and amend all references to renumbered paragraphs of Chapter 2.7, as appropriate (*apply to 1.1.1.6 (b), 3.3.1 SP290, 4.1.1.9, 4.1.9.2.3 (b) and (c), 5.2.2.1.12.1, 5.2.2.1.12.2 (a)(i), 6.4.8.8, 6.4.10.3, 6.4.12.1, 6.4.12.2, 6.4.14, 6.4.24.1, 6.4.24.2 and 6.4.24.3*):

"CHAPTER 2.7

CLASS 7 - RADIOACTIVE MATERIAL

NOTE: For Class 7, the type of packaging may have a decisive effect on classification.

2.7.1 Definitions

2.7.1.1 *Radioactive material* means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.7.2.2.1 to 2.7.2.2.6.

2.7.1.2 Contamination

Contamination means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm² for all other alpha emitters.

Non-fixed contamination means contamination that can be removed from a surface during routine conditions of transport.

Fixed contamination means contamination other than non-fixed contamination.

2.7.1.3 Definitions of specific terms

A_1 and A_2

A_1 means the activity value of special form radioactive material which is listed in the Table in 2.7.2.2.1 or derived in 2.7.2.2 and is used to determine the activity limits for the requirements of these Regulations.

A_2 means the activity value of radioactive material, other than special form radioactive material, which is listed in the Table in 2.7.2.2.1 or derived in 2.7.2.2 and is used to determine the activity limits for the requirements of these Regulations.

Fissile material means uranium-233, uranium-235, plutonium-239, plutonium-241, or any combination of these radionuclides. Excepted from this definition is:

- (a) Natural uranium or depleted uranium which is unirradiated; and
- (b) Natural uranium or depleted uranium which has been irradiated in thermal reactors only.

Low dispersible radioactive material means either a solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form.

Low specific activity (LSA) material means radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. External shielding materials surrounding the LSA material shall not be considered in determining the estimated average specific activity.

Low toxicity alpha emitters are: natural uranium; depleted uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

Specific activity of a radionuclide means the activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.

Special form radioactive material means either:

- (a) An indispersible solid radioactive material; or
- (b) A sealed capsule containing radioactive material.

Surface contaminated object (SCO) means a solid object which is not itself radioactive but which has radioactive material distributed on its surfaces.

Unirradiated thorium means thorium containing not more than 10^{-7} g of uranium-233 per gram of thorium-232.

Unirradiated uranium means uranium containing not more than 2×10^3 Bq of plutonium per gram of uranium-235, not more than 9×10^6 Bq of fission products per gram of uranium-235 and not more than 5×10^{-3} g of uranium-236 per gram of uranium-235.

Uranium - natural, depleted, enriched means the following:

Natural uranium means uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass).

Depleted uranium means uranium containing a lesser mass percentage of uranium-235 than in natural uranium.

Enriched uranium means uranium containing a greater mass percentage of uranium-235 than 0.72%. In all cases, a very small mass percentage of uranium-234 is present.

2.7.2 Classification

2.7.2.1 General provisions

2.7.2.1.1 Radioactive material shall be assigned to one of the UN number specified in Table 2.7.2.1.1 depending on the activity level of the radionuclides contained in a package, the fissile or non-fissile properties of these radionuclides, the type of package to be presented for transport,

and the nature or form of the contents of the package, or special arrangements governing the transport operation, in accordance with the provisions laid down in 2.7.2.2 to 2.7.2.5.

Table 2.7.2.1.1		Assignment of UN numbers	
Excepted packages (1.5.1.5)			
UN 2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING		
UN 2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM		
UN 2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL		
UN 2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES		
Low specific activity radioactive material (2.7.2.3.1)			
UN 2912	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile-excepted		
UN 3321	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non fissile or fissile-excepted		
UN 3322	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non fissile or fissile-excepted		
UN 3324	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE		
UN 3325	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY, (LSA-III), FISSILE		
Surface contaminated objects (2.7.2.3.2)			
UN 2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), non-fissile or fissile-excepted		
UN 3326	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE		
Type A packages (2.7.2.4.4)			
UN 2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non-fissile or fissile-excepted		
UN 3327	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE, non-special form		
UN 3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non fissile or fissile-excepted		
UN 3333	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE		
Type B(U) package (2.7.2.4.6)			
UN 2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non-fissile or fissile-excepted		
UN 3328	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE		
Type B(M) package (2.7.2.4.6)			
UN 2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non-fissile or fissile-excepted		
UN 3329	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE		
Type C package (2.7.2.4.6)			
UN 3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE, non fissile or fissile-excepted		
UN 3330	RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE		

Table 2.7.2.1.1		Assignment of UN numbers	
Special arrangement (2.7.2.5)			
UN 2919	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non-fissile or fissile-excepted		
UN 3331	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE		
Uranium hexafluoride (2.7.2.4.5)			
UN 2977	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE		
UN 2978	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted		

2.7.2.2 *Determination of activity level*

2.7.2.2.1 The following basic values for individual radionuclides are given in Table 2.7.2.2.1:

- (a) A_1 and A_2 in TBq;
- (b) Activity concentration for exempt material in Bq/g; and
- (c) Activity limits for exempt consignments in Bq.

Table 2.7.2.2.1: Basic radionuclides values for individual radionuclides

Insert here the Table of existing 2.7.7.2.1 with its footnotes (a) – (g).

2.7.2.2.2 For individual radionuclides which are not listed in Table 2.7.2.2.1 the determination of the basic radionuclide values referred to in 2.7.2.2.1 shall require multilateral approval. It is permissible to use an A_2 value calculated using a dose coefficient for the appropriate lung absorption type as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 2.7.2.2.2 may be used without obtaining competent authority approval.

Table 2.7.2.2.2: Basic radionuclide values for unknown radionuclides or mixtures

Radioactive contents	A_1	A_2	Activity concentration for exempt material	Activity limit for exempt consignments
	(TBq)	(TBq)	(Bq/g)	(Bq)
Only beta or gamma emitting nuclides are known to be present	0.1	0.02	1×10^1	1×10^4
Alpha emitting nuclides but no neutron emitters are known to be present	0.2	9×10^{-5}	1×10^{-1}	1×10^3
Neutron emitting nuclides are known to be present or no relevant data are available	0.001	9×10^{-5}	1×10^{-1}	1×10^3

2.7.2.2.3 In the calculations of A_1 and A_2 for a radionuclide not in Table 2.7.2.2.1, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, shall be considered as a single radionuclide; and the activity to be taken into account and the A_1 or A_2 value to be applied shall be those corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and such daughter nuclides shall be considered as mixtures of different nuclides.

2.7.2.2.4 For mixtures of radionuclides, the determination of the basic radionuclide values referred to in 2.7.2.2.1 may be determined as follows:

$$X_m = \frac{1}{\sum_i \frac{f(i)}{X(i)}}$$

where,

$f(i)$ is the fraction of activity or activity concentration of radionuclide i in the mixture;

$X(i)$ is the appropriate value of A_1 or A_2 , or the activity concentration for exempt material or the activity limit for an exempt consignment as appropriate for the radionuclide i ; and

X_m is the derived value of A_1 or A_2 , or the activity concentration for exempt material or the activity limit for an exempt consignment in the case of a mixture.

2.7.2.2.5 When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped and the lowest radionuclide value, as appropriate, for the radionuclides in each group may be used in applying the formulas in 2.7.2.2.4 and 2.7.2.4.4. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.

2.7.2.2.6 For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 2.7.2.2.2 shall be used.

2.7.2.3 *Determination of other material characteristics*

2.7.2.3.1 *Low specific activity (LSA) material*

2.7.2.3.1.1 (Reserved)

2.7.2.3.1.2 LSA material shall be in one of three groups:

- (a) LSA-I
 - (i) uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides which are intended to be processed for the use of these radionuclides;
 - (ii) Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, providing they are unirradiated and in solid or liquid form;
 - (iii) radioactive material for which the A_2 value is unlimited, excluding material classified as fissile according to 2.7.2.3.5; or
 - (iv) other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in 2.7.2.2.1 to 2.7.2.2.6, excluding material classified as fissile according to 2.7.2.3.5;
- (b) LSA-II
 - (i) water with tritium concentration up to 0.8 TBq/L; or
 - (ii) other material in which the activity is distributed throughout and the estimated average specific activity does not exceed 10^{-4} A_2/g for solids and gases, and 10^{-5} A_2/g for liquids;
- (c) LSA-III - Solids (e.g. consolidated wastes, activated materials), excluding powders, in which:
 - (i) the radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen, ceramic, etc.);
 - (ii) the radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for seven days would not exceed $0.1 A_2$; and
 - (iii) the estimated average specific activity of the solid, excluding any shielding material, does not exceed $2 \times 10^{-3} A_2/g$.

2.7.2.3.1.3 LSA-III material shall be a solid of such a nature that if the entire contents of a package were subjected to the test specified in 2.7.2.3.1.4 the activity in the water would not exceed $0.1 A_2$.

2.7.2.3.1.4 LSA-III material shall be tested as follows:

A solid material sample representing the entire contents of the package shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6-8 and a maximum conductivity of 1 mS/m at 20 °C. The total activity of the free volume of water shall be measured following the 7 day immersion of the test sample.

2.7.2.3.1.5 Demonstration of compliance with the performance standards in 2.7.2.3.1.4 shall be in accordance with 6.4.12.1 and 6.4.12.2.

2.7.2.3.2 *Surface contaminated object (SCO)*

SCO is classified in one of two groups:

- (a) SCO-I: A solid object on which:
 - (i) the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.4 Bq/cm^2 for all other alpha emitters; and
 - (ii) the fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $4 \times 10^4 \text{ Bq/cm}^2$ for beta and gamma emitters and low toxicity alpha emitters, or $4 \times 10^3 \text{ Bq/cm}^2$ for all other alpha emitters; and
 - (iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $4 \times 10^4 \text{ Bq/cm}^2$ for beta and gamma emitters and low toxicity alpha emitters, or $4 \times 10^3 \text{ Bq/cm}^2$ for all other alpha emitters;
- (b) SCO-II: A solid object on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified for SCO-I in (a) above and on which:
 - (i) the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 400 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 40 Bq/cm^2 for all other alpha emitters; and

- (ii) the fixed contamination on the accessible surface, averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $8 \times 10^5 \text{ Bq/cm}^2$ for beta and gamma emitters and low toxicity alpha emitters, or $8 \times 10^4 \text{ Bq/cm}^2$ for all other alpha emitters; and
- (iii) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed $8 \times 10^5 \text{ Bq/cm}^2$ for beta and gamma emitters and low toxicity alpha emitters, or $8 \times 10^4 \text{ Bq/cm}^2$ for all other alpha emitters.

2.7.2.3.3 *Special form radioactive material*

2.7.2.3.3.1 Special form radioactive material shall have at least one dimension not less than 5 mm. When a sealed capsule constitutes part of the special form radioactive material, the capsule shall be so manufactured that it can be opened only by destroying it. The design for special form radioactive material requires unilateral approval.

2.7.2.3.3.2 Special form radioactive material shall be of such a nature or shall be so designed that if it is subjected to the tests specified in 2.7.2.3.3.4 to 2.7.2.3.3.8, it shall meet the following requirements:

- (a) It would not break or shatter under the impact, percussion and bending tests 2.7.2.3.3.5 (a) (b) (c), 2.7.2.3.3.6 (a) as applicable;
- (b) It would not melt or disperse in the applicable heat test 2.7.2.3.3.5 (d) or 2.7.2.3.3.6 (b) as applicable; and
- (c) The activity in the water from the leaching tests specified in 2.7.2.3.3.7 and 2.7.2.3.3.8 would not exceed 2 kBq; or alternatively for sealed sources, the leakage rate for the volumetric leakage assessment test specified in ISO 9978:1992 "Radiation Protection - Sealed Radioactive Sources - Leakage Test Methods", would not exceed the applicable acceptance threshold acceptable to the competent authority.

2.7.2.3.3.3 Demonstration of compliance with the performance standards in 2.7.2.3.3.2 shall be in accordance with 6.4.12.1 and 6.4.12.2.

2.7.2.3.3.4 Specimens that comprise or simulate special form radioactive material shall be subjected to the impact test, the percussion test, the bending test, and the heat test specified in 2.7.2.3.3.5 or alternative tests as authorized in 2.7.2.3.3.6. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test shall be performed on the specimen by a method no less sensitive than the methods given in 2.7.2.3.3.7 for indispersible solid material or 2.7.2.3.3.8 for encapsulated material.

