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

Sub-Committee of Experts on the Transport of Dangerous Goods

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PACKAGINGS (INCLUDING IBC'S AND LARGE PACKAGINGS)

Evaluation of the United Nations packaging requirements

Transmitted by the expert from the Netherlands

Introduction

1. The Netherlands proposal ST/SG/AC.10/C.3/2004/70 was discussed by the Sub-Committee at its twenty-fifth session and a number of delegates supported the document, but some delegates indicated that they had comments, which had not been communicated yet. It was decided to have an informal meeting to inform the expert from the Netherlands about these comments, so that the expert from the Netherlands could make a proposal to the Sub-Committee how to proceed further.

2. During this informal meeting it became clear that some delegates considered some of the proposed changes not of an editorial nature and these changes would raise such a discussion that it was foreseen that no decision could be made during the present session of the Sub-Committee.

3. The Netherlands has thus decided to delete those changes in the proposal ST/SG/AC.10/C.3/2004/70, which were not considered editorial during the informal meeting. Further the comments made by the expert from Belgium in document UN/SCETDG/25/INF.70 were taken into account.

It is important to note that, with regard to Chapter 6.3, the general opinion at the informal meeting was that, in addition to the changes as proposed by the Netherlands concerning chapter 6.3, further changes of contents (non-editorial) are necessary. This revision of chapter 6.3 could be part of the working program of the Sub-Committee in the next biennium.

4. In this document all editorial changes are given, based on ST/SG/AC.10/C.3/2004/70 and the outcome of the discussion at the informal meeting.

All amendments, where new text is shown by a different colour + underlining and text to be deleted by a strike out, are integrated in the current text of Part 4 and Part 6 of the 13th revised edition of the 'Orange Book' and are accompanied, between brackets and in italics, with a short explanation.

Proposal

4. The Sub-Committee is invited to consider the proposed amendments given in the Annex, where Part I of this Annex contains the amendments to Part 6 and Part II the amendments to Part 4, in conjunction with proposal ST/SG/AC.10/C.3/2004/67 and take action as deemed appropriate.

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CHAPTER 6.1

**REQUIREMENTS FOR THE CONSTRUCTION
AND TESTING OF PACKAGINGS
(OTHER THAN FOR DIVISION 6.2 SUBSTANCES)**

6.1.1 General

6.1.1.1 The requirements of this Chapter do not apply to:

- (a) Packages containing radioactive material, which shall comply with the Regulations of the International Atomic Energy Agency (IAEA), except that:
 - (i) Radioactive material possessing other dangerous properties (subsidiary risks) shall also comply with special provision 172; and
 - (ii) Low specific activity (LSA) material and surface contaminated objects (SCO) may be carried in certain packagings defined in these Regulations provided that the supplementary provisions set out in the IAEA Regulations are also met;
- (b) Pressure receptacles;
- (c) Packages whose net mass exceeds 400 kg;
- (d) Packagings with a capacity exceeding 450 litres.

* * *

6.1.3.1 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.

The marking shall show:

- (a) The United Nations packaging symbol



This shall not be used for any purpose other than certifying that a packaging complies with the relevant regulations in this Chapter. For embossed metal packagings the capital letters "UN" may be applied as the symbol;

- (b) The code designating the type of packaging according to 6.1.2;
- (c) A code in two parts:
 - (i) a letter designating the packing group(s) for which the design type has been successfully tested:

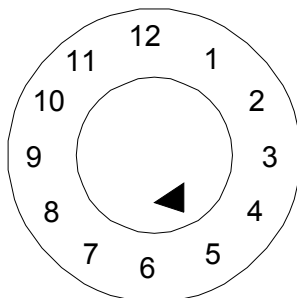
X for packing groups I, II and III

Y for packing groups II and III

Z for packing group III only;

- (ii) the relative density, rounded off to the first decimal, for which the design type has been tested for packagings without inner packagings intended to contain liquids; this may be omitted when the relative density does not exceed 1.2. For packagings intended to contain solids or inner packagings, the maximum gross mass in kilograms;

- (d) Either the letter "S" denoting that the packaging is intended for the transport of solids or inner packagings or, for packagings (other than combination packagings) intended to contain liquids, the hydraulic test pressure which the packaging was shown to withstand in kPa rounded down to the nearest 10 kPa;
- (e) The last two digits of the year during which the packaging was manufactured. Packagings of types IH and 3H shall also be appropriately marked with the month of manufacture; this may be marked on the packaging in a different place from the remainder of the marking. An appropriate method is:



- (f) The State authorizing the allocation of the mark, indicated by the distinguishing sign for motor vehicles in international traffic;
- (g) The name of the manufacturer or other identification of the packaging specified by the competent authority.

