

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

2 December 2010

Thirty-eighth session

Geneva, 29 November –7 December 2010

Item 4 of the provisional agenda

Listing, classification and packing

Flexible bulk containers – report of the working group

1. As a result of the work undertaken during the current biennium, the Sub-Committee established an informal working group to discuss the proposal related to flexible bulk containers (FBC) contained in ST/SG/AC.10/C.3/2010/58. The working group met concurrent with the plenary session on November 29-30, 2010. Annex I contains an updated proposal based on the working groups efforts. Annex II is a version with "track changes" identifying the amendments made to 2010/58.

2. The working group discussed a number of principle issues that were raised during the plenary session in order to establish a direction for the group's work. These issues are as follows:

(a) Including the proposed FBC provisions as a subset of the BK1 provisions. The working group examined the possibility of including the FBC concept as a liner system within a BK1 open top rigid bulk container. There was interest in this approach in order to address the concerns of transport stability. However, the working group determined this approach would result in either significantly raising the requirements for BK1 containers or it would create two different types of BK1 containers – one type representing the existing BK1 standard and one type with the enhanced FBC requirements. A separate BK3 standard would further ease the ability of modal bodies to consider as an authorized packaging type and assign specific transport conditions as necessary. The group also considered if a BK1 performance standard was necessary in addition to the BK3 container, but could not come to agreement on this point. On this basis, the group decided to refine the proposal for a new BK3 standard based on 2010/58.

(b) Design, construction and service equipment. The working group amended these provisions with the goal of standardizing the text with similar existing provisions within the Model Regulations and broadening the scope to allow for future innovation and variances in design. The group also discussed the importance of the flexible bulk container design preventing or minimizing bulging/deformation; although the group did not have text readily available to recommend.

(c) Test provisions. The working group reviewed each testing provision to confirm the applicability of each test to this type of container and ensure consistency with other similar provisions within the Model Regulations (i.e, the drop test surface). Some provisions, such as the topple test and tear test, were amended to improve the test

methods in relation to FBCs. Two test methods were recommended for deletion. The waterproofness test was determined to be inappropriate, although it should be noted that the general design requirement that the FBC must be waterproof remains. The group felt the Model Regulations in many cases require waterproof/water tightness without detailing a specific test method. Also, the group deleted the proposed safety coefficient test. This test is not a design type test, rather it is a periodic inspection test to verify the continued integrity of the load bearing strap material. Instead of this periodic inspection test the group decided to recommend a limited service life for the FBC use.

(d) Stack test. The majority of the group expressed concern over the practice of stacking FBCs during transport. The group then considered if FBCs were not allowed to be stacked in transport, should a stack test be required? The resulting discussion led to a general agreement that for land transport, FBCs should not be stacked within the conveyance. However, it was identified that in some regions vessel transport (particularly barge) may allow for stacking within the conveyance. Further, it was recognized that FBCs could be stacked in storage and a stack test is necessary to demonstrate the integrity of the FBC to withstand stack forces even if the FBC is not stacked during transport.

(e) Limited service life. The group had a discussion on the periodic inspection requirements and how best to ensure continued serviceability of the FBC over time. It was noted that the liner material (typically a waterproof polyester/rubber material) is in practice tested at 1.5-2 year intervals and the strapping is tested every 5 years. From the experience gained from this practical use and testing, the group decided to recommend a 2 year limited use life unless otherwise approved by the competent authority. The group chose to take a conservative approach in this regards and recognized that as use and experience is gained over time, this service life limit could be readdressed in the future.

(f) Transport stability and stowage. The group addressed the need to ensure adequate FBC stability during transport, keeping in mind the different transport environments. It was decided that the Model Regulations should require that FBC's be transported within a conveyance with rigid sides and ends that extend at least two-thirds of the height of the FBC. The term conveyance was selected after a review of the definitions to accommodate road, rail, and vessel transport. Further, the group decided FBCs should not be stacked in transport to prevent an unstable transport condition. Container securing, strapping or blocking and bracing requirements were added similar to current provisions in 7.1.1.8.

3. The working group felt they had fulfilled the task presented to them by the Sub-Committee to consider and improve upon the provisions proposed in 2010/58. However, some members expressed reservation that the improved technical provisions could be adequately adapted to address all concerns, particularly those related to modal regulations. Annex I contains the results of the working groups efforts to refine the testing requirements, general use provisions and additional transport conditions applicable to flexible bulk containers for consideration by the Sub-Committee.