2.7.2.3.3.5 The relevant test methods are:

- (a) Impact test: The specimen shall drop onto the target from a height of 9 m. The target shall be as defined in 6.4.14;
- (b) Percussion test: The specimen shall be placed on a sheet of lead which is supported by a smooth solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm. The lead, of hardness number 3.5 to 4.5 on the Vickers scale and not more than 25 mm thick, shall cover an area greater than that covered by the specimen. A fresh surface of lead shall be used for each impact. The bar shall strike the specimen so as to cause maximum damage;
- (c) Bending test: The test shall apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen shall be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp. The orientation of the specimen shall be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The bar shall strike the specimen so as to cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of (3.0 ± 0.3) mm;
- (d) Heat test: The specimen shall be heated in air to a temperature of 800 °C and held at that temperature for a period of 10 minutes and shall then be allowed to cool.

2.7.2.3.3.6 Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:

- (a) The tests prescribed in 2.7.2.3.3.5 (a) and (b) provided the mass of the special form radioactive material:
 - (i) is less than 200 g and they are alternatively subjected to the Class 4 impact test prescribed in ISO 2919:1999 "Radiation protection - Sealed radioactive sources - General requirements and classification";
or
 - (ii) is less than 500 g and they are alternatively subjected to the Class 5 impact test prescribed in ISO 2919:1999 "Radiation protection - Sealed radioactive sources - General requirements and classification";
and
- (b) The test prescribed in 2.7.2.3.3.5 (d) provided they are alternatively subjected to the Class 6 temperature test specified in ISO 2919:1999 "Radiation protection - Sealed radioactive sources - General requirements and classification".

2.7.2.3.3.7 For specimens which comprise or simulate indispersible solid material, a leaching assessment shall be performed as follows:

- (a) The specimen shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6-8 and a maximum conductivity of 1 mS/m at 20 °C;
- (b) The water with specimen shall then be heated to a temperature of (50 ± 5) °C and maintained at this temperature for 4 hours;
- (c) The activity of the water shall then be determined;
- (d) The specimen shall then be kept for at least 7 days in still air at not less than 30 °C and relative humidity not less than 90%;
- (e) The specimen shall then be immersed in water of the same specification as in (a) above and the water with the specimen heated to (50 ± 5) °C and maintained at this temperature for 4 hours;
- (f) The activity of the water shall then be determined.

2.7.2.3.3.8 For specimens which comprise or simulate radioactive material enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment shall be performed as follows:

- (a) The leaching assessment shall consist of the following steps:
 - (i) the specimen shall be immersed in water at ambient temperature. The water shall have an initial pH of 6-8 with a maximum conductivity of 1 mS/m at 20 °C;
 - (ii) the water and specimen shall be heated to a temperature of (50 ± 5) °C and maintained at this temperature for 4 hours;
 - (iii) the activity of the water shall then be determined;
 - (iv) the specimen shall then be kept for at least 7 days in still air at not less than 30 °C and relative humidity of not less than 90%;
 - (v) the process in (i), (ii) and (iii) shall be repeated;
- (b) The alternative volumetric leakage assessment shall comprise any of the tests prescribed in ISO 9978:1992 "Radiation Protection - Sealed

radioactive sources - Leakage test methods", which are acceptable to the competent authority.

2.7.2.3.4 *Low dispersible material*

2.7.2.3.4.1 The design for low dispersible radioactive material shall require multilateral approval. Low dispersible radioactive material shall be such that the total amount of this radioactive material in a package shall meet the following requirements:

- (a) The radiation level at 3 m from the unshielded radioactive material does not exceed 10 mSv/h;
- (b) If subjected to the tests specified in 6.4.20.3 and 6.4.20.4, the airborne release in gaseous and particulate forms of up to 100 µm aerodynamic equivalent diameter would not exceed 100 A₂. A separate specimen may be used for each test; and
- (c) If subjected to the test specified in 2.7.2.3.1.4 the activity in the water would not exceed 100 A₂. In the application of this test, the damaging effects of the tests specified in (b) above shall be taken into account.

2.7.2.3.4.2 Low dispersible material shall be tested as follows:

A specimen that comprises or simulates low dispersible radioactive material shall be subjected to the enhanced thermal test specified in 6.4.20.3 and the impact test specified in 6.4.20.4. A different specimen may be used for each of the tests. Following each test, the specimen shall be subjected to the leach test specified in 2.7.2.3.1.4. After each test it shall be determined if the applicable requirements of 2.7.2.3.4.1 have been met.

2.7.2.3.4.3 Demonstration of compliance with the performance standards in 2.7.2.3.4.1 and 2.7.2.3.4.2 shall be in accordance with 6.4.12.1 and 6.4.12.2.

2.7.2.3.5 *Fissile material*

Packages containing fissile radionuclides shall be classified under the relevant entry of table 2.7.2.1.1 for fissile material unless the following conditions are met:

- (a) A mass limit per consignment such that:

$$\frac{\text{mass of uranium - 235 (g)}}{X} + \frac{\text{mass of other fissile material (g)}}{Y} < 1$$

where X and Y are the mass limits defined in Table 2.7.2.3.5, provided that the smallest external dimension of each package is not less than 10 cm and that either:

- (i) each individual package contains not more than 15 g of fissile material; for unpackaged material, this quantity limitation shall apply to the consignment being carried in or on the conveyance; or
- (ii) the fissile material is a homogeneous hydrogenous solution or mixture where the ratio of fissile nuclides to hydrogen is less than 5% by mass; or
- (iii) there are not more than 5 g of fissile material in any 10 litre volume of material.

Neither beryllium nor deuterium shall be present in quantities exceeding 1% of the applicable consignment mass limits provided in Table 2.7.2.3.5, except for deuterium in natural concentration in hydrogen.

- (b) Uranium enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the fissile material is distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement;
- (c) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2;
- (d) Packages containing, individually, a total plutonium mass not more than 1 kg, of which not more than 20% by mass may consist of plutonium-239, plutonium-241 or any combination of those radionuclides.

Table 2.7.2.3.5: Consignment mass limits for exceptions from the requirements for packages containing fissile material

Fissile material	Fissile material mass (g) mixed with substances having an average hydrogen density less than or equal to water	Fissile material mass (g) mixed with substances having an average hydrogen density greater than water
Uranium-235 (X)	400	290
Other fissile material (Y)	250	180

2.7.2.4 Classification of packages or unpacked material

The quantity of radioactive material in a package shall not exceed the relevant limits for the package type as specified below.

2.7.2.4.1 Classification as excepted package

2.7.2.4.1.1 Packages may be classified as excepted packages if:

- (a) They are empty packagings having contained radioactive material;
- (b) They contain instruments or articles in limited quantities;
- (c) They contain articles manufactured of natural uranium, depleted uranium or natural thorium; or
- (d) They contain radioactive material in limited quantities.

2.7.2.4.1.2 A package containing radioactive material may be classified as an excepted package provided that the radiation level at any point on its external surface does not exceed 5 μ Sv/h.

Table 2.7.2.4.1.2: Activity limits for excepted packages

Physical state of contents (1)	Instruments or article		Materials Package limits ^a (4)
	Item limits ^a (2)	Package limits ^a (3)	
Solids			
special form	$10^{-2} A_1$	A_1	$10^{-3} A_1$
other form	$10^{-2} A_2$	A_2	$10^{-3} A_2$
Liquids	$10^{-3} A_2$	$10^{-1} A_2$	$10^{-4} A_2$
Gases			
tritium	$2 \times 10^{-2} A_2$	$2 \times 10^{-1} A_2$	$2 \times 10^{-2} A_2$
special form	$10^{-3} A_1$	$10^{-2} A_1$	$10^{-3} A_1$
other forms	$10^{-3} A_2$	$10^{-2} A_2$	$10^{-3} A_2$

^a For mixtures of radionuclides, see 2.7.2.2.4 to 2.7.2.2.6.

2.7.2.4.1.3 Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article may be classified under UN 2911, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS or ARTICLES provided that:

- (a) The radiation level at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h; and
- (b) Each instrument or manufactured article bears the marking "RADIOACTIVE" except:
 - (i) radioluminescent time-pieces or devices;

- (ii) consumer products that either have received regulatory approval according to 1.5.1.4 (d) or do not individually exceed the activity limit for an exempt consignment in Table 2.7.2.2.1 (column 5), provided such products are transported in a package that bears the marking "RADIOACTIVE" on an internal surface in such a manner that warning of the presence of radioactive material is visible on opening the package; and
- (c) The active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article); and
- (d) The limits specified in columns 2 and 3 of Table 2.7.2.4.1.2 are met for each individual item and each package, respectively.

2.7.2.4.1.4 Radioactive material with an activity not exceeding the limit specified in column 4 of Table 2.7.2.4.1.2, may be classified under UN 2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY OF MATERIAL provided that:

- (a) The package retains its radioactive contents under routine conditions of transport; and
- (b) The package bears the marking "RADIOACTIVE" on an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.

2.7.2.4.1.5 An empty packaging which had previously contained radioactive material with an activity not exceeding the limit specified in column 4 of Table 2.7.2.4.1.2 may be classified under UN 2908, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING, provided that:

- (a) It is in a well-maintained condition and securely closed;
- (b) The outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material;
- (c) The level of internal non-fixed contamination, when averaged over any 300 cm², does not exceed:
 - (i) 400 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters; and
 - (ii) 40 Bq/cm² for all other alpha emitters; and
- (d) Any labels which may have been displayed on it in conformity with 5.2.2.1.11.1 are no longer visible.

2.7.2.4.1.6 Articles manufactured of natural uranium, depleted uranium or natural thorium and articles in which the sole radioactive material is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be classified under UN 2909, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM, provided that the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.

2.7.2.4.2 *Classification as Low specific activity (LSA) material*

Radioactive material may only be classified as LSA material if the conditions of 2.7.2.3.1 and 4.1.9.2 are met.

2.7.2.4.3 *Classification as Surface contaminated object (SCO)*

Radioactive material may be classified as SCO if the conditions of 2.7.2.3.2.1 and 4.1.9.2 are met.

2.7.2.4.4 *Classification as Type A package*

Packages containing radioactive material may be classified as Type A packages provided that the following conditions are met:

Type A packages shall not contain activities greater than the following:

- (a) For special form radioactive material - A_1 ; or
- (b) For all other radioactive material - A_2 .

For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the radioactive contents of a Type A package:

$$\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$$

where $B(i)$ is the activity of radionuclide i as special form radioactive material;

$A_1(i)$ is the A_1 value for radionuclide i ;

$C(j)$ is the activity of radionuclide j as other than special form radioactive material; and

$A_2(j)$ is the A_2 value for radionuclide j .

2.7.2.4.5 *Classification of Uranium hexafluoride*

Uranium hexafluoride shall only be assigned to UN Nos. 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE, or 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted.

2.7.2.4.5.1 Packages containing uranium hexafluoride shall not contain:

- (a) A mass of uranium hexafluoride different from that authorized for the package design;
- (b) A mass of uranium hexafluoride greater than a value that would lead to an ullage smaller than 5 % at the maximum temperature of the package as specified for the plant systems where the package shall be used; or
- (c) Uranium hexafluoride other than in solid form or at an internal pressure above atmospheric pressure when presented for transport.

2.7.2.4.6 *Classification as Type B(U), Type B(M) or Type C packages*

2.7.2.4.6.1 Packages not otherwise classified in 2.7.2.4 (2.7.2.4.1 to 2.7.2.4.5) shall be classified in accordance with the competent authority approval certificate for the package issued by the country of origin of design.

2.7.2.4.6.2 A package may only be classified as a Type B(U) if it does not contain:

- (a) Activities greater than those authorized for the package design;
- (b) Radionuclides different from those authorized for the package design; or
- (c) Contents in a form, or a physical or chemical state different from those authorized for the package design;

as specified in the certificate of approval.

2.7.2.4.6.3 A package may only be classified as a Type B(M) if it does not contain:

- (a) Activities greater than those authorized for the package design;
- (b) Radionuclides different from those authorized for the package design; or
- (c) Contents in a form, or a physical or chemical state different from those authorized for the package design;

as specified in the certificate of approval.

- 2.7.2.4.6.4 A package may only be classified as a Type C if it does not contain:
- (a) Activities greater than those authorized for the package design;
 - (b) Radionuclides different from those authorized for the package design; or
 - (c) Contents in a form, or physical or chemical state different from those authorized for the package design;

as specified in the certificate of approval.

2.7.2.5 *Special arrangements*

Radioactive material shall be classified as transported under special arrangement when it is intended to be transported in accordance with 1.5.4."

Chapter 2.8

- 2.8.2.5 (c) (ii) In the first sentence, replace "corrosion rate on steel" with "corrosion rate on either steel" and insert "when tested on both materials" at the end.

Add a new note at the end to read as follows:

"NOTE: Where an initial test on either steel or aluminium indicates the substance being tested is corrosive the follow up test on the other metal is not required."