* * *

6.1.4.18 *Paper bags*

5M1 multiwall

5M2 multiwall, water resistant

6.1.4.18.1 Bags shall be made of a suitable kraft paper or of an equivalent paper with at least three plies, the middle ply of which may be net-cloth with adhesive bonding to the outer ply. The strength of

the paper and the construction of the bags shall be appropriate to the capacity of the bag and to its intended use. Joins and closures shall be sift-proof.

6.1.4.18.2 Bags 5M2: to prevent the entry of moisture, a bag of four plies or more shall be made waterproof by the use of either a water resistant ply as one of the two outermost plies or a water resistant barrier made of a suitable protective material between the two outermost plies; a bag of three plies shall be made waterproof by the use of a water resistant ply as the outermost ply. Where there is a danger of the substance contained reacting with moisture or where it is packed damp, a waterproof ply or barrier, such as double-tarred kraft paper, plastics-coated kraft paper, plastics film bonded to the inner surface of the bag, or one or more inner plastics liners, shall also be placed next to the substance. Joins and closures shall be waterproof.

6.1.4.18.3 Maximum net mass: 50 kg

* * *

6.1.5 Test requirements for packagings

6.1.5.1 *Performance and frequency of tests*

6.1.5.1.1 The design type of each packaging shall be tested as provided in 6.1.5 in accordance with procedures established by the competent authority.

6.1.5.1.2 Tests shall be successfully performed on each packaging design type before such packaging is 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.

6.1.5.1.3 Tests shall be repeated on production samples at intervals established by the competent authority. For such tests on paper or fibreboard packagings, preparation at ambient conditions is considered equivalent to the requirements of 6.1.5.2.3.

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

6.1.5.1.5 The competent authority may permit the selective testing of packagings that differ only in minor respects from a tested type, e.g. smaller sizes of inner packagings or inner packagings of lower net mass; and packagings such as drums, bags and boxes which are produced with small reductions in external dimension(s).

6.1.5.1.6 will be moved to chapter 4.1 as new 4.1.1.5.2 (This part is meant for the user, a reference to 4.1.1.5.2 will be retained)

6.1.5.1.6 The conditions for assembling different inner packagings in an outer packaging and permissible variations in inner packagings, see 4.1.1.5.2.

~~6.1.5.1.6 — Where an outer packaging of a combination packaging has been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this outer packaging. In addition, provided an equivalent level of performance is maintained, the following variations in inner packagings are allowed without further testing of the package:~~

~~(a) — Inner packagings of equivalent or smaller size may be used provided:~~

~~(i) — The inner packagings are of similar design to the tested inner packagings (e.g. shape—round, rectangular, etc.);~~

~~(ii) — The material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;~~

~~(iii) — The inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.);~~

~~(iv) — Sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and~~

~~(v) — Inner packagings are oriented within the outer packaging in the same manner as in the tested package.~~

~~(b) — A lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in (a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.~~

6.1.5.1.7 Articles or inner packagings of any type for solids or liquids may be assembled and transported without testing in an outer packaging under the following conditions:

(a) The outer packaging shall have been successfully tested in accordance with 6.1.5.3 with fragile (e.g. glass) inner packagings containing liquids using the packing group I drop height;

(b) The total combined gross mass of inner packagings shall not exceed one half the gross mass of inner packagings used for the drop test in (a) above;

(c) The thickness of cushioning material between inner packagings and between inner packagings and the outside of the packaging shall not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single inner packaging was used in the original test, the thicknesses of cushioning between inner packagings shall not be less than the thickness of cushioning between the outside of the packaging and the inner packaging in the original test. If either fewer or smaller inner packagings are used (as compared to the inner packagings used in the drop test), sufficient additional cushioning material shall be used to take up void spaces;