ANNEX I

Proposals of amendments

11. In Chapter 1.2, section 1.2.1 “Definitions”, at the end of the definition for “bulk container”, add “and flexible bulk containers (FBCs)”.

12. Add a code “BK3” similar to “BK1” code for the following UN numbers in column (10) of the dangerous goods list of Chapter 3.2:

<i>UN No.</i>	<i>Name and description</i>	<i>Class or division</i>	<i>UN packing group</i>
(1)	(2)	(3)	(5)
1334	NAPHTALENE, CRUDE or NAPHTALENE, REFINED	4.1	III
1350	SULPHUR	4.1	III
1454	CALCIUM NITRATE	5.1	III
1474	MAGNESIUM NITRATE	5.1	III
1486	POTASSIUM NITRATE	5.1	III
1498	SODIUM NITRATE	5.1	III
1499	SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	5.1	III
1942	AMMONIUM NITRATE, with not more than 0.2% total combustible material, including any organic substance, calculated as carbon to the exclusion of any other added substances	5.1	III
2067	AMMONIUM NITRATE BASED FERTILIZER	5.1	III
2213	PARAFORMALDEHYDE	4.1	III
3377	SODIUM PERBORATE MONOHYDRATE	5.1	III
3378	SODIUM CARBONATE PEROXYHYDRATE	5.1	III

13. Add a code “BK3” similar to “BK2” code for the following UN numbers in column (10) of the dangerous goods list of Chapter 3.2:

<i>UN No.</i>	<i>Name and description</i>	<i>Class or division</i>	<i>UN packing group</i>
(1)	(2)	(3)	(5)
1408	FERROSILICON with 30% or more but less than 90% silicon	4.3	III
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	9	III

14. In Chapter 4.3 (Use of bulk containers), 4.3.1.1, insert the following after the description of the meaning of BK1 and BK2:

“BK3: the transport in flexible bulk containers is permitted”.

15. In Chapter 4.3, add a new 4.3.1.16 to read:

4.3.1.16 Before a flexible bulk container is filled it shall be visually examined to ensure it is structurally serviceable, its textile slings, load-bearing structure straps, body fabric, lock device parts including metal and textile parts are free from protrusions or damages and that inner liners are free from rips, tears or any damage.

4.3.1.16.1 For flexible bulk containers, unless otherwise approved by the competent authority, the period of use permitted for the transport of dangerous substances shall be two years from the date of manufacture of the flexible bulk container.

4.3.1.16.2 A venting device shall be fitted if a dangerous accumulation of flammable, corrosive or toxic gases may develop within the flexible bulk container.

16. Amend 4.3.2.2 to read as follows:

4.3.2.2 Bulk goods of Division 4.3

Closed bulk containers (code BK2) and flexible bulk containers (code BK3) may be used. These goods shall be transported in bulk containers which are waterproof.”.

17. In section 6.8.1, add the following definition:

“*Flexible bulk container* means a flexible container for bulk cargoes with a capacity not exceeding 15 m³ and includes liners, handling devices and service equipment [and shall be transported in a conveyance with rigid sides and ends].

18. In the table of 6.8.2.3, add the following line:

“Flexible bulk container BK3”.

19. Add a new paragraph 6.8.5.3.5 to read:

“6.8.5.3.5 Flexible bulk containers shall be manufactured and tested under a quality assurance programme which satisfies the competent authority, in order to ensure that each manufactured flexible bulk container meets the requirements of this Chapter.”

20. At the end of the title of section 6.8.4.1, add “and flexible bulk containers (FBCs)”.

21. Add a new section 6.8.5 to read as follows:

6.8.5 Requirements for the design, construction, inspection and testing of flexible bulk containers [BK3]

6.8.5.1 *Design and construction requirements*

6.8.5.1.1 Flexible bulk containers shall be waterproof.

6.8.5.1.3 Flexible bulk containers shall be completely closed to prevent the release of contents.

6.8.5.1.4 Flexible bulk containers shall be sift proof.

6.8.5.1.5 Parts of the flexible bulk container which are in direct contact with dangerous goods:

(a) Shall not be affected or significantly weakened by those dangerous goods.

