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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**

Sub-Committee of Experts on the
Transport of Dangerous Goods

Twenty-fifth session, 5-14 July 2004
Item 4(a) of the provisional agenda

PACKAGINGS (INCLUDING IBC'S AND LARGE PACKAGINGS)

Evaluation of the United Nations packaging requirements

Transmitted by the expert from the Netherlands

Introduction

1. In the Netherlands proposal ST/SG/AC.10/C.3/2004/67, paragraph 6 it is indicated that the proposed amendments concerning the proposal will be given in ST/SG/AC.10/C.3/2004/70 and in UN/SCETDG/25/INF.5.

The document ST/SG/AC.10/C.3/2004/70 contains only the amended paragraphs, and the informal document UN/SCETDG/25/INF.5 contains the full text of all amended chapters.

2. The proposed amendments concern changes in Chapters 6.1, 6.3, 6.5 and 6.6 (with corresponding changes in Part 4).

3. All amendments, where new text is shown by a different color + 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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Part I: PROPOSED CHANGES IN CHAPTER 6.1, 6.3, 6.5 AND 6.6

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) PPackagings (excluding outer packagings of combination packagings) with a capacity exceeding 450 litres.
(This makes it clear, that the maximum capacity is not meant for the outer packaging of a combination packaging)

* * *

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

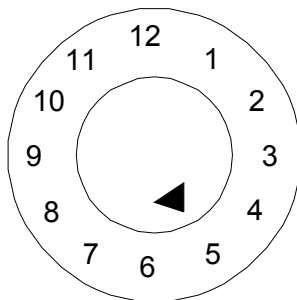
Y for packing groups II and III

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, rounded off to 1 kg for a gross mass greater than 10 kg, to 0.5 kg for a gross mass between 2 and 10 kg and to 0.1 kg for a gross mass smaller than 2 kg; (This makes it clear how to round off the maximum gross mass)

(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 1H 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* *(The proposed changes in 6.1.4.18 are meant to clarify, that for a 5M2 type bag the purpose is to protect inner layer(s) against moisture and that the bag is thus made waterproof)*

5M1 multiwall

5M2 multiwall, water-proof 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 protect the inner plies against 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. A water resistant ply can consist of a ply with a suitable coating, e.g. plastics. Where there is a danger of the substance contained reacting with moisture or where it is packed damp, a water resistant ~~proof~~ 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)

~~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.~~

6.1.5.1.67 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.

6.1.5.1.78 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.

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

6.1.5.1.940 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.

6.1.5.1.104+ *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.

* * *

CHAPTER 6.3

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PACKAGINGS FOR DIVISION 6.2 SUBSTANCES

6.3.1 General

6.3.1.1 The maximum net mass shall be 400 kg. *(upper limit as in 6.1)*

6.3.1.2 The requirements for packagings in 6.3 are based on packagings 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 6.3, provided that they are equally effective, acceptable to the competent authority and able successfully to withstand the tests described in 6.3.2. Methods of testing other than those described in these Regulations are acceptable, provided they are equivalent. *(This paragraph is equivalent to 6.1.1.2)*

6.3.1.3~~A~~ packaging that meets the requirements of this section and of 6.3.2 shall be marked with:

- (a) The United Nations packaging symbol;
- (b) The code designating the type of packaging according to the requirements of 6.1.2;
- (c) The text "CLASS 6.2";
- (d) The last two digits of the year of manufacture of the packaging;
- (e) The state authorizing the allocation of the mark, indicated by the distinguishing sign for motor vehicles in international traffic;
- (f) The name of the manufacturer or other identification of the packaging specified by the competent authority;
- (g) For packagings meeting the requirements of 6.3.2.79, the letter "U", inserted immediately following the marking required in (b) above.

Each element of the marking applied in accordance with (a) to (g) shall be clearly separated, e.g. by a slash or space, so as to be easily identifiable.

6.3.1.4 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. *(Paragraph as in 6.1.3.1)*

6.3.1.52 Example of marking: (Notes are inserted as in 6.1.3)



4G/CLASS 6.2/01

as in 6.3.1.1 (a), (b), (c) and (d)

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as in 6.3.1.1 (e), (f)

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. In itself, therefore, the mark does not necessarily confirm that the packaging may be used for any substance: generally the type of packaging (e.g. steel drum), its maximum capacity and/or mass, and any special requirements are specified for each substance in Part 3 of these Regulations.