(d) The outer packaging shall have passed successfully the stacking test in 6.1.5.6 while empty. The total mass of identical packages shall be based on the combined mass of inner packagings used for the drop test in (a) above;

(e) Inner packagings containing liquids shall be completely surrounded with a sufficient quantity of absorbent material to absorb the entire liquid contents of the inner packagings;

- (f) If the outer packaging is intended to contain inner packagings for liquids and is not leakproof, or is intended to contain inner packagings for solids and is not siftproof, a means of containing any liquid or solid contents in the event of leakage shall be provided in the form of a leakproof liner, plastics bag or other equally efficient means of containment. For packagings containing liquids, the absorbent material required in (e) above shall be placed inside the means of containing the liquid contents;
- (g) For air transport, packagings shall comply with 4.1.1.4.1;
- (h) Packagings shall be marked in accordance with 6.1.3 as having been tested to packing group I performance for combination packagings. The marked gross mass in kilograms shall be the sum of the mass of the outer packaging plus one half of the mass of the inner packaging(s) as used for the drop test referred to in (a) above. Such a packaging mark shall also contain a letter "V" as described in 6.1.2.4.

6.1.5.1.8 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.

6.1.5.1.9 If an inner treatment or coating is required for safety reasons, it shall retain its protective properties even after the tests.

6.1.5.1.10 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.

6.1.5.1.11 *Salvage packagings*

Salvage packagings (see 1.2.1) shall be tested and marked in accordance with the provisions applicable to packing group II packagings intended for the transport of solids or inner packagings, except as follows:

- (a) The test substance used in performing the tests shall be water, and the packagings shall be filled to not less than 98% of their maximum capacity. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total package mass so long as they are placed so that the test results are not affected. Alternatively, in performing the drop test, the drop height may be varied in accordance with 6.1.5.3.5 (b);
- (b) Packagings shall, in addition, have been successfully subjected to the leakproofness test at 30 kPa, with the results of this test reflected in the test report required by 6.1.5.7; and
- (c) Packagings shall be marked with the letter "T" as described in 6.1.2.4.

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CHAPTER 6.5

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF INTERMEDIATE BULK CONTAINERS

6.5.1 General requirements ~~applicable to all types of IBCs (Heading was changed because of changes made in 6.5.1)~~

[...]

6.5.1.5 ~~Construction requirements (This part has been moved to 6.5.3 (All construction requirements are put in 6.5.3))~~

~~6.5.1.5.1 IBCs shall be resistant to or adequately protected from deterioration due to the external environment.~~

~~6.5.1.5.2 IBCs shall be so constructed and closed that none of the contents can escape under normal conditions of transport including the effect of vibration, or by changes in temperature, humidity or pressure.~~

~~6.5.1.5.3 IBCs and their closures shall be constructed of materials compatible with their contents, or be protected internally, so that they are not liable:~~

- ~~(a) To be attacked by the contents so as to make their use dangerous;~~
- ~~(b) To cause the contents to react or decompose, or form harmful or dangerous compounds with the IBCs.~~

~~6.5.1.5.4 Gaskets, where used, shall be made of materials not subject to attack by the contents of the IBCs.~~

~~6.5.1.5.5 All service equipment shall be so positioned or protected as to minimize the risk of escape of the contents owing to damage during handling and transport.~~

~~6.5.1.5.6 IBCs, their attachments and their service and structural equipment shall be designed to withstand, without loss of contents, the internal pressure of the contents and the stresses of normal handling and transport. IBCs intended for stacking shall be designed for stacking. Any lifting or securing features of IBCs shall be of sufficient strength to withstand the normal conditions of handling and transport without gross distortion or failure and shall be so positioned that no undue stress is caused in any part of the IBC.~~

~~6.5.1.5.7 Where an IBC consists of a body within a framework it shall be so constructed that:~~

- ~~(a) The body does not chafe or rub against the framework so as to cause material damage to the body;~~
- ~~(b) The body is retained within the framework at all times;~~
- ~~(c) The items of equipment are fixed in such a way that they cannot be damaged if the connections between body and frame allow relative expansion or movement.~~

~~6.5.1.5.8~~ — Where a bottom discharge valve is fitted, it shall be capable of being made secure in the closed position and the whole discharge system shall be suitably protected from damage. Valves having lever closures shall be able to be secured against accidental opening and the open or closed position shall be readily apparent. For IBCs containing liquids, a secondary means of sealing the discharge aperture shall also be provided, e.g. by a blank flange or equivalent device.