PART 3**Chapter 3.1**

- 3.1.2.2 Delete "each supplemented with the technical name of the goods (see 3.1.2.8.1)" after examples (a) and (b).

Chapter 3.2

- 3.2.1 Amend the explanatory text for Column 7 to read as follows:

"Column 7a "Limited Quantities" - this column provides the maximum quantity per inner packaging or article for transporting dangerous goods as limited quantities in accordance with Chapter 3.4.

Column 7b "Excepted Quantities" - this column provides an alpha numeric code described in sub-section 3.5.1.2 and indicates the maximum quantity per inner and outer packaging for transporting dangerous goods as excepted quantities in accordance with Chapter 3.5."

Dangerous goods list

Renumber column (7) as (7a) and insert a new column (7b) with the heading "Excepted quantities". Insert the following common heading for both columns (7a) and (7b): "Limited and Excepted quantity provisions".

Insert a new row below the headings with the corresponding reference paragraphs as follows:

	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
	3.1.2	2.0	2.0	2.0.1.3	3.3	3.4	3.5	4.1.4	4.1.4.	4.2.5 4.3.2	4.2.5

In column (7a) replace "None" with "0" wherever it appears.

Add E0 in column (7b) for:

- All goods of Classes 1 and 7 and all goods of Divisions 2.1, 2.3, 5.2 and 6.2;
- All goods of Division 2.2 with a subsidiary risk in column (4) and UN Nos. 1044, 1950, 2037, 2857 and 3164;
- UN Nos. 1204, 2059, 3064, 3256, 3269, 3343, 3357, 3379 and 3473 in Class 3;
- All goods of Class 3 with a subsidiary risk in column (4), packing group I;
- All goods of Division 4.1, packing group I, and UN Nos. 1327, 2304, 2448, 2555, 2556, 2557, 2907, 3176 (packing groups II and III), 3221 to 3240, 3319, 3344 and 3360;
- All goods of Division 4.2, packing group I, and UN 1856;
- All goods of Division 4.3, packing group I, and UN 3292;
- All goods of Division 5.1, packing group I and UN 2426;

- All goods of Class 8, packing group I, and UN Nos. 2028, 2215 (MOLTEN), 2576, 2794, 2795, 2800, 2803, 2809 and 3028;
- UN Nos. 1845, 2807, 2990, 3072, 3090, 3091, 3166, 3171, 3245, 3257, 3258, 3268, 3316, 3334, 3335, 3359 and 3363 of Class 9.

Add E1 in column (7b) for:

- All goods of Division 2.2 without subsidiary risk in column (4);
- All goods of Class 3 without a subsidiary risk in column (4), packing group III, except for UN Nos. 2059, 3256 and 3269;
- All goods of Class 3 with a subsidiary risk in column (4), packing group III;
- All goods of Division 4.1, packing group III, except for UN Nos. 2304, 2448 and 3176;
- All goods of Division 4.2, packing group III;
- All goods of Division 4.3, packing group III;
- All goods of Division 5.1, packing group III;
- All goods of Division 6.1, packing group III;
- All goods of Class 8, packing group III, except for UN Nos. 2215 (MOLTEN), 2803 and 2809;
- All goods of Class 9, packing group III, except for UN 1845, 2807, 3257, 3258 and 3268.

Add E2 in column (7b) for:

- All goods of Class 3 without a subsidiary risk in column (4), packing group II, except for UN Nos. 1204, 2059, 3064, 3269 and 3357;
- All goods of Class 3 with a subsidiary risk in column (4), packing group II;
- All goods of Division 4.1, packing group II, except for UN Nos. 2555, 2556, 2557, 2907, 3176, 3319 and 3344;
- All goods of Division 4.2, packing group II;
- All goods of Division 4.3, packing group II, except for UN 3292;
- All goods of Division 5.1, packing group II;
- All goods of Class 8, packing group II, except for UN Nos. 2028 and 2576;
- All goods of Class 9, packing group II, except for UN Nos. 3090, 3091, 3480 and 3481.

Add E3 in column (7b) for all goods of Class 3 without a subsidiary risk in column (4), packing group I, except for UN Nos. 2059 and 3379.

Add E4 in column (7b) for all goods of Division 6.1, packing group II, except for UN Nos. 1600, 1700, 2016, 2017, 2312 and 3250.

Add E5 in column (7b) for all goods of Division 6.1, packing group I, and for UN Nos. 1600, 1700, 2016, 2017, 2312 and 3250.

Delete "TP9" each time it appears in column (11) with the exception of UN 3375.

Delete "TP12" each time it appears in column (11).

For UN Nos. 0504, 3354, 3355, 3356, 3357 and 3374, add "0" in column (7a).

For UN Nos. 1092, 1238, 1239 and 1244, packing group I, in column (10), replace "T14" with "T22" and add "TP35" in column (11).

For UN Nos. 1098, 1143, 1163, 1595, 1695, 1752, 1809, 2334, 2337, 2646 and 3023, packing group I, in column (10), replace "T14" with "T20" and add "TP35" in column (11).

For UN Nos. 1162, 1196, 1250, 1298, 1305, 1724, 1728, 1747, 1753, 1762, 1763, 1766, 1767, 1769, 1771, 1781, 1784, 1799, 1800, 1801, 1804, 1816, 2434, 2435, 2437, 2985, 2986, 2987, 3361 and 3362, replace "P001" with "P010" in column (8) and add "TP7" in column (11).

For UN Nos. 1162, 1196, 1298, 1724, 1728, 1747, 1753, 1762, 1763, 1766, 1767, 1769, 1771, 1781, 1784, 1799, 1800, 1801, 1804, 1816, 1818, 2434, 2435, 2437, 2985, 2986 and 2987, delete "IBC02" in column (8).

For UN Nos. 1162, 1196, 1298, 1724, 1728, 1747, 1753, 1762, 1763, 1766, 1767, 1769, 1771, 1781, 1784, 1799, 1800, 1801, 1804, 1816, 1818, 2434, 2435 and 2437, replace "T7" with "T10" in column (10).

For UN Nos. 1170, 1987 and 1993, delete "330" in column (6).

For UN Nos. 1183, 1242 and 2988, replace "T10" with "T14".

For UN Nos. 1185, 1994 and 2480, packing group I, add "T22" in column (10) and "TP2 TP13" in column (11) respectively.

For UN 1239, packing group I, and for UN Nos. 1781, 1804, 1818, 2986 and 2987, add "TP13" in column (11).

For UN Nos. 1250 and 1305, replace "I" with "II" in column (5) and replace "T11" with "T10" in column (10).

For UN Nos. 1463, 1473, 1484, 1485, 1487, 1488, 1490, 1493, 1494, 1495, 1512, 1514, 1751, 2465, 2468, 2627 and 3247, add "B2" in column (9).

For UN Nos. 1851, 3248 and 3249, packing groups II and III, delete "PP6" in column (9).

For UN Nos. 2813 and 3131, packing group I, add "T9" in column (10) and "TP7 TP33" in column (11) respectively.

For UN Nos. 2814 and 3373, insert "BK1 BK2" in column (10).

For UN Nos. 2814, 2900 and 3373, insert "341" in column (6).

For UN Nos. 2908, 2909, 2910 and 2911, in columns (8) to (11), replace "See Chapter 2.7" with "See Chapter 1.5".

- For UN Nos. 2913, 3321, 3322, 3324, 3325 and 3326, insert "336" in column (6).
- For UN Nos. 2916, 2917, 3328 and 3329 insert "337" in column (6).
- For UN Nos. 2985, 2986, 3361 and 3362, replace "T11" with "T14".
- For UN Nos. 3077 and 3082, add "335" in column (6).
- For UN Nos. 3129, 3130 and 3148, replace "g/kg" with "ml/l" in column (7a).
- For UN Nos. 3361 and 3362, delete "IBC01" in column (8) and add "TP27" in column (11).
- UN 0411 The amendment does not apply to the English version.
- UN 1017 In column (4), add "5.1".
- UN 1344 In column (2), add "(PICRIC ACID)" after "TRINITROPHENOL".
- UN 1356 In column (2), add "(TNT)" after "TRINITROTOLUENE".
- UN 1474 In column (6), add "332".
- UN 1569 In column (10), replace "T3" with "T20" and in column (11), replace "TP33" with "TP2 TP13".
- UN 1647 For packing group I, add "T20" in column (10) and "TP2 TP13" in column (11).
- UN 1744 In column (8), replace "P601" with "P804" and in column (9), delete "PP82".
- UN 1790 (2 entries) In the French text, delete "solution" in column (2).
- UN 1818 Replace "1 L" with "0" in column (7a), replace "P001" with "P010" in column (8).
- UN 2031 For packing group II, in column (2), add "at least 65%, but" after "with", in column (4), add "5.1", and in column (9), add "B15".
- UN 2059 In column (8), for packing group II, add "IBC02" and for packing group III, add "IBC03".
- UN 2823 In column (9), add "B3".
- UN 2844 In column (9), delete "B2".
- UN 3077 In column (10), add "BK2".
- UN 3082 Add "PP1" in column (9).
- UN 3090 In column (2), amend the name and description to read: "LITHIUM METAL BATTERIES (including lithium alloy batteries)".

- UN 3091 In column (2), insert "METAL" after "LITHIUM" (twice).
- UN 3129 For packing group I, add "T14" in column (10) and "TP2 TP7" in column (11) respectively.
For packing group II, add "T11" in column (10) and "TP2" in column (11) respectively.
For packing group III, add "T7" in column (10) and "TP1" in column (11) respectively.
- UN 3148 For packing group I, add "T9" in column (10) and "TP2 TP7" in column (11) respectively.
For packing group II, add "T7" in column (10) and "TP2" in column (11) respectively.
For packing group III, add "T7" in column (10) and "TP1" in column (11) respectively.
- UN 3316 In column (6), add "340".
- UN 3344 In column (2), add "(PENTAERYTHRITOL TETRANITRATE; PETN)" after "TETRANITRATE".
- UN 3432 In column (9), add "B2, B4" adjacent to "IBC08".
- UN 3468 In column (2), add at the end: "or HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM CONTAINED IN EQUIPMENT or HYDROGEN IN A METAL HYDRIDE STORAGE SYSTEM PACKED WITH EQUIPMENT".
- UN 3473 In column (2), replace "FUEL CELL CARTRIDGES" with "FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT", in column (8), replace "P003" with "P004", and in column (9), delete "PP88".

Add the following new entries:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
0505	SIGNALS, DISTRESS, ship	1.4G				0	E0	P135			
0506	SIGNALS, DISTRESS, ship	1.4S				0	E0	P135			
0507	SIGNALS, SMOKE	1.4S				0	E0	P135			
0508	1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, dry or wetted with less than 20% water, by mass	1.3C				0	E0	P114(b)	PP48		
2031	NITRIC ACID, other than red fuming, with less than 65% nitric acid	8		II		1 L	E2	P001 IBC02	PP81 B15	T8	TP2

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3474	1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, WETTED with not less than 20% water, by mass	4.1		I	28	0	E0	P406	PP48		
3475	ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 10% ethanol	3		II	333	1 L	E2	P001 IBC02		T4	TP1
3476	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing water-reactive substances	4.3			328 334	500 ml or 500 g	E0	P004			
3477	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing corrosive substances	8			328 334	1 L or 1 kg	E0	P004			
3478	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas	2.1			328 338	120 ml	E0	P004			
3479	FUEL CELL CARTRIDGES or FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride	2.1			328 339	120 ml	E0	P004			
3480	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	9		II	188 230 310	0	E0	P903			
3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT	9		II	188 230	0	E0	P903			

Chapter 3.3

3.3.1 **SP188** At the beginning, replace "Lithium cells" with "Cells".

In (a), replace "lithium equivalent content is not more than 1.5 g" with "Watt-hour rating is not more than 20 Wh".

In (b), replace "aggregate lithium-equivalent content is not more than 8 g;" with "Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case;".

Replace (d) and (e) with the following new sub-paragraphs (d) to (i):

- "(d) Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit. The inner packagings shall be packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2, and 4.1.1.5.
- (e) Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. When lithium batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
- (f) Except for packages containing no more than four cells installed in equipment or no more than two batteries installed in equipment, each package shall be marked with the following:
 - (i) an indication that the package contains "lithium metal" or "lithium ion" cells or batteries, as appropriate;
 - (ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;
 - (iii) an indication that special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - (iv) a telephone number for additional information.
- (g) Each consignment of one or more packages marked in accordance with paragraph (f) shall be accompanied with a document including the following:
 - (i) an indication that the package contains "lithium metal" or "lithium ion" cells or batteries, as appropriate;
 - (ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;
 - (iii) an indication that special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - (iv) a telephone number for additional information.

- (h) Except when lithium batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and
- (i) Except when lithium batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass."

In the last sentence, delete ", except in the case of a lithium ion cell the "lithium-equivalent content" in grams is calculated to be 0.3 times the rated capacity in ampere hours".