NOTE 2: The marking is intended to be of assistance to packaging manufacturers, reconditioners, packaging users, carriers and regulatory authorities. In relation to the use of a new packaging, the original marking is a means for its manufacturer(s) to identify the type and to indicate those performance test regulations that have been met.

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.

6.3.1.6 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.(paragraph as in 6.1.1.4)

6.3.1.73Manufacturers and subsequent distributors of packagings shall provide information regarding procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other components needed to ensure that packages as presented for transport are capable of passing the applicable performance tests of this Chapter.

6.3.2 6.3.2—Test requirements for packagings

6.3.2.1 Performance and frequency of tests (paragraphs as in 6.1.5.1)

6.3.2.1.1 The design type of each packaging shall be tested as provided in 6.3.2 in accordance with procedures established by the competent authority.

6.3.2.1.2 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.

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

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

6.3.2.1.5 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).

6.3.2.1.6 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.

6.3.2.1.7 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.

6.3.2.1.7 Preparation of packagings for testing

6.3.2.2.1.4 Other than for packagings for live animals and organisms, samples of each packaging shall be prepared for testing as described in 6.3.2.2.2 and then subjected to the tests in 6.3.2.4 to 6.3.2.6. If the nature of the packaging makes it necessary, equivalent preparation and tests are permitted, provided that these may be demonstrated to be at least as effective.

6.3.2.2.2 Samples of each packaging shall be prepared as for transport except that a liquid or solid infectious substance shall be replaced by water or, where conditioning at -18 °C is specified, by water/antifreeze. Each primary receptacle shall be filled to not less than 98% of its capacity.(filling requirement as in 6.1.5.2.1)

6.3.2.3 Tests required

Material of					Tests required				
Outer packaging			inner packaging		Refer to 6.3.2.5				Refer to 6.3.2.6
Fibre-board	Plastics	Other	Plastics	Other	(a)	(b)	(c)	(d)	
X			x			x	x	when dry ice is used	X
X				x		x			X
	X		x				x		X
	X			x			x		X
		x	x				x		X
		x		x	x				X

6.3.2.4 Packagings prepared as for transport shall be subjected to the tests in 6.3.2.3, which - for test purposes - categorizes packagings according to their material characteristics. 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. If a primary receptacle and a secondary packaging of an inner packaging are made of different materials, the material of the primary receptacle determines the appropriate test. In instances where a primary receptacle is made of two materials, the material most liable to damage determines the appropriate test.

6.3.2.5 (a) Samples shall be subjected to free-fall drops on to a rigid, non-resilient, flat, horizontal surface from a height of 9 m. Where the samples are in the shape of a box, five shall be dropped in sequence:

- (i) flat on to the base;
- (ii) flat on to the top;
- (iii) flat on to the longest side;
- (iv) flat on to the shortest side;
- (v) on to a corner;

Where the samples are in the shape of a drum, three shall be dropped in sequence:

- (vi) diagonally on to the top chime, with the centre of gravity directly above the point of impact;
- (vii) diagonally on to the base chime;
- (viii) flat on to the side;

Following the appropriate drop sequence, there may be no leakage from the primary receptacle(s) which shall remain protected by absorbent material in the secondary packaging (when present) (absorbent material is not required for solids);

NOTE: 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.

- (b) 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 (a);
- (c) The sample shall be conditioned in an atmosphere of -18 °C or less for a period of at least 24 hours and within 15 minutes of removal from that atmosphere be subjected to the test described in (a). Where the sample contains dry ice, the conditioning period may be reduced to 4 hours;
- (d) Where the packaging is intended to contain dry ice, a test additional to that specified in (a) or (b) or (c) shall be carried out. One sample shall be stored so that all the dry ice dissipates and then be subjected to the test described in (a) with a drop orientation such that the packaging shall strike the target on the weakest part. (this makes it clear that the test is performed on one sample)

6.3.2.6 Packagings with a gross mass of 7 kg or less shall be subjected to the tests described in (a) below and packagings with a gross mass exceeding 7 kg to the tests in (b) below.