~~6.5.1.5.9~~ — Each IBC shall be capable of passing the relevant performance tests.

~~**6.5.1.6 Testing, certification and inspection** *This part has been moved to 6.5.4 (All test requirements are put in 6.5.4)*~~

~~6.5.1.6.1~~ — *Quality assurance:* the IBCs shall be manufactured and tested under a quality assurance programme which satisfies the competent authority, in order to ensure that each manufactured IBC meets the requirements of this Chapter.

~~6.5.1.6.2~~ — *Test requirements:* IBCs shall be subject to design type tests and, if applicable, to initial and periodic tests in accordance with 6.5.4.14.

~~6.5.1.6.3~~ — *Certification:* in respect of each design type of IBC a certificate and mark (as in 6.5.2) shall be issued attesting that the design type including its equipment meets the test requirements.

~~6.5.1.6.4~~ — *Inspection:* every metal, rigid plastics and composite IBCs shall be inspected to the satisfaction of the competent authority:

~~(a)~~ — Before it is put into service, and thereafter at intervals not exceeding five years, with regard to:

~~(i)~~ — conformity to design type including marking;

~~(ii)~~ — internal and external condition;

~~(iii)~~ — proper functioning of service equipment;

~~Thermal insulation, if any, need be removed only to the extent necessary for a proper examination of the body of the IBC;~~

~~(b)~~ — At intervals of not more than two and a half years, with regard to:

~~(i)~~ — external condition;

~~(ii)~~ — proper functioning of service equipment;

~~Thermal insulation, if any, need be removed only to the extent necessary for a proper examination of the body of the IBC.~~

~~— A report of each inspection shall be kept by the owner of the IBC at least until the next inspection. The report shall include the results of the inspection and shall identify the party performing the inspection (see also the marking requirements in 6.5.2.2.1).~~

~~6.5.1.6.5~~ — When an IBC is impaired as a result of impact (e.g. accident) or any other cause, it shall be repaired or otherwise maintained (see definition of "*Routine maintenance of IBCs*" in 1.2.1), so as to

~~conform to the design type. The bodies of rigid plastics IBCs and the inner receptacles of composite IBCs that are impaired shall be replaced.~~

~~6.5.1.6.6 — *Repaired IBCs*~~

~~6.5.1.6.6.1 — In addition to any other testing and inspection requirements in these Regulations, an IBC shall be subjected to the full testing and inspection requirements set out in 6.5.4.14.3 and 6.5.1.6.4 (a), and the required reports shall be prepared, whenever it is repaired.~~

~~6.5.1.6.6.2 — The Party performing the tests and inspections after the repair shall durably marking the IBC near the manufacturer's UN design type marking to show:~~

- ~~(a) — the State in which the repair was carried out;~~
- ~~(b) — the name or authorized symbol of the party performing the repair; and~~
- ~~(c) — the date (month and year) of the tests and inspections.~~

~~6.5.1.6.6.3 — Test and inspections performed in accordance with 6.5.1.6.6.1 may be considered to satisfy the requirements for the two and a half and five year periodic tests and inspections.~~

~~6.5.1.6.7 — The competent authority may at any time require proof, by tests in accordance with this Chapter, that IBCs meet the requirements of the design type tests.~~

6.5.3 Construction Specific requirements for IBCs (This chapter now includes 6.5.1.5)

6.5.3.1 General requirements for IBCs

6.5.3.1.1 IBCs shall be resistant to or adequately protected from deterioration due to the external environment.

6.5.3.1.2 IBCs shall be so constructed and closed that none of the contents can escape under normal conditions of transport including the effect of vibration, or by changes in temperature, humidity or pressure.

6.5.3.1.3 IBCs and their closures shall be constructed of materials compatible with their contents, or be protected internally, so that they are not liable:

- (a) To be attacked by the contents so as to make their use dangerous;
- (b) To cause the contents to react or decompose, or form harmful or dangerous compounds with the IBCs.