Insert a new last paragraph to read as follows:

"Separate entries exist for lithium metal batteries and lithium ion batteries to facilitate the transport of these batteries for specific modes of transport and to enable the application of different emergency response actions."

- SP198** Replace "UN 1210, UN 1263 and UN 3066" with "UN Nos. 1210, 1263, 3066, 3469 and 3470".
- SP199** Replace "are considered insoluble. See ISO 3711:1990." with "(see ISO 3711:1990 *Lead chromate pigments and lead chromate-molybdate pigments – Specifications and methods of test*) are considered insoluble and are not subject to these Regulations unless they meet the criteria for inclusion in another hazard class or division."
- SP236** Replace the last sentence ("The quantity limit shown in Column 7 of the Dangerous Goods List applies to the base material.") by the following: "The quantity limit and the excepted quantity code shown in columns 7a and 7b of the Dangerous Goods List apply to the base material."
- SP251** In the first paragraph, replace "the word "NONE" has been indicated in column 7" with "the quantity 0 has been indicated in column 7a"
In the last paragraph, insert "for limited quantities" after "quantity limits" and replace "7" with "7a".
- SP289** Replace "Air bags or seat-belts" with "Air bag inflators, air bag modules or seat-belt pretensioners".
- SP301** In the fourth and the last sentences, replace "in column 7" by "in column 7a".
- SP307** In (b) Insert "and/or mineral calcium sulphate" after "dolomite".
- SP310** At the beginning, replace "100 lithium cells" with "100 cells".

SP328 Amend to read as follows:

"328 This entry applies to fuel cell cartridges including when contained in equipment or packed with equipment. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridge means an article that stores fuel for discharge into the fuel cell through a valve(s) that controls the discharge of fuel into the fuel cell. Fuel cell cartridges, including when contained in equipment, shall be designed and constructed to prevent fuel leakage under normal conditions of transport.

Fuel cell cartridge design types using liquids as fuels shall pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage.

Except for fuel cell cartridges containing hydrogen in metal hydride which shall be in compliance with Special Provision 339, each fuel cell cartridge design type shall be shown to pass a 1.2 meter drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents.

Fuel cell cartridges containing hydrogen in a metal hydride transported under this entry shall have a water capacity less than or equal to 120 ml."

SP330 Delete.

Add the following new special provisions:

"332 Magnesium nitrate hexahydrate is not subject to these Regulations.

333 Ethanol and gasoline, motor spirit or petrol mixtures for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of variations in volatility.

334 A fuel cell cartridge may contain an activator provided it is fitted with two independent means of preventing unintended mixing with the fuel during transport.

335 Mixtures of solids which are not subject to these Regulations and environmentally hazardous liquids or solids shall be classified as UN 3077 and may be transported under this entry, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging. Sealed packets and articles containing less than 10 ml of an environmentally hazardous liquid, absorbed into a solid material but with no free liquid in the packet or article, or containing less than 10 g of an environmentally hazardous solid, are not subject to these Regulations.

- 336** A single package of non-combustible solid LSA-II or LSA-III material, if carried by air, shall not contain an activity greater than 3000 A₂.
- 337** Type B(U) and Type B(M) packages, if transported by air, shall not contain activities greater than the following:
- (a) For low dispersible radioactive material: as authorized for the package design as specified in the certificate of approval;
 - (b) For special form radioactive material: 3000 A₁ or 100 000 A₂, whichever is the lower; or
 - (c) For all other radioactive material: 3000 A₂.
- 338** Each fuel cell cartridge transported under this entry and designed to contain a liquefied flammable gas shall:
- (a) Be capable of withstanding, without leakage or bursting, a pressure of at least two times the equilibrium pressure of the contents at 55 °C;
 - (b) Not contain more than 200 ml of liquefied flammable gas with a vapour pressure not exceeding 1 000 kPa at 55 °C; and
 - (c) Pass the hot water bath test prescribed in 6.2.4.1 of Chapter 6.2.
- 339** Fuel cell cartridges containing hydrogen in a metal hydride transported under this entry shall have a water capacity less than or equal to 120 ml.

The pressure in the fuel cell cartridge shall not exceed 5 MPa at 55 °C. The design type shall withstand, without leaking or bursting, a pressure of two (2) times the design pressure of the cartridge at 55 °C or 200 kPa more than the design pressure of the cartridge at 55 °C, whichever is greater. The pressure at which this test is conducted is referred to in the Drop Test and the Hydrogen Cycling Test as the "minimum shell burst pressure".

Fuel cell cartridges shall be filled in accordance with procedures provided by the manufacturer. The manufacturer shall provide the following information with each fuel cell cartridge:

- (a) Inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge;
- (b) Safety precautions and potential hazards to be aware of;
- (c) Method for determining when the rated capacity has been achieved;

- (d) Minimum and maximum pressure range;
- (e) Minimum and maximum temperature range; and
- (f) Any other requirements to be met for initial filling and refilling including the type of equipment to be used for initial filling and refilling.

The fuel cell cartridges shall be designed and constructed to prevent fuel leakage under normal conditions of transport. Each cartridge design type, including cartridges integral to a fuel cell, shall be subjected to and shall pass the following tests:

Drop test

A 1.8 metre drop test onto an unyielding surface in four different orientations:

- (a) Vertically, on the end containing the shut-off valve assembly;
- (b) Vertically, on the end opposite to the shut-off valve assembly;
- (c) Horizontally, onto a 38 mm steel apex, with the steel apex in the upward position; and
- (d) At a 45° angle on the end containing the shut-off valve assembly.

There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations, when the cartridge is charged to its rated charging pressure. The fuel cell cartridge shall then be hydrostatically pressurized to destruction. The recorded burst pressure shall exceed 85% of the minimum shell burst pressure.

Fire test

A fuel cell cartridge filled to rated capacity with hydrogen shall be subjected to a fire engulfment test. The cartridge design, which may include a vent feature integral to it, is deemed to have passed the fire test if:

- (a) The internal pressure vents to zero gauge pressure without rupture of the cartridge; or
- (b) The cartridge withstands the fire for a minimum of 20 minutes without rupture.

Hydrogen cycling test

This test is intended to ensure that a fuel cell cartridge design stress limits are not exceeded during use.

The fuel cell cartridge shall be cycled from not more than 5% rated hydrogen capacity to not less than 95% rated hydrogen capacity and back to not more than 5% rated hydrogen capacity. The rated charging pressure shall be used for charging and temperatures shall be held within the operating temperature range. The cycling shall be continued for at least 100 cycles.

Following the cycling test, the fuel cell cartridge shall be charged and the water volume displaced by the cartridge shall be measured. The cartridge design is deemed to have passed the hydrogen cycling test if the water volume displaced by the cycled cartridge does not exceed the water volume displaced by an uncycled cartridge charged to 95% rated capacity and pressurized to 75% of its minimum shell burst pressure.

Production leak test

Each fuel cell cartridge shall be tested for leaks at $15\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, while pressurized to its rated charging pressure. There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations.

Each fuel cell cartridge shall be permanently marked with the following information:

- (a) The rated charging pressure in megapascals (MPa);
- (b) The manufacturer's serial number of the fuel cell cartridges or unique identification number; and
- (c) The date of expiry based on the maximum service life (year in four digits; month in two digits).

340 Chemical kits and first aid kits containing dangerous goods in inner packagings which do not exceed the quantity limits for excepted quantities applicable to individual substances as specified in column 7b of the Dangerous Goods List may be transported in accordance with Chapter 3.5. Division 5.2 substances, although not individually authorized as excepted quantities in the Dangerous Goods List, are authorized in such kits and are assigned Code E2 (see 3.5.1.2).

341 Bulk transport of infectious substances in BK1 and BK2 bulk containers is only permitted for infectious substances contained in animal material as defined in 1.2.1 (See 4.3.2.4.1)."

Chapter 3.4

3.4.1 In the second and the third sentences, replace "in column 7" with "in column 7a".

In the third sentence, replace "the word "None"" with "the quantity "0"".

Chapter 3.5

Add a new Chapter 3.5 to read as follows:

**"CHAPTER 3.5
DANGEROUS GOODS
PACKED IN EXCEPTED QUANTITIES**

3.5.1 Excepted quantities

3.5.1.1 Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this section are not subject to any other provisions of these Regulations except for:

- (a) The training requirements in Chapter 1.3;
- (b) The classification procedures and packing group criteria in Part 2, Classification;
- (c) The packaging requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.4.1 and 4.1.1.6 in Part 4.

***NOTE:** In the case of radioactive material, the requirements for radioactive material in excepted packages in 1.5.1.5 apply.*

3.5.1.2 Dangerous goods which may be carried as excepted quantities in accordance with these provisions are shown in column 7b of the dangerous goods list by means of an alphanumeric code as follows:

Code	Maximum quantity per inner packaging	Maximum quantity per outer packaging
E0	Not permitted as Excepted Quantity	
E1	30g/30ml	1kg/1L
E2	30g/30ml	500g/500ml
E3	30g/30ml	300g/300ml
E4	1g/1ml	500g/500ml
E5	1g/1ml	300g/300ml

For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer package.

Where dangerous goods in excepted quantities for which different codes are assigned are packaged together the total quantity per outer packaging shall be limited to that corresponding to the most restrictive Code.

Excepted quantities of dangerous goods shall be transported in accordance with the provisions of sections 3.5.1.3 to 3.5.1.6.

3.5.1.3 Packagings used for the transport of dangerous goods in excepted quantities shall be in compliance with the following:

- (a) There shall be an inner packaging and each inner packaging shall be constructed of plastic (when used for liquid dangerous goods it shall have a minimum thickness of not less than 0.2 mm), or of glass, porcelain, stoneware, earthenware or metal (see also 4.1.1.2) and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leak proof threaded type cap. The closure shall be resistant to the contents;
- (b) Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents. The intermediate packaging shall completely contain the contents in case of breakage or leakage, regardless of package orientation. For liquid dangerous goods, the intermediate packaging shall 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 shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials;
- (c) The intermediate packaging shall be securely packed in a strong, rigid outer packaging (wooden, fibreboard or other equally strong material);
- (d) Each package type shall be in compliance with the provisions in 3.5.1.4;
- (e) Each package shall be of such a size that there is adequate space to apply all necessary markings; and
- (f) Overpacks may be used and may also contain packages of dangerous goods or goods not subject to these Regulations.

3.5.1.4 *Tests for packages*

3.5.1.4.1 The complete package as prepared for transport, with inner packagings filled to not less than 95% of their capacity for solids or 98% for liquids, shall be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

- (a) Drops onto a rigid, non-resilient flat and horizontal surface from a height of 1.8 m:
 - (i) Where the sample is in the shape of a box, it shall be dropped in each of the following attitudes:
 - flat on the base;
 - flat on the top;
 - flat on the longest side;
 - flat on the shortest side;
 - on a corner;
 - (ii) Where the sample is in the shape of a drum, it shall be dropped in each of the following attitudes:
 - diagonally on the top chime, with the centre of gravity directly above the point of impact;
 - diagonally on the base chime;
 - flat on the side.

NOTE: Each of the above drops 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 drop sample).

3.5.1.4.2 For the purposes of testing, 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.

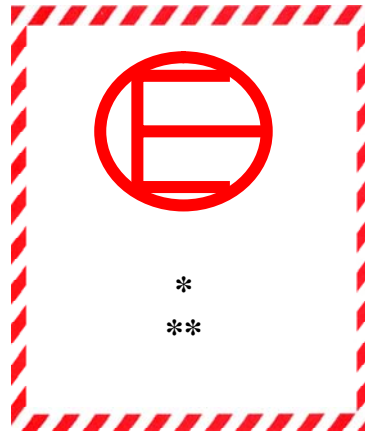
3.5.1.5 *Marking of packages*

3.5.1.5.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this Chapter shall be durably and legibly marked with the mark shown in Figure 3.5.1. The primary hazard class or, when assigned, the division of each of the dangerous goods contained in the package shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the package this information shall be included within the mark.

3.5.1.5.2 For packages the dimensions of the mark shall be a minimum of 100 mm × 100 mm.

3.5.1.5.3 An overpack containing dangerous goods in excepted quantities shall display the markings required by 3.5.1.5.1, unless such markings on packages within the overpack are clearly visible.

Figure 3.5.1



Excepted quantities mark

Hatching and symbol of the same colour, black or red,
on white or suitable contrasting background

- * *The Class or, when assigned, the Division Number(s) shall be shown in this location.*
- ** *The name of the consignor or of the consignee shall be shown in this location if not shown elsewhere on the package.*

3.5.1.6 *Maximum number of packages in any freight vehicle, railway freight wagon or multimodal freight container*

The number of packages in any freight vehicle, railway freight wagon or multimodal freight container shall not exceed 1 000.