- (a) Samples shall be placed on a level hard surface. A cylindrical steel rod with a mass of at least 7 kg, a diameter of not exceeding 38 mm (better defined as in (b)) and the impact end edges a radius not exceeding 6 mm, shall be dropped in a vertical free fall from a height of 1 m, measured from the impact end to the impact surface of the sample. One sample shall be placed on its base. A second sample shall be placed in an orientation perpendicular to that used for the first. In each instance the steel rod shall be aimed to impact the primary receptacle. Following each impact, penetration of the secondary packaging is acceptable, provided that there is no leakage from the primary receptacle(s);

- (b) Samples shall be dropped on to the end of a cylindrical steel rod. The rod shall be set vertically in a level hard surface. It shall have a diameter of 38 mm and the edges of the upper end a radius not exceeding 6 mm. The rod shall protrude from the surface a distance at least equal to that between the primary receptacle(s) and the outer surface of the outer packaging with a minimum of 200 mm. One sample shall be dropped in a vertical free fall from a height of 1 m, measured from the top of the steel rod. A second sample shall be dropped from the same height in an orientation perpendicular to that used for the first. In each instance the packaging shall be so orientated that the steel rod would penetrate the primary receptacle(s). Following each impact, penetration of the secondary packaging is acceptable, provided that there ~~is shall be~~ no leakage from the primary receptacle(s). (the same criterion as in (a))

(This is now par.6.3.2.1.5)

~~6.3.2.7 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).~~

(This paragraph is moved to Part 4)

~~6.3.2.8 Provided an equivalent level of performance is maintained, the following variations in the primary receptacles placed within a secondary packaging are allowed without further testing of the completed package:~~

- ~~(a) Primary receptacles of equivalent or smaller size as compared to the tested primary receptacles may be used provided:~~
- ~~(i) The primary receptacles are of similar design to the tested primary receptacle (e.g. shape: round, rectangular, etc.);~~
- ~~(ii) The material of construction of the primary receptacle (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested primary receptacle;~~
- ~~(iii) The primary receptacles 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 primary receptacles; and~~
- ~~(v) Primary receptacles are oriented within the secondary packaging in the same manner as in the tested package;~~
- ~~(b) A lesser number of the tested primary receptacles, or of the alternative types of primary receptacles 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 primary receptacles.~~

(In order to get a uniform terminology, inner receptacle has been replaced by primary receptacle, intermediate packaging by secondary packaging in 6.3.2.9, except in (a) where intermediate packaging has been replaced by inner packaging which is the correct wording there)

6.3.2. ~~79~~ Primary ~~inner~~ receptacles of any type may be assembled within an ~~intermediate~~ (secondary) packaging and transported without testing in the outer packaging under the following conditions:

- (a) The ~~inner/intermediate~~/outer packaging combination shall have been successfully tested in accordance with 6.3.2.3 with fragile (e.g., glass) ~~primary/inner~~ receptacles;
- (b) The total combined gross mass of ~~primary/inner~~ receptacles shall not exceed one half the gross mass of ~~primary/inner~~ receptacles used for the drop test in (a) above;
- (c) The thickness of cushioning between ~~primary/inner~~ receptacles and between ~~primary/inner~~ receptacles and the outside of the ~~secondary/intermediate~~ packaging shall not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single ~~primary/inner~~ receptacle was used in the original test, the thickness of cushioning between ~~primary/inner~~ receptacles shall not be less than the thickness of cushioning between the outside of the ~~secondary/intermediate~~ packaging and the ~~primary/inner~~ receptacle in the original test. When either fewer or smaller ~~primary/inner~~ receptacles are used (as compared to the ~~primary/inner~~ receptacles used in the drop test), sufficient additional cushioning material shall be used to take up the void;
- (d) The outer packaging shall have successfully passed the stacking test in 6.1.5.6 while empty. The total mass of identical packages shall be based on the combined mass of ~~primary/inner~~ receptacles used in the drop test in (a) above;
- (e) For ~~primary/inner~~ receptacles containing liquids, an adequate quantity of absorbent material to absorb the entire liquid content of the ~~primary/inner~~ receptacles shall be present;
- (f) If the outer packaging is intended to contain ~~primary/inner~~ receptacles for liquids and is not leakproof, or is intended to contain ~~primary/inner~~ receptacles 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 effective means of containment;
- (g) In addition to the markings prescribed in 6.3.1. ~~34~~(a) to (f), packagings shall be marked in accordance with 6.3.1. ~~31~~ (g).

6.3.3 Test report

6.3.3.1 A test report containing at least the following particulars shall be drawn up and shall be available to the users of the packaging:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. A unique test report identification;
4. Date of the test report;
5. Manufacturer of the packaging;

6. Description of the packaging design type (e.g. dimensions, materials, closures, thickness, etc.), including method of manufacture (e.g. blow moulding) and which may include drawing(s) and/or photograph(s);
7. Maximum capacity;
8. Characteristics of test contents, e.g. viscosity and relative density for liquids and particle size for solids;
9. Test descriptions and results;
10. The test report shall be signed with the name and status of the signatory.