6.5.3.1.4 Gaskets, where used, shall be made of materials not subject to attack by the contents of the IBCs.

6.5.3.1.5 All service equipment shall be so positioned or protected as to minimize the risk of escape of the contents owing to damage during handling and transport.

6.5.3.1.6 IBCs, their attachments and their service and structural equipment shall be designed to withstand, without loss of contents, the internal pressure of the contents and the stresses of normal

handling and transport. IBCs intended for stacking shall be designed for stacking. Any lifting or securing features of IBCs shall be of sufficient strength to withstand the normal conditions of handling and transport without gross distortion or failure and shall be so positioned that no undue stress is caused in any part of the IBC.

6.5.3.1.7 Where an IBC consists of a body within a framework it shall be so constructed that:

- (a) The body does not chafe or rub against the framework so as to cause material damage to the body;
- (b) The body is retained within the framework at all times;
- (c) The items of equipment are fixed in such a way that they cannot be damaged if the connections between body and frame allow relative expansion or movement.

6.5.3.1.8 Where a bottom discharge valve is fitted, it shall be capable of being made secure in the closed position and the whole discharge system shall be suitably protected from damage. Valves having lever closures shall be able to be secured against accidental opening and the open or closed position shall be readily apparent. For IBCs containing liquids, a secondary means of sealing the discharge aperture shall also be provided, e.g. by a blank flange or equivalent device.

~~6.5.3.1.9 Each IBC shall be capable of passing the relevant performance tests.~~
~~(6.5.3.1.9 has been deleted as this subject is already covered in 4.1.1.9)~~

(All subsequent paragraphs of chapter 6.5.3 will have to be renumbered)

6.5.4—Test requirements for IBCs (This chapter now includes 6.5.1.6)

6.5.4 Testing, certification and inspection

6.5.4.1 *Quality assurance:* the IBCs shall be manufactured and tested under a quality assurance programme which satisfies the competent authority, in order to ensure that each manufactured IBC meets the requirements of this Chapter.

6.5.4.2 *Test requirements:* IBCs shall be subject to design type tests and, if applicable, to initial and periodic tests in accordance with 6.5.4.14.

6.5.4.3 *Certification:* in respect of each design type of IBC a certificate and mark (as in 6.5.2) shall be issued attesting that the design type including its equipment meets the test requirements.

6.5.4.4 *Inspection:* every metal, rigid plastics and composite IBCs shall be inspected to the satisfaction of the competent authority:

- (a) Before it is put into service, and thereafter at intervals not exceeding five years, with regard to:
 - (i) conformity to design type including marking;
 - (ii) internal and external condition;
 - (iii) proper functioning of service equipment;

Thermal insulation, if any, need be removed only to the extent necessary for a proper examination of the body of the IBC;

(b) At intervals of not more than two and a half years, with regard to:

(i) external condition;

(ii) proper functioning of service equipment;

Thermal insulation, if any, need be removed only to the extent necessary for a proper examination of the body of the IBC.

A report of each inspection shall be kept by the owner of the IBC at least until the next inspection. The report shall include the results of the inspection and shall identify the party performing the inspection (see also the marking requirements in 6.5.2.2.1).

6.5.4.5 When an IBC is impaired as a result of impact (e.g. accident) or any other cause, it shall be repaired or otherwise maintained (see definition of "Routine maintenance of IBCs" in 1.2.1), so as to conform to the design type. The bodies of rigid plastics IBCs and the inner receptacles of composite IBCs that are impaired shall be replaced.

6.5.4.6 Repaired IBCs

6.5.4.6.1 In addition to any other testing and inspection requirements in these Regulations, an IBC shall be subjected to the full testing and inspection requirements set out in 6.5.4.14.3 and 6.5.4.4 (a), and the required reports shall be prepared, whenever it is repaired.

6.5.4.6.2 The Party performing the tests and inspections after the repair shall durably marking the IBC near the manufacturer's UN design type marking to show:

(a) the State in which the repair was carried out;

(b) the name or authorized symbol of the party performing the repair; and

(c) the date (month and year) of the tests and inspections.

6.5.4.6.3 Test and inspections performed in accordance with 6.5.4.6.1 may be considered to satisfy the requirements for the two and a half and five-year periodic tests and inspections.

6.5.4.7 The competent authority may at any time require proof, by tests in accordance with this Chapter, that IBCs meet the requirements of the design type tests.