3.5.1.7 *Documentation*

If a document (such as a bill of lading or air waybill) accompanies dangerous goods in excepted quantities, it shall include the statement "Dangerous Goods in Excepted Quantities" and indicate the number of packages."

PART 4**Chapter 4.1**

4.1.1.3 Add the following new paragraph at the end:

"However, IBCs manufactured before 1 January 2011 and conforming to a design type which has not passed the vibration test of 6.5.6.13 may still be used."

4.1.1.10 In the last sentence before the table, delete "Metal".

4.1.2.2 Replace the three first letters (a), (b) and (c) with dashes (*the text remains unchanged*).

4.1.4.1 **P001 and P002** Delete PP6.

P001 Amend the beginning of special packing provision PP1 to read as follows: "For UN Nos. 1133, 1210, 1263 and 1866 and for adhesives, printing inks, printing ink related materials, paints, paint related materials and resin solutions which are assigned to UN 3082, metal or plastics packagings for substances of packing groups II and III in quantities of 5 litres or less per packaging are not required to meet the performance tests in Chapter 6.1 when transported:" (*Remainder unchanged*).

P003 Delete PP88.

P010 Insert the following new packing instruction:

P010		PACKING INSTRUCTION		P010	
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:					
Combination packagings					
Inner packagings		Outer packagings	Maximum net mass (see 4.1.3.3)		
Glass	1 l	Drums steel (1A2) plastics (1H2) plywood (1D) fibre (1G) Boxes steel (4A) natural wood (4C1, 4C2) plywood (4D) reconstituted wood (4F) fibreboard (4G) expanded plastics (4H1) solid plastics (4H2)			
Steel	40 l				
				400 kg	
				400 kg	
				400 kg	
				400 kg	
				400 kg	
				400 kg	
				400 kg	
				60 kg	
				400 kg	

Single packagings	Maximum capacity (see 4.1.3.3)
Drums steel, non-removable head (1A1)	450 l
Jerricans steel, non-removable head (3A1)	60 l
Composite packagings plastics receptacle in steel drums (6HA1)	250 l

P099 Insert "for these goods" before "by the competent authority" and add the following new sentence at the end: "A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority".

P114(b) Add the following new special packing provision:

"PP48 For UN No. 0508, metal packagings shall not be used."

In special packing provision PP50, replace "For UN 0160 and UN 0161" with "For UN Nos. 0160, 0161 and 0508" and replace "required" with "necessary".

P200 In paragraph (3) (b), amend the second sentence to read as follows:

"The use of test pressures and filling ratios other than those in the table is permitted, except where (4), special packing provision "o" applies, provided that:

- (i) the criterion of (4), special packing provision "r" is met when applicable; or
- (ii) the above criterion is met in all other cases."

In paragraph (4), in the third paragraph of special packing provision "k", replace "assemblies (groups)" with "groups".

In paragraph (4), amend special packing provision "n" to read as follows:

"n: Cylinders and individual cylinders in a bundle shall contain not more than 5 kg of the gas. When bundles containing UN 1045 Fluorine, compressed are divided into groups of cylinders in accordance with special packing provision "k" each group shall contain not more than 5 kg of the gas."

In paragraph (4), insert a new special packing provision "r" to read as follows:

"r: The filling ratio of this gas shall be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the pressure receptacle."

In paragraph (4), add a new paragraph at the end of special packing provision "z" to read as follows:

"Mixtures containing UN 2192 germane, other than mixtures of up to 35% germane in hydrogen or nitrogen or up to 28% germane in helium or argon, shall be filled to a pressure such that, if complete decomposition of the germane occurs, two thirds of the test pressure of the pressure receptacle shall not be exceeded."

In Table 1, amend the values in columns "Test pressure" and "Maximum working pressure" as follows:

UN No.	Name	Test pressure, bar		Maximum working pressure
		Existing	Amended	
1660	Nitric oxide, compressed	200	225	33

In Table 2: For UN 1017 add "5.1" in column "Subsidiary risk".

For UN 2192 replace "1.02" with "0.064" in column "Filling ratio" and add ", r" in column "Special packing provisions".

For UN 2203 delete "d, " in column "Special packing provisions" (twice).

For UN 2676, insert ", r" in column "Special packing provisions".

For UN 2189, add a new test-pressure/filling-ratio entry as follows:

Test pressure, bar	Filling ratio
200	1.08

In Table 2, amend the values in column "Filling ratio" as follows:

UN No.	Name	Test pressure, bar	Filling ratio
1011	Butane	10	0.52
1013	Carbon dioxide	190	0.68
1013	Carbon dioxide	250	0.76
1020	Chloropentafluoroethane (R115)	25	1.05
1022	Chlorotrifluoromethane (R13)	250	1.11
1035	Ethane	120	0.30
1035	Ethane	300	0.40
1048	Hydrogen bromide	60	1.51
1080	Sulphur hexafluoride	70	1.06
1080	Sulphur hexafluoride	140	1.34
1080	Sulphur hexafluoride	160	1.38
1962	Ethylene	300	0.38
1973	R502	31	1.01
1976	Octafluorocyclobutane (RC318)	11	1.32
1982	Tetrafluoromethane (R14)	200	0.71
1982	Tetrafluoromethane (R14)	300	0.90
1984	Trifluoromethane (R23)	190	0.88
1984	Trifluoromethane (R23)	250	0.96
2035	1,1,1-trifluoroethane (R143a)	35	0.73
2036	Xenon	130	1.28
2193	Hexafluoroethane (R116)	200	1.13

UN No.	Name	Test pressure, bar	Filling ratio
2196	Tungsten hexafluoride	10	3.08
2198	Phosphorus pentafluoride	300	1.25
2424	Octafluoropropane (R218)	25	1.04
2454	Methyl fluoride (R41)	300	0.63
2599	R503	31	0.12
2599	R503	42	0.17
2599	R503	100	0.64

In Table 2, amend the values in columns "Test pressure" and "Filling ratio" as follows:

UN No.	Name	Test pressure, bar		Filling ratio
		Existing	Amended	
1005	Ammonia, anhydrous	33	29	0.54
1018	Chlorodifluoromethane (R22)	29	27	Unchanged
1021	1-Chloro-1,2,2,2-tetrafluoroethane (R124)	12	11	Unchanged
1027	Cyclopropane	20	18	0.55
1028	Dichlorodifluoromethane (R12)	18	16	Unchanged
1030	1,1-Difluoroethane (R152a)	18	16	Unchanged
1053	Hydrogen sulphide	55	48	Unchanged
1077	Propylene	30	27	Unchanged
1079	Sulphur dioxide	14	12	Unchanged
1978	Propane	25	23	0.43
2204	Carbonyl sulphide	26	30	0.87
2676	Stibine	20	200	0.49
3159	1,1,1,2-Tetrafluoroethane (R134a)	22	18	1.05
3220	Pentafluoroethane (R125)	36	35	0.87
3296	Heptafluoropropane (R227ea)	15	13	1.21
3338	R407A	36	32	Unchanged
3339	R407B	38	33	Unchanged
3340	R407C	35	30	Unchanged

P406 Add the following new special packing provision:

"**PP48** For UN No. 3474, metal packagings shall not be used."

P601 In (2), delete "or additionally, for UN 1744 only, in polyvinylidene fluoride (PVDF) inner packagings,".

Delete PP82.

P620 In (a) (i) and (ii), replace "watertight" with "leakproof".

Amend sub-paragraph (b) to read as follows:

"A rigid outer packaging. The smallest external dimension shall be not less than 100 mm."

In additional requirement 2 (b), replace "6.3.1.1" with "6.3.3".

Insert the following new additional requirement:

"(4) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4.1.3.7."

P621 In the second sentence, delete "and the special provisions of 4.1.8".

P650 In (6), replace "6.3.2.5" with "6.3.5.3" and "6.3.2.2 to 6.3.2.4" with "6.3.5.2".

Insert the following new additional requirement at the end:

"Additional requirement:

(1) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4.1.3.7."

P801 Insert ", except 4.1.1.3," after "provisions of 4.1.1".

P903 In the first row after the packing instruction number, replace "and 3091" with ", 3091, 3480 and 3481".

Delete "lithium" before "cells and batteries" (twice).

Add the following new packing instructions **P004** and **P804**:

P004	PACKING INSTRUCTION	P004
	This instruction applies to UN Nos. 3473, 3476, 3477, 3478 and 3479	
	The following packagings are authorized provided the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.3, 4.1.1.6 and 4.1.3 are met:	
	(1) For fuel cell cartridges, packagings conforming to the packing group II performance level; and	
	(2) For fuel cell cartridges contained in equipment or packed with equipment, strong outer packagings. Large robust equipment (see 4.1.3.8) containing fuel cell cartridges may be transported unpackaged. When fuel cell cartridges are packed with equipment, they shall be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the contents within the outer packaging. Fuel cell cartridges which are installed in equipment shall be protected against short circuit and the entire system shall be protected against inadvertent operation.	

P804	PACKING INSTRUCTION	P804
This instruction applies to UN 1744.		
The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed:		
(1) Combination packagings with a maximum gross mass of 25 kg, consisting of one or more glass inner packaging(s) with a maximum capacity of 1.3 litres each and filled to not more than 90% of their capacity, the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during transport, together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings.		
(2) Combination packagings consisting of metal or polyvinylidene fluoride (PVDF) inner packagings, not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport;		
(3) Packagings consisting of:		
Outer packagings:		
Steel or plastic drums, removable head (1A2 or 1H2) tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly;		
Inner packagings:		
Drums and composite packagings (1A1, 1B1, 1N1, 1H1 or 6HA1) meeting the requirements of Chapter 6.1 for single packagings, subject to the following conditions:		
(a) The hydraulic pressure test shall be conducted at a pressure of at least 300 kPa (3 bar) (gauge pressure); (b) The design and production leakproofness tests shall be conducted at a test pressure of 30 kPa (0,3 bar); (c) They shall be isolated from the outer drum by the use of inert shock-mitigating cushioning material which surrounds the inner packaging on all sides; (d) Their capacity shall not exceed 125 litres; (e) Closures shall be of a screw type that are: (i) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport; (ii) Provided with a cap seal; (f) The outer and inner packagings shall be subjected periodically to an internal inspection and leakproofness test according to (b) at intervals of not more than two and a half years; and (g) The outer and inner packagings shall bear in clearly legible and durable characters:		

P804	PACKING INSTRUCTION	P804
<p>(i) the date (month, year) of the initial test and the latest periodic test and inspection of the inner packaging; and</p> <p>(ii) the name or authorized symbol of the expert performing the tests and inspections;</p> <p>(4) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met.</p> <p>(a) They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure);</p> <p>(b) They shall be subjected periodically to an internal inspection and leakproofness test at intervals of not more than two and a half years;</p> <p>(c) They may not be equipped with any pressure relief device;</p> <p>(d) Each pressure receptacle shall be closed with a plug or valve(s) fitted with a secondary closure device; and</p> <p>(e) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents.</p>		

4.1.4.2 **IBC01, IBC02 and IBC03** Delete the additional requirement.

IBC02 Add a new special packing provision to read as follows:

B15 For UN 2031 with more than 55% nitric acid, the permitted use of rigid plastics IBCs and of composite IBCs with a rigid plastics inner receptacle shall be two years from their date of manufacture."

IBC03 In the special packing provision B11, insert at the beginning "Notwithstanding the provisions of 4.1.1.10".

IBC05, IBC06, IBC07 and IBC08 In special packing provision B2, delete "packing group II".

IBC99 Insert "for these goods" before "by the competent authority" and add the following new sentence at the end: "A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority".

IBC520 For UN 3109, in the entry for tert-Butyl peroxy-3,5,5-trimethylhexanoate, not more than 32% in diluent type A (third entry), replace "32%" with "37%".

For UN 3119, in the entry for Di-(2-ethylhexyl) peroxydicarbonate, not more than 52%, stable dispersion, in water (ninth entry), replace "52%" with "62%".