6.3.3.2 The test report shall contain statements that the packaging prepared as for transport was tested in accordance with the appropriate requirements of this Chapter and that the use of other packaging methods or components may render it invalid. A copy of the test report shall be available to the competent authority.

CHAPTER 6.5

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF INTERMEDIATE BULK CONTAINERS

6.5.1 General requirements applicable to all types of IBCs

[...]

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.
(It is proposed to delete 6.5.3.1.9 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 6.5.1.6.4 (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 6.5.1.6.6.1 may be considered to satisfy the requirements for the two and a half and five-year periodic tests and inspections.

6.5.4.7 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))

~~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.

6.6.5.1.67 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.

6.6.5.1.78 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.

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

6.6.5.2.4 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>

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.

(Tear test, topple test and righting test are inserted for large packagings as for IBCs)

6.6.5.3.5 Tear test

6.6.5.3.5.1 Applicability

For all types of flexible large packagings, as a design type test.

6.6.5.3.5.2 Preparation of the large packaging for test

The large packaging shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass, the contents being evenly distributed.

6.6.5.3.5.3 Method of testing

Once the large packaging is placed on the ground, a 100 mm knife score, completely penetrating the wall of a wide face, is made at a 45° angle to the principal axis of the large packaging, halfway between the bottom surface and the top level of the contents. The large packaging shall then be subjected to a uniformly distributed superimposed load equivalent to twice the maximum permissible gross mass. The load shall be applied for at least five minutes. A large packaging which is designed to be lifted from the top or the side shall then, after removal of the superimposed load, be lifted clear of the floor and maintained in that position for a period of five minutes.

6.6.5.3.5.4 Criterion for passing the test

The cut shall not propagate more than 25% of its original length.

6.6.5.3.6 Topple test6.6.5.3.6.1 Applicability

For all types of flexible large packagings, as a design type test.

6.6.5.3.6.2 Preparation of the large packaging for test

The large packaging shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass, the contents being evenly distributed.

6.6.5.3.6.3 Method of testing

The large packaging shall be caused to topple on to any part of its top on to a rigid, non-resilient, smooth, flat and horizontal surface.

6.6.5.3.6.4 Topple height

<u>Packing group I</u>	<u>Packing group II</u>	<u>Packing group III</u>
<u>1.8 m</u>	<u>1.2 m</u>	<u>0.8 m</u>

6.6.5.3.6.5 Criterion for passing the test

No loss of contents. A slight discharge, e.g. from closures or stitch holes, upon impact shall not be considered to be a failure of the large packaging provided that no further leakage occurs.

6.6.5.3.7 Righting test6.6.5.3.7.1 Applicability

For all flexible large packagings designed to be lifted from the top or side, as a design type test.

6.6.5.3.7.2 Preparation of the large packaging for test

The large packaging shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass, the contents being evenly distributed.

6.6.5.3.7.3 *Method of testing*

The large packaging, lying on its side, shall be lifted at a speed of at least 0.1 m/s to upright position, clear of the floor, by one lifting device or by two lifting devices when four are provided.

6.6.5.3.7.4 *Criterion for passing the test*

No damage to the large packaging or its lifting devices which renders the large packaging unsafe for transport or handling.

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)

(When the new 4.1.1.5.2 and 4.1.1.5.3 are accepted, it can be considered to merge 4.1.1.5.2 and 4.1.1.5.3)

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.

(The new 4.1.1.5.3 was formerly 6.3.2.8 and is considered to be meant for the user)

4.1.1.5.3 Provided an equivalent level of performance is maintained, the following variations in the primary receptacles placed within a secondary packaging [(division 6.2 packagings)] are allowed without further testing of the completed package:

(a) Primary receptacles of equivalent or smaller size as compared to the tested primary receptacles may be used provided:

(i) The primary receptacles are of similar design to the tested primary receptacle (e.g. shape: round, rectangular, etc.);

- (ii) The material of construction of the primary receptacle (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested primary receptacle;
 - (iii) The primary receptacles 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 primary receptacles; and
 - (v) Primary receptacles are oriented within the secondary packaging in the same manner as in the tested package;
- (b) A lesser number of the tested primary receptacles, or of the alternative types of primary receptacles 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 primary receptacles.

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