(All subsequent paragraphs of chapter 6.5.4 will have to be renumbered)

6.5.4.5.5 Criteria for passing the test

(a) Metal, rigid plastics and composite IBCs: no permanent deformation which renders the IBC, including the base pallet, if any, unsafe for transport and no loss of contents;

- (b) Flexible IBCs: no damage to the IBC or its lifting devices which renders the IBC unsafe for transport or handling and no loss of contents. *(This addition makes the criterion consistent with criteria of other tests).*

CHAPTER 6.6

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF LARGE PACKAGINGS

[...]

(6.6.5.1.6 will be moved to chapter 4.1 as new 4.1.1.5.2 (this part is meant for the user, a reference to 4.1.1.5.2 will be retained))

6.6.5.1.6 The conditions for assembling different inner packagings in a large packaging and permissible variations in inner packagings, see 4.1.1.5.2.

~~6.6.5.1.6 Where a large packaging has been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this large packaging. In addition, provided an equivalent level of performance is maintained, the following variations in inner packagings are allowed without further testing of the package:~~

~~(a) Inner packagings of equivalent or smaller size may be used provided:~~

~~(i) The inner packagings are of similar design to the tested inner packagings (e.g. shape—round, rectangular, etc);~~

~~(ii) The material of construction of the inner packagings (glass, plastics, metal etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;~~

~~(iii) The inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc);~~

~~(iv) Sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and~~

~~(v) Inner packagings are oriented within the large packagings in the same manner as in the tested package;~~

~~(b) A lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in (a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.~~

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

6.6.5.1.8 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.

(6.6.5.2.2 is the same as the provision for IBCs, par. 6.5.4.1.3)

6.6.5.2.2 In the drop tests for liquids, when another substance is used, its relative density and viscosity shall be similar to those of the substance to be carried. Water may also be used for the liquid drop test under the following conditions:

- (a) Where the substances to be carried have a relative density not exceeding 1.2, the drop heights shall be those shown on the table in 6.6.5.3.4.4;
- (b) Where the substances to be carried have a relative density exceeding 1.2, the drop heights shall be calculated on the basis of the relative density (d) of the substance to be carried rounded up to the first decimal as follows:

<u>Packing group I</u>	<u>Packing group II</u>	<u>Packing group III</u>
<u>d x 1.5 m</u>	<u>d x 1.0 m</u>	<u>d x 0.67 m</u>

Renumber 6.5.2.2 to 6.5.2.3 and 6.6.5.2.3 to 6.6.5.2.4

6.6.5.3.2.4 Criteria for passing the test (Criteria are similar to IBCs, par. 6.5.4.5.5)

~~No permanent deformation which renders the large packagings unsafe for transport and no loss of contents.~~

- (a) All types of large packagings other than flexible large packagings: no permanent deformation which renders the large packaging, including the base pallet, if any, unsafe for transport and no loss of contents;
- (b) Flexible large packagings: no damage to the large packaging or its lifting devices which renders the large packaging unsafe for transport or handling and no loss of contents.

6.6.5.3.3.5 Criteria for passing the test (Criteria are the same as for IBCs, par. 6.5.4.6.5)

~~No permanent deformation which renders the large packaging unsafe for transport and no loss of contents.~~

- (a) All types of large packagings other than flexible large packagings: no permanent deformation which renders the large packaging including the base pallet, if any, unsafe for transport and no loss of contents;
- (b) Flexible large packagings: no deterioration of the body which renders the large packaging unsafe for transport and no loss of contents.

Part II PROPOSED CHANGES IN PART 4

General remark: changes which are agreed in chapter 6.1, 6.3, 6.5 and 6.6 can have consequential amendments in Part 4 (references to these chapters)

PART 4

PACKING AND TANK PROVISIONS

CHAPTER 4.1

USE OF PACKAGINGS, INCLUDING INTERMEDIATE BULK CONTAINERS (IBCs) AND LARGE PACKAGINGS

4.1.1 General provisions for the packing of dangerous goods in packagings, including IBCs and large packagings

NOTE: *The general provisions of this section only apply to the packing of goods of Class 2, Division 6.2 and Class 7 as indicated in 4.1.8.2 (Division 6.2), 4.1.9.1.5 (Class 7) and in the applicable packing instructions of 4.1.4 (packing instructions P201 and P202 for Class 2 and P621, IBC620 and LP621 for Division 6.2).*