Insert the following new entries:

UN No.	Organic peroxide	Type of IBC	Maximum quantity (litres)	Control temperature	Emergency temperature
3109	tert-Butyl peroxybenzoate, not more than 32% in diluent type A	31A	1250		
3109	1,1-Di-(tert-Butylperoxy)cyclohexane, not more than 37% in diluent type A	31A	1250		
3119	tert-Amyl peroxy-pivalate, not more than 32% in diluent type A	31A	1250	+10	+15
3119	tert-Butyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1250	-5	+5
3119	Di-(2-neodecanoylperoxyisopropyl)benzene, not more than 42%, stable dispersion, in water	31A	1250	-15	-5
3119	3-Hydroxy-1,1-dimethylbutyl peroxy-neodecanoate, not more than 52%, stable dispersion, in water	31A	1250	-15	-5

- 4.1.4.3 **LP99** Insert "for these goods" before "by the competent authority" and add the following new sentence at the end: "A copy of the competent authority approval shall accompany each consignment or the transport document shall include an indication that the packaging was approved by the competent authority".
- 4.1.6.1.2 Delete the third and fourth sentences ("Pressure receptacles for UN 1001 acetylene ... compatible with the pressure receptacles.").
- 4.1.8 Replace "**(Division 6.2)**" with "**of Category A (Division 6.2, UN 2814 and UN 2900)**".
- 4.1.8.2 Replace "liquids shall be filled into packagings, including IBCs, which" with "liquids shall only be filled into packagings which".
- 4.1.8.3 Delete "For UN 2814 and UN 2900," and "and assignment to UN 2814 or UN 2900".
- 4.1.8.4 Delete "thoroughly" and add "to nullify any hazard" after "sterilized".
- 4.1.8.5 Replace with the text of existing 6.3.2.8.
- 4.1.9.1.1 Add at the end: "The types of packages for radioactive materials covered by these Regulations, are:
- (a) Excepted package (see 1.5.1.5);

- (b) Industrial package Type 1 (Type IP-1 package);
- (c) Industrial package Type 2 (Type IP-2 package);
- (d) Industrial package Type 3 (Type IP-3 package);
- (e) Type A package;
- (f) Type B(U) package;
- (g) Type B(M) package;
- (h) Type C package.

Packages containing fissile material or uranium hexafluoride are subject to additional requirements."

4.1.9.1.6 to 4.1.9.1.11 Insert the following new paragraphs:

"4.1.9.1.6 Before the first shipment of any package, the following requirements shall be fulfilled:

- (a) If the design pressure of the containment system exceeds 35 kPa (gauge), it shall 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 shall 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 6.4.11.1, neutron poisons are specifically included as components of the package, checks shall be performed to confirm the presence and distribution of those neutron poisons.

4.1.9.1.7 Before each shipment of any package, the following requirements shall be fulfilled:

- (a) For any package it shall be ensured that all the requirements specified in the relevant provisions of these Regulations have been satisfied;
- (b) It shall be ensured that lifting attachments which do not meet the requirements of 6.4.2.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6.4.2.3;

- (c) For each package requiring competent authority approval, it shall 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 shall 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 shall 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 6.4.8.8 and 6.4.10.3 were made;
- (f) For each special form radioactive material, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied;
- (g) For packages containing fissile material the measurement specified in 6.4.11.4 (b) and the tests to demonstrate closure of each package as specified in 6.4.11.7 shall be performed where applicable;
- (h) For each low dispersible radioactive material, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.

4.1.9.1.8 The consignor shall 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.

4.1.9.1.9 Except for consignments under exclusive use, the transport index of any package or overpack shall not exceed 10, nor shall the criticality safety index of any package or overpack exceed 50.

4.1.9.1.10 Except for packages or overpacks transported under exclusive use by rail or by road under the conditions specified in 7.2.3.1.2 (a), or under exclusive use and special arrangement by vessel or by air under the conditions specified in 7.2.3.2.1 or 7.2.3.3.3 respectively, the maximum radiation level at any point on any external surface of a package or overpack shall not exceed 2 mSv/h.

4.1.9.1.11 The maximum radiation level at any point on any external surface of a package or overpack under exclusive use shall not exceed 10 mSv/h."

4.1.9.3 Insert a new sub-section to read as follows:

"4.1.9.3 Packages containing fissile material

Unless not classified as fissile in accordance with 2.7.2.3.5, packages containing fissile material shall not contain:

- (a) A mass of fissile material different from that authorized for the package design;
- (b) Any radionuclide or fissile material different from those authorized for the package design; or
- (c) Contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the package design;

as specified in their certificates of approval where appropriate."

Chapter 4.2

Wherever it appears, replace the word "shipper" with "consignor" (*apply to 4.2.1.9.1 (twice), 4.2.2.7.1, 4.2.3.6.1 and 4.2.4.5.5*).

4.2.5.2.6 **T23** For UN 3119, in the entry for Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 38% in diluent type A, add "or type B" after "type A".

Insert the following new entry:

UN No	Substance	Min. test pressure (bar)	Min. shell thickness (mm-reference steel)	Bottom opening requirements	Pressure-relief requirements	Degree of filling	Control temp.	Emergency temp.
3119	tert-Amyl peroxyneodecanoate, not more than 47% in diluent type A						-10	-5

4.2.5.3 Delete TP12.

Add the following new Special Provision:

"TP35 Portable tank instruction T14 prescribed in the Model Regulations annexed to the 14th revised edition of the Recommendations on the Transport of Dangerous Goods may continue to be applied until 31 December 2014."

Chapter 4.3

4.3.2.4 In the heading, delete "*waste*".

4.3.2.4.1 Amend the heading to read "*Bulk transport of animal material of Division 6.2*".

Insert the following new text before the indents:

"Animal material containing infectious substances (UN Nos. 2814, 2900 and 3373) is authorized for transport in bulk containers provided the following conditions are met:".

In (a), replace "For waste goods of UN Nos. 2814 and 2900, sheeted" with "Sheeted" at the beginning.

Amend sub-paragraph (c) to read as follows: "The animal material shall be thoroughly treated with an appropriate disinfectant before loading prior to transport;"

In (d), replace "Waste goods of UN Nos. 2814 and 2900 in a sheeted" with "Sheeted" at the beginning.

In (e), delete "used for the transport of waste goods of UN Nos. 2814 and 2900".

Insert the following new note after the indents:

"NOTE: Additional provisions may be required by appropriate national health authorities."

PART 5

Chapter 5.1

- 5.1.2.1 Add at the end: ", except as required in 5.2.2.1.12."
- 5.1.3.2 Replace "Tanks and intermediate bulk containers" with "Packagings, including IBCs, and tanks".
- 5.1.5.1 Delete. Renumber subsequent paragraphs 5.1.5.2 to 5.1.5.3.3 accordingly.

Consequential amendments:

Section 5.1.5 Amend all references to renumbered paragraphs, as appropriate.

6.4.23.14 (h) Replace "5.1.5.2.2" with "5.1.5.1.2".

6.4.22.2, 6.4.22.3 and 6.4.23.2 (c) Replace "5.1.5.3.1" with "5.1.5.2.1".

5.1.5.2.2 (current 5.1.5.3.2) Delete the second sentence.

5.1.5.3 Insert a new sub-section to read as follows:

"5.1.5.3 Determination of transport index (TI) and criticality safety index (CSI)

5.1.5.3.1 The transport index (TI) for a package, overpack or freight container, or for unpackaged LSA-I or SCO-I, shall 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, freight container, or unpackaged LSA-I and SCO-I. The value determined shall 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 tanks, freight containers and unpackaged LSA-I and SCO-I, the value determined in step (a) above shall be multiplied by the appropriate factor from Table 5.1.5.3.1;
- (c) The value obtained in steps (a) and (b) above shall 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.

Table 5.1.5.3.1: Multiplication factors for tanks, freight containers and unpackaged LSA-I and SCO-I

Size of load ^a	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

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

5.1.5.3.2 The transport index for each overpack, freight container or conveyance shall be determined as either the sum of the TIs 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 shall be determined only as the sum of the TIs of all the packages.

5.1.5.3.3 The criticality safety index for each overpack or freight container shall be determined as the sum of the CSIs of all the packages contained. The same procedure shall be followed for determining the total sum of the CSIs in a consignment or aboard a conveyance.

5.1.5.3.4 Packages and overpacks shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 5.1.5.3.4 and with the following requirements:

- (a) For a package or overpack, both the transport index and the surface radiation level conditions shall 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 shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category;
- (b) The transport index shall be determined following the procedures specified in 5.1.5.3.1 and 5.1.5.3.2;
- (c) If the surface radiation level is greater than 2 mSv/h, the package or overpack shall be transported under exclusive use and under the provisions of 7.2.3.1.3, 7.2.3.2.1, or 7.2.3.3.3, as appropriate;
- (d) A package transported under a special arrangement shall be assigned to category III-YELLOW 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 shall be assigned to category III-YELLOW except when otherwise specified

in the competent authority approval certificate of the country of origin of design (see 2.7.2.4.6).

Table 5.1.5.3.4: Categories of packages and overpacks

Conditions		
Transport index	Maximum radiation level at any point on external surface	Category
0 ^a	Not more than 0.005 mSv/h	I-WHITE
More than 0 but not more than 1 ^a	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 ^b

^a *If the measured TI is not greater than 0.05, the value quoted may be zero in accordance with 5.1.5.3.1(c).*

^b *Shall also be transported under exclusive use."*

Chapter 5.2

5.2.1.5.2 Amend to read as follows:

"5.2.1.5.2 In the case of excepted packages marking the proper shipping name is not required."

5.2.1.7.1 In the third indent, delete "open".

5.2.1.7.2 (a) Insert "except for cryogenic receptacles" after "pressure receptacles".

5.2.1.7.2 (d) Replace "type B(U), B(M) or C" with "type IP-2, type IP-3, type A, type B(U), type B(M) or type C".

5.2.2.1.12.1 In the first sentence, replace "Except as provided for large freight containers and tanks in accordance with 5.3.1.1.5.1" with "Except when enlarged labels are used in accordance with 5.3.1.1.5.1".

5.2.2.1.12.2(d) Replace "See 2.7.6.1.1 and 2.7.6.1.2" with "The number determined in accordance with 5.1.5.3.1 and 5.1.5.3.2".

5.2.2.2.1.1 Replace "They shall have a line of the same colour as the symbol, 5 mm inside the edge and running parallel with it." with "They shall have a line 5 mm inside the edge and running parallel with it. In the upper half of a label the line shall have the same colour as the symbol and in the lower half it shall have the same colour as the figure in the bottom corner."

5.2.2.2.1.2 Replace "ISO 7225:1994" with "ISO 7225:2005" (twice).

5.2.2.2.1.3 Amend to read as follows:

"5.2.2.2.1.3 With the exception of Divisions 1.4, 1.5 and 1.6, the upper half of the label shall contain the pictorial symbol and the lower half shall contain the class or division number (and for goods of Class 1, 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 5.2.2.2.1.5 provided the text does not obscure or detract from the other required label elements."

5.2.2.2.1.6 Insert a new-sub paragraph (c) to read as follows:

"(c) the Division 5.2 label, where the symbol may be shown in white; and"

Consequential amendments:

5.2.2.2.1.6 (b) Delete "and".

5.2.2.2.1.6 (c) Renumber as (d).

5.2.2.2.2 Under the labels for Division 2.1, replace "5.2.2.2.1.6 (c)" with "5.2.2.2.1.6 (d)".

Chapter 5.3

5.3.2.1.2 (a) Amend to read as follows:

"(a) Against a white background in the area below the pictorial symbol and above the class or division number and the compatibility group letter in a manner that does not obscure or detract from the other required label elements (see Figures 5.3.1 and 5.3.2); or".

Chapter 5.4

5.4.1.5.2 Replace "in column 7" by "in column 7a".

5.4.1.5.9 Insert a new paragraph 5.4.1.5.9 to read as follows:

"5.4.1.5.9 *Transport of IBCs or portable tanks after the date of expiry of the last periodic test or inspection*

For transport in accordance with 4.1.2.2 (b), 6.7.2.19.6 (b), 6.7.3.15.6 (b) or 6.7.4.14.6 (b), a statement to this effect shall be included in the transport document, as follows: "Transport in accordance with 4.1.2.2 (b)", "Transport in accordance with 6.7.2.19.6 (b)", "Transport in accordance with 6.7.3.15.6 (b)" or "Transport in accordance with 6.7.4.14.6 (b)" as appropriate."

5.4.2.2 Add the following new sentence at the end: "Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures."

5.4.2.3 Add the following new sub-section:

"5.4.2.3 If the dangerous goods documentation is presented to the carrier by means of electronic data processing (EDP) or electronic data interchange (EDI) transmission techniques, the signature(s) may be replaced by the name(s) (in capitals) of the person authorized to sign."

Chapter 5.5

5.5.2.2 Replace "When the fumigated unit has been ventilated to remove harmful concentrations of fumigant gas, the warning sign shall be removed." with "The marking, as required by this paragraph, shall remain on the unit until the following provisions are met:

- (a) The fumigated unit has been ventilated to remove harmful concentrations of fumigant gas; and
- (b) The fumigated goods or materials have been unloaded."

Figure 5.5.1 In the Fumigation warning sign, insert "VENTILATED ON (date)" before "DO NOT ENTER".

PART 6

6.1.1.4, 6.3.2.2, 6.5.4.1 and 6.6.1.2 At the end, add a new note to read as follows:

"NOTE: ISO 16106:2006 "Packaging – Transport packages for dangerous goods – Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings – Guidelines for the application of ISO 9001" provides acceptable guidance on procedures which may be followed."