4.1.1.1 Dangerous goods shall be packed in good quality packagings, including IBCs and large packagings, which shall be strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment between transport units and between transport units and warehouses as well as any removal from a pallet or overpack for subsequent manual or mechanical handling. Packagings, including IBCs and large packagings, shall be constructed and closed so as to prevent any loss of contents when prepared for transport which may be caused under normal conditions of transport, by vibration, or by changes in temperature, humidity or pressure (resulting from altitude, for example). Packagings, including IBCs and large packagings, shall be closed in accordance with the information provided by the manufacturer. No dangerous residue shall adhere to the outside of packages, IBCs and large packagings during transport. These provisions apply, as appropriate, to new, reused, reconditioned or remanufactured packagings, and to new, reused, repaired or remanufactured IBCs, and to new or reused large packagings.

4.1.1.2 Parts of packagings, including IBCs and large packagings, which are in direct contact with dangerous goods:

- (a) shall not be affected or significantly weakened by those dangerous goods; and
- (b) shall not cause a dangerous effect e.g. catalysing a reaction or reacting with the dangerous goods.

Where necessary, they shall be provided with a suitable inner coating or treatment.

4.1.1.3 Unless provided elsewhere in these Regulations, each packaging, including IBCs and large packagings, except inner packagings, shall conform to a design type successfully tested in accordance with the requirements of 6.1.5, 6.3.2, 6.5.4 or 6.6.5, as applicable.

4.1.1.4 When filling packagings, including IBCs and large packagings, with liquids, sufficient ullage (outage) shall be left to ensure that neither leakage nor permanent distortion of the packaging occurs as a result of an expansion of the liquid caused by temperatures likely to occur during transport. Unless specific requirements are prescribed, liquids shall not completely fill a packaging at a temperature of 55 °C. However, sufficient ullage shall be left in an IBC to ensure that at the mean bulk temperature of 50 °C it is not filled to more than 98% of its water capacity.

4.1.1.4.1 For air transport, packagings intended to contain liquids shall also be capable of withstanding a pressure differential without leakage as specified in the international regulations for air transport.

~~4.1.1.5~~ 4.1.1.5.1 Inner packagings shall be packed in an outer packaging in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the outer packaging. Inner packagings that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials, etc., shall be secured in outer packagings with suitable cushioning material. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material or of the outer packaging.

(The new 4.1.1.5.2 was formerly 6.1.5.1.6 and 6.6.5.1.6 and is considered to be meant for the user)

4.1.1.5.2 Where an outer packaging of a combination packaging or a large packaging have been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this outer packaging or large packaging. In addition, provided an equivalent level of performance is maintained, the following variations in inner packagings are allowed without further testing of the package:

(a) Inner packagings of equivalent or smaller size may be used provided:

(i) The inner packagings are of similar design to the tested inner packagings (e.g. shape - round, rectangular, etc.);

(ii) The material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;

(iii) The inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.);

(iv) Sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and

(v) Inner packagings are oriented within the outer packaging or large packaging in the same manner as in the tested package.

(b) A lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in (a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.

4.1.1.6 Dangerous goods shall not be packed together in the same outer packaging or in large packagings, with dangerous or other goods if they react dangerously with each other and cause:

- (a) combustion and/or evolution of considerable heat;
- (b) evolution of flammable, toxic or asphyxiant gases;
- (c) the formation of corrosive substances; or

(d) the formation of unstable substances.

4.1.1.7 The closures of packagings containing wetted or diluted substances shall be such that the percentage of liquid (water, solvent or phlegmatizer) does not fall below the prescribed limits during transport.

4.1.1.7.1 Where two or more closure systems are fitted in series on an IBC, that nearest to the substance being carried shall be closed first.

4.1.1.8 Liquids may only be filled into inner packagings which have an appropriate resistance to internal pressure that may be developed under normal conditions of transport. Where pressure may develop in a package by the emission of gas from the contents (as a result of temperature increase or other causes), the packaging, including IBC, may be fitted with a vent. A venting device shall be fitted if dangerous