Chapter 6.1

6.1.2.6 Insert the new following note after the list:

"NOTE: Plastics materials, is taken to include other polymeric materials such as rubber."

6.1.3.1 (a) Replace the first sentence after the symbol with: "This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5 or 6.6."

6.1.5.1.2 Replace the first sentence with "Each packaging design type shall successfully pass the tests prescribed in this Chapter before being used."

6.1.5.3.4 Amend to read as follows:

"6.1.5.3.4 Target

The target shall be a non-resilient and horizontal surface and shall be:

- Integral and massive enough to be immovable;
- Flat with a surface kept free from local defects capable of influencing the test results;
- Rigid enough to be non-deformable under test conditions and not liable to become damaged by the tests; and
- Sufficiently large to ensure that the test package falls entirely upon the surface.

Chapter 6.2

In the title, replace "**AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES)**" with "**, SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS**".

6.2.1 In the Note, replace "*and small receptacles containing gas (gas cartridges)*" with "*, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas*".

6.2.1.1.6 Replace "Manifolds shall be designed such that they are protected from impact." with "Manifold assemblies (e.g. manifold, valves, and pressure gauges) shall be designed and constructed such that they are protected from impact damage and forces normally encountered in transport. Manifolds shall have at least the same test pressure as the cylinders."

Replace "means shall be provided" with "each pressure receptacle shall have an isolation valve".

6.2.1.1.9 Insert a new paragraph 6.2.1.1.9 with the heading "*Additional requirements for the construction of pressure receptacles for acetylene*" and with the text of the third and fourth sentences of existing 4.1.6.1.2 ("Pressure receptacles for UN 1001 acetylene ... compatible with the pressure receptacles.").

6.2.1.3.1 Amend to read as follows:

"6.2.1.3.1 Valves, piping and other fittings subjected to pressure, excluding pressure relief devices, shall be designed and constructed so that the burst pressure is at least 1.5 times the test pressure of the pressure receptacle."

6.2.1.4 Renumber sub-section 6.2.1.4 as 6.2.1.5 and renumber subsequent paragraphs and cross-references accordingly.

6.2.1.5 Renumber sub-section 6.2.1.5 as 6.2.1.6 and renumber subsequent paragraphs accordingly.

Consequential amendments:

In 4.1.6.1.4, 4.1.6.1.10, 4.2.4.2 and 6.7.5.12.4, replace "6.2.1.5" with "6.2.1.6".

6.2.1.5.1(renumbered 6.2.1.6.1) Add a new paragraph (e) at the end, after the notes, to read as follows:

"(e) Check of service equipment, other accessories and pressure-relief devices, if to be reintroduced into service."

6.2.1.5.2 (renumbered 6.2.1.6.2) Amend to read as follows:

"6.2.1.5.2 Pressure receptacles intended for the transport of UN 1001 acetylene, dissolved and UN 3374 acetylene, solvent free, shall be examined only as specified in 6.2.1.5.1 (a), (c) and (e). In addition the condition of the porous material (e.g. cracks, top clearance, loosening, settlement) shall be examined."

6.2.1.6 Renumber sub-section 6.2.1.6 as 6.2.1.4 and renumber subsequent paragraphs accordingly.

6.2.2.1.3 In the table, delete the last entry (ISO 11118:1999).

6.2.2.2 Add the following new note at the end:

"NOTE: The limitations imposed in ISO 11114-1 on high strength steel alloys at ultimate tensile strength levels up to 1 100 MPa do not apply to SILANE (UN 2203)."

6.2.2.4 Amend the three first entries of the table to read as follows:

ISO 6406:2005	Seamless steel gas cylinders – Periodic inspection and testing
ISO 10461:2005/A1:2006	Seamless aluminium-alloy gas cylinders – Periodic inspection and testing
ISO 10462:2005	Transportable cylinders for dissolved acetylene – Periodic inspection and maintenance

6.2.2.7.1 (a) Replace the first sentence after the symbol with: "This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5 or 6.6."

6.2.4 In the title, replace "**and small receptacles containing gas (gas cartridges)**" with "**, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas**".

6.2.4.1 In the title, insert "*and fuel cell cartridges containing liquefied flammable gas*" after "*(gas cartridges)*".

6.2.4.1.1 In the first sentence, insert "or fuel cell cartridge" after "Each receptacle" at the beginning and insert "or the fuel cell cartridge" after "the receptacle" in the text between brackets.

In the second sentence, insert "or the fuel cell cartridges" after "receptacles" and "or fuel cell cartridge" after "receptacle" respectively.

6.2.4.1.2 Insert "or fuel cell cartridge" after "receptacle" twice.

Chapter 6.3

In the title, replace "**SUBSTANCES**" with "**INFECTIOUS SUBSTANCES OF CATEGORY A**".

Sections 6.3.1 to 6.3.3 Amend to read as follows:

"6.3.1 General

6.3.1.1 The requirements of this Chapter apply to packagings intended for the transport of infectious substances of Category A.

6.3.2 Requirements for packagings

6.3.2.1 The requirements for packagings in this section are based on packagings, as specified in 6.1.4, currently used. In order to take into account progress in science and technology, there is no objection to the use of packagings having specifications different from those in this Chapter provided that they are equally effective, acceptable to the competent authority and able successfully to withstand the tests described in 6.3.5. Methods of testing other than those described in these Regulations are acceptable provided they are equivalent.

6.3.2.2 Packagings shall be manufactured and tested under a quality assurance programme which satisfies the competent authority in order to ensure that each packaging meets the requirements of this Chapter.

6.3.2.3 *Text of existing 6.3.1.3*

6.3.3 Code for designating types of packagings

6.3.3.1 The codes for designating types of packagings are set out in 6.1.2.7.

6.3.3.2 The letters "U" or "W" may follow the packaging code. The letter "U" signifies a special packaging conforming to the requirements of 6.3.5.1.6. The letter "W" signifies that the packaging, although, of the same type indicated by the code is manufactured to a specification different from that in 6.1.4 and is considered equivalent under the requirements of 6.3.2.1."

Add new sections 6.3.4 and 6.3.5 as follows:

"6.3.4 Marking

NOTE 1: *The marking indicates that the packaging which bears it corresponds to a successfully tested design type and that it complies with the requirements of this Chapter which are related to the manufacture, but not to the use, of the packaging.*

NOTE 2: *The marking is intended to be of assistance to packaging manufacturers, reconditioners, packaging users, carriers and regulatory authorities.*

NOTE 3: *The marking does not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, to test reports or to a register of successfully tested packagings.*

6.3.4.1 Each packaging intended for use according to these Regulations shall bear markings which are durable, legible and placed in a location and of such a size relative to the

packaging as to be readily visible. For packages with a gross mass of more than 30 kg, the markings or a duplicate thereof shall appear on the top or on a side of the packaging. Letters, numerals and symbols shall be at least 12 mm high, except for packagings of 30 litres or 30 kg capacity or less, when they shall be at least 6 mm in height and for packagings of 5 litres or 5 kg or less when they shall be of an appropriate size.

6.3.4.2 *Text of existing 6.3.1.1, with the following modifications:*

At the beginning, replace "6.3.2" with "6.3.5".

In (a), add at the end: "This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5 or 6.6;"

In (g), replace "6.3.2.9" with "6.3.5.1.6".

At the end, delete the text after sub-paragraphs (a) to (g).

6.3.4.3 Marking shall be applied in the sequence shown in 6.3.4.2 (a) to (g); each element of the marking required in these sub-paragraphs shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable. For examples, see 6.3.4.4.

Any additional markings authorized by a competent authority shall still enable the parts of the mark to be correctly identified with reference to 6.3.4.1.

6.3.4.4 *Text of existing 6.3.1.2, with the following modifications:*

In the marking, replace "01" with "06".
Replace "6.3.1.1" with "6.3.4.2" (twice).
Replace "(e)," with "(e) and".

6.3.5 *Heading of existing 6.3.2.*

6.3.5.1 *Performance and frequency of tests*

6.3.5.1.1 The design type of each packaging shall be tested as provided in this section in accordance with procedures established by the competent authority.

6.3.5.1.2 Each packaging design type shall successfully pass the tests prescribed in this Chapter before being used. A packaging design type is defined by the design, size, material and thickness, manner of construction and packing, but may include various surface treatments. It also includes packagings which differ from the design type only in their lesser design height.

6.3.5.1.3 Tests shall be repeated on production samples at intervals established by the competent authority.

6.3.5.1.4 Tests shall also be repeated after each modification which alters the design, material or manner of construction of a packaging.

6.3.5.1.5 *Text of existing 6.3.2.7, with the following modifications:*

Replace "of inner packagings or inner packagings of lower net mass" with "or lower net mass of primary receptacles".

Delete ", bags".

6.3.5.1.6 *Text of existing 6.3.2.9, with the following modifications:*

At the beginning, replace "Inner" with "Primary", "intermediate (secondary)" with "secondary" and "outer" with "rigid outer".

In (a), replace "intermediate/outer packaging combination" with "rigid outer packaging", "6.3.2.3" with "6.3.5.2.2" and "inner" with "primary".

In (b), replace "inner" with "primary" (twice).

In (c), replace "inner" with "primary" (seven times) and "intermediate" with "secondary" (twice). Add "spaces" at the end.

In (d), replace "outer" with "rigid outer" and "inner receptacles" with "packagings".

In (e), replace "inner" with "primary" (twice).

In (f), replace "outer" with "rigid outer" and "inner" with "primary" (twice).

In (g), replace "6.3.1.1" with "6.3.4.2" (twice).

6.3.5.1.7 The competent authority may at any time require proof, by tests in accordance with this section, that serially-produced packagings meet the requirements of the design type tests.

6.3.5.1.8 Provided the validity of the test results is not affected and with the approval of the competent authority, several tests may be made on one sample.

6.3.5.2 *Preparation of packagings for testing*

6.3.5.2.1 *Text of existing 6.3.2.2, with the following modifications:*

Replace "98% capacity" with "not less than 98 % of its capacity".

Add a new note at the end to read as follows:

"NOTE: *The term water includes water/antifreeze solution with a minimum specific gravity of 0.95 for testing at – 18 °C."*

6.3.5.2.2 *Tests and number of samples required*

Tests required for packaging types

Type of packaging ^a			Tests required					
Rigid outer packaging	Primary receptacle		Water spray	Cold conditioning	Drop	Additional drop	Puncture	Stack
	Plastics	Other	6.3.5.3.6.1	6.3.5.3.6.2	6.3.5.3	6.3.5.3.6.3	6.3.5.4	6.1.5.6
			No. of samples	No. of samples	No. of samples	No. of samples	No. of samples	
Fibreboard box	x		5	5	10	Required on one sample when the packaging is intended to contain dry ice.	2	Required on three samples when testing a "U"-marked packaging as defined in 6.3.5.1.6 for specific provisions.
		x	5	0	5		2	
Fibreboard drum	x		3	3	6		2	
		x	3	0	3		2	
Plastics box	x		0	5	5		2	
		x	0	5	5		2	
Plastics drum/jerrican	x		0	3	3		2	
		x	0	3	3		2	
Boxes of other material	x		0	5	5		2	
		x	0	0	5		2	
Drums/jerricans of other material	x		0	3	3	2		
		x	0	0	3	2		

^a "Type of packaging" categorizes packagings for test purposes according to the kind of packaging and its material characteristics.

NOTE 1: In instances where a primary receptacle is made of two or more materials, the material most liable to damage determines the appropriate test.

NOTE 2: The material of the secondary packagings are not taken into consideration when selecting the test or conditioning for the test.

Explanation for use of the table:

If the packaging to be tested consists of a fibreboard outer box with a plastics primary receptacle, five samples must undergo the water spray test (see 6.3.5.3.6.1) prior to dropping and another five must be conditioned to – 18 °C (see 6.3.5.3.6.2) prior to dropping. If the packaging is to contain dry ice then one further single sample shall be dropped five times after conditioning in accordance with 6.3.5.3.6.3.

Packagings prepared as for transport shall be subjected to the tests in 6.3.5.3 and 6.3.5.4. For outer packagings, the headings in the table relate to fibreboard or similar materials whose performance may be rapidly affected by moisture; plastics which may embrittle at low temperature; and other materials such as metal whose performance is not affected by moisture or temperature.

6.3.5.3 *Drop test*

6.3.5.3.1 Samples shall be subjected to free-fall drops from a height of 9 m onto a non-resilient, horizontal, flat, massive and rigid surface in conformity with 6.1.5.3.4.

6.3.5.3.2 Where the samples are in the shape of a box; five shall be dropped one in each of the following orientations:

- (a) flat on the base;
- (b) flat on the top;
- (c) flat on the longest side;
- (d) flat on the shortest side;
- (e) on a corner.

6.3.5.3.3 Where the samples are in the shape of a drum, three shall be dropped one in each of the following orientations:

- (a) diagonally on the top chime, with the centre of gravity directly above the point of impact;
- (b) diagonally on the base chime;
- (c) flat on the side.

6.3.5.3.4 While the sample shall be released in the required orientation, it is accepted that for aerodynamic reasons the impact may not take place in that orientation.

6.3.5.3.5 Following the appropriate drop sequence, there shall be no leakage from the primary receptacle(s) which shall remain protected by cushioning/absorbent material in the secondary packaging.

6.3.5.3.6 *Special preparation of test sample for the drop test*

6.3.5.3.6.1 *Fibreboard - Water spray test*

Fibreboard outer packagings: The sample shall be subjected to a water spray that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour. It shall then be subjected to the test described in 6.3.5.3.1.

6.3.5.3.6.2 *Plastics material – Cold conditioning*

Plastics primary receptacles or outer packagings: The temperature of the test sample and its contents shall be reduced to -18 °C or lower for a period of at least 24 hours and within 15 minutes of removal from that atmosphere the test sample shall be subjected to the test described in 6.3.5.3.1. Where the sample contains dry ice, the conditioning period shall be reduced to 4 hours.

6.3.5.3.6.3 *Packagings intended to contain dry ice – Additional drop test*

Where the packaging is intended to contain dry ice, a test additional to that specified in 6.3.5.3.1 and, when appropriate, in 6.3.5.3.6.1 or 6.3.5.3.6.2 shall be carried out. One sample shall be stored so that all the dry ice dissipates and then that sample shall be dropped in one of the orientations described in 6.3.5.3.2 which shall be that most likely to result in failure of the packaging.

6.3.5.4 *Puncture test*

6.3.5.4.1 *Packagings with a gross mass of 7 kg or less*

Text of existing 6.3.2.6 (a), with the following modification:

Replace "not exceeding 38 mm" with "of 38 mm".

6.3.5.4.2 *Packagings with a gross mass exceeding 7 kg*

Text of existing 6.3.2.6 (b), with the following modifications:

In the fourth sentence, replace "the primary receptacle(s) and the outer surface" with "the centre of the primary receptacle(s) and the outer surface".

In the fifth sentence, insert "with its top face lowermost" before "in a vertical free fall".

In the last but one sentence, replace "the steel rod would penetrate" with "the steel rod would be capable of penetrating".

In the last sentence, replace "there shall be no leakage" with "penetration of the secondary packaging is acceptable provided that there is no leakage".

6.3.5.5 *Heading of existing 6.3.3*

6.3.5.5.1 *Text of existing 6.3.3.1, with the following modifications:*

At the beginning, insert "written" before "test report".

In the 4th indent, replace "the test report" with "the test and of the report".

Amend the 8th indent to read as follows: "8. Test contents;".

6.3.5.5.2 *Text of existing 6.3.3.2."*

Chapter 6.4

6.4.5.4.1 (b) Amend to read as follows:

"(b) They are designed to satisfy the requirements prescribed for packing group I or II in Chapter 6.1 of these Regulations; and".

6.4.5.4.2 (b) Amend to read as follows:

"(b) They are designed to satisfy the requirements prescribed in Chapter 6.7 of these Regulations and are capable of withstanding a test pressure of 265 kPa; and".

6.4.5.4.3 Replace "that they conform to standards at least equivalent to those prescribed in 6.4.5.4.2." with "that:

- (a) They satisfy the requirements of 6.4.5.1;
- (b) They are designed to satisfy the requirements prescribed in regional or national regulations for the transport of dangerous goods and are capable of withstanding a test pressure of 265 kPa; and
- (c) They are designed so that any additional shielding which is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing an increase of more than 20% in the maximum radiation level at any external surface of the tanks."

6.4.5.4.4 In the first sentence, insert "of a permanent enclosed character" after "Freight containers".

6.4.5.4.5 (b) Amend the text before (i) and (ii) to read as follows:

"(b) They are designed to satisfy the requirements prescribed in Chapter 6.5 of these Regulations for packing group I or II, and if they were subjected to the tests prescribed in that Chapter, but with the drop test conducted in the most damaging orientation, they would prevent:".

6.4.11.2 In the first sentence, replace "of this paragraph" with "of 2.7.2.3.5". Delete subparagraphs (a) to (d) and Table 6.4.11.2.

6.4.11.13 Add a new sub-section to read as follows:

"6.4.11.13 The criticality safety index (CSI) for packages containing fissile material shall be obtained by dividing the number 50 by the smaller of the two

values of N derived in 6.4.11.11 and 6.4.11.12 (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).".

6.4.23.14 (o) Insert "6.4.8.4," before "6.4.8.5".

6.4.23.15 Add at the end "under 6.4.22.2, 6.4.22.3, 6.4.22.4, 6.4.24.2 and 6.4.24.3".

Chapter 6.5

6.5.1.2 In the definition of *Plastics*, insert "*material*" after "*Plastics*" and delete ", etc".

6.5.2.1.1 (a) Insert a new sentence after the symbol to read as follows: "This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5 or 6.6.".

6.5.2.2.1 Add the following new entry to the table and the following new note b after the table:

Additional marking	Category of IBC				
	Metal	Rigid Plastics	Composite	Fibreboard	Wooden
Maximum permitted stacking load ^b	X	X	X	X	X

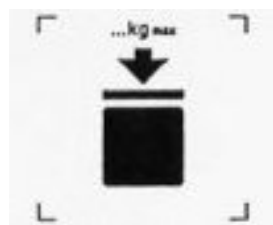
^b See 6.5.2.2.2.

Add the following new note, at the end:

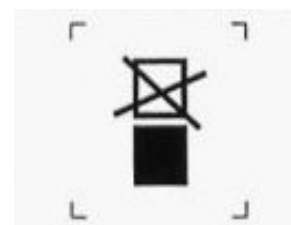
"NOTE: *This additional marking shall apply to all IBCs manufactured, repaired or remanufactured as from 1 January 2011.*".

6.5.2.2.2 Add a new 6.5.2.2.2 to read as follows and renumber subsequent paragraphs accordingly:

"6.5.2.2.2 The maximum permitted stacking load applicable when the IBC is in use shall be displayed on a symbol as follows:



IBCs capable of being stacked



IBCs NOT capable of being stacked

The symbol shall be not less than 100 mm × 100 mm, be durable and clearly visible. The letters and numbers indicating the mass shall be at least 12 mm high.

The mass marked above the symbol shall not exceed the load imposed during the design type test (see 6.5.6.6.4) divided by 1.8.

NOTE: The provisions of 6.5.2.2.2 shall apply to all IBCs manufactured, repaired or remanufactured as from 1 January 2011."

6.5.4.4.2 In the first sentence, add "at least equally effective as the test prescribed in 6.5.6.7.3" after "a suitable leakproofness test". After the sub-paragraphs (a) and (b), replace "For this test the IBC need not have its closures fitted." with "For this test the IBC shall be fitted with the primary bottom closure."

6.5.6.1.1 Replace the first sentence with "Each IBC design type shall successfully pass the tests prescribed in this Chapter before being used."

6.5.6.3.5 Replace the seven first columns with the following new eight first columns (3 last columns unchanged):

Type of IBC	Vibration ^f	Bottom lift	Top lift ^a	Stacking ^b	Leak-proofness	Hydraulic pressure	Drop
Metal:							
11A, 11B, 11N	-	1st ^a	2nd	3rd	-	-	4th ^e
21A, 21B, 21N	-	1st ^a	2nd	3rd	4th	5th	6th ^e
31A, 31B, 31N	1st	2nd ^a	3rd	4th	5th	6th	7th ^e
Flexible ^d	-	-	x ^c	x	-	-	x
Rigid plastics:							
11H1, 11H2	-	1st ^a	2nd	3rd	-	-	4th
21H1, 21H2	-	1st ^a	2nd	3rd	4th	5th	6th
31H1, 31H2	1st	2nd ^a	3rd	4th	5th	6th	7th
Composite:							
11HZ1, 11HZ2	-	1st ^a	2nd	3rd	-	-	4th ^e
21HZ1, 21HZ2	-	1st ^a	2nd	3rd	4th	5th	6th ^e
31HZ1, 31HZ2	1st	2nd ^a	3rd	4th	5th	6th	7th ^e
Fibreboard	-	1st	-	2nd	-	-	3rd
Wooden	-	1st	-	2nd	-	-	3rd

Insert a new note f after the table to read as follows:

^f *Another IBC of the same design may be used for the vibration test."*

6.5.6.5.5 (a) Amend to read as follows:

"(a) Metal, rigid plastics and composite IBCs: the IBC remains safe for normal conditions of transport, there is no observable permanent deformation of the IBC, including the base pallet, if any, and no loss of contents;"

- 6.5.6.7.3 Delete the last sentence.
- 6.5.6.9.3 Amend the first sentence to read as follows: "The IBC shall be dropped on its base onto a non-resilient, horizontal, flat, massive and rigid surface in conformity with the requirements of 6.1.5.3.4, in such a manner as to ensure that the point of impact is that part of the base of the IBC considered to be the most vulnerable."
- 6.5.6.9.5 Add a new sub-paragraph (d) to read as follows:
- "(d) All IBCs: no damage which renders the IBC unsafe to be transported for salvage or for disposal, and no loss of contents. In addition, the IBC shall be capable of being lifted by an appropriate means until clear of the floor for five minutes."

6.5.6.13 Add a new 6.5.6.13 to read as follows and renumber the subsequent paragraphs accordingly:

"6.5.6.13 *Vibration test*

6.5.6.13.1 *Applicability*

For all IBCs used for liquids, as a design type test.

NOTE: This test applies to design types for IBCs manufactured after 31 December 2010.

6.5.6.13.2 *Preparation of the IBC for test*

A sample IBC shall be selected at random and shall be fitted and closed as for transport. The IBC shall be filled with water to not less than 98% of its maximum capacity.

6.5.6.13.3 *Test method and duration*

6.5.6.13.3.1 The IBC shall be placed in the center of the test machine platform with a vertical sinusoidal, double amplitude (peak-to peak displacement) of 25 mm \pm 5%. If necessary, restraining devices shall be attached to the platform to prevent the specimen from moving horizontally off the platform without restricting vertical movement.

6.5.6.13.3.2 The test shall be conducted for one hour at a frequency that causes part of the base of the IBC to be momentarily raised from the vibrating platform for part of each cycle to such a degree that a metal shim can be completely inserted intermittently at, at least, one point between the base of the IBC and the test platform. The frequency may need to be adjusted after the initial set point to prevent the packaging from going into resonance. Nevertheless, the test frequency shall continue to allow placement of the metal shim under the IBC as described in this paragraph. The continuing ability to insert the metal shim is essential to passing the test. The metal shim used for this test shall be at least 1.6 mm thick, 50 mm wide, and be of sufficient length to be inserted between the IBC and the test platform a minimum of 100 mm to perform the test.

6.5.6.13.4 *Criteria for passing the test*

No leakage or rupture shall be observed. In addition, no breakage or failure of structural components, such as broken welds or failed fastenings, shall be observed."

Consequential amendments:

6.5.6.2.1 *Replace "6.5.6.12" by "6.5.6.13".*

6.5.6.2.3 *Replace "6.5.6.13" by "6.5.6.14".*

Chapter 6.6

6.6.3.1 (a) Insert a new sentence after the symbol to read as follows: "This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5 or 6.6."

6.6.5.1.2 Replace the first sentence with "Each large packaging design type shall successfully pass the tests prescribed in this Chapter before being used."

6.6.5.3.4.3 Amend the text after the heading to read as follows: "The large packaging shall be dropped onto a non resilient, horizontal, flat, massive and rigid surface in conformity with the requirements of 6.1.5.3.4, in such a manner as to ensure that the point of impact is that part of the base of the large packaging considered to be the most vulnerable."

Chapter 6.7

6.7.4.14.4 In the last sentence, insert "and tests" after "periodic inspection".

6.7.4.14.5 Delete.

6.7.5.3.2 In the last sentence, replace "isolated by a valve assemblies of not more than 3000 litres" with "divided into groups of not more than 3000 litres each isolated by a valve".

6.7.5.4.1 Replace "shall be isolated by a valve into assemblies of not more than 3000 litres. Each assembly shall be fitted" with "divided into groups of not more than 3000 litres each isolated by a valve. Each group shall be fitted".

PART 7

Chapter 7.1

7.1.3.2.3 Replace "and inorganic nitrates of Class 5.1 (UN Nos. 1942 and 2067)" with "(UN Nos. 1942 and 2067) and alkali metal nitrates (e.g. UN 1486) and alkaline earth metal nitrates (e.g. UN 1454)".