(b) Shall not cause a dangerous effect e.g. catalyzing a reaction or reacting with the dangerous goods.

(c) Shall not allow permeation of the dangerous goods that could constitute a danger under normal conditions of transport.

6.8.5.2 *Service equipment and handling device*

6.8.5.2.1 Filling and discharge devices shall be so constructed as to be protected against damage during transport and handling. The filling and discharge devices shall be capable of being secured against unintended opening.

6.8.5.2.2 Slings of the flexible bulk container, if fitted, should withstand pressure and dynamic forces which can appear in normal conditions of handling and transportation.

6.8.5.2.3 The handling devices shall be strong enough to withstand repeated use.

6.8.5.3 *Inspection and testing*

6.8.5.3.1 Each flexible bulk container design type shall successfully pass the tests prescribed in this Chapter before being used.

6.8.5.3.2 Tests shall also be repeated after each modification of design type which alters the design, material or manner of construction of a flexible bulk container.

6.8.5.3.4 Tests shall be carried out on flexible bulk containers prepared as for transport. Flexible bulk containers shall be filled to the maximum mass at which they may be used and the contents shall be evenly distributed. The substances to be transported in the flexible bulk container may be replaced by other substances except where this would invalidate the results of the tests. When another substance is used it shall have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. 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.

6.8.5.3.5 *Drop test*

6.8.5.3.5.1 *Applicability*

For all types of flexible bulk containers, as a design type test.

6.8.5.3.5.2 Preparation for testing

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.8.5.3.5.3 The flexible bulk container shall be dropped onto a target surface that is non-resilient and horizontal. The target surface shall be:

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

Following the drop, the flexible bulk container shall be restored to the upright position for observation.

6.8.5.3.5.4 Drop heights are as follows:

Packing group III: 0.8 m

6.8.5.3.5.5 Criteria for passing the test:

- (a) There shall be 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 flexible bulk container provided that no further leakage occurs after the container has been restored to the upright position;
- (b) There shall be no damage which renders the flexible bulk container unsafe to be transported for salvage or for disposal

6.8.5.3.6 *Top lift test*

6.8.5.3.6.1 Applicability

For all types of flexible bulk containers as a design type test.

6.8.5.3.6.2 Preparation for testing

Flexible bulk containers shall be filled to six times the maximum net mass, the load being evenly distributed.

6.8.5.3.6.3 A flexible bulk container shall be lifted in the manner for which it is designed until clear of the floor and maintained in that position for a period of five minutes.

6.8.5.3.6.5 Criteria for passing the test: there shall be no damage to the flexible bulk container or its lifting devices which renders the flexible bulk container unsafe for transport or handling, and no loss of contents.

6.8.5.3.7 *Topple test*

6.8.5.3.7.1 Applicability

For all types of flexible bulk containers as a design type test.

6.8.5.3.7.2 Preparation for testing

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.8.5.3.7.3 Flexible bulk container shall be toppled onto any part of its top by lifting the side furthest from the drop edge upon a target surface that is non-resilient and horizontal. The target surface shall be:

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

6.8.5.3.7.4 For all flexible bulk containers, the topple height is specified as follows:

Packing group III: 0.8 m

6.8.5.3.7.5 Criteria for passing the test: there shall be 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 flexible bulk container provided that no further leakage occurs.

6.8.5.3.8 *Righting test*

6.8.5.3.8.1 Applicability

For all types of flexible bulk containers designed to be lifted from the top or side, as a design type test.

6.8.5.3.8.2 Preparation for testing

The flexible bulk container shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass.

6.8.5.3.8.3 The flexible bulk container, lying on its side, shall be lifted at a speed of at least 0.1 m/s to an upright position, clear of the floor, by no more than half of the lifting devices.

6.8.5.3.8.4 Criteria for passing the test: there shall be no damage to the flexible bulk container or its lifting devices which renders the flexible bulk container unsafe for transport or handling.

6.8.5.3.9 *Tear test*

6.8.5.3.9.1 Applicability

For all types of flexible bulk containers as a design type test.

6.8.5.3.9.2 Preparation for testing

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.8.5.3.9.3 With the flexible bulk container placed on the ground, a 300mm cut, completely penetrating all layers of the flexible bulk container on a wall of a wide face. The cut shall be made at a 45° angle to the principal axis of the flexible bulk container, halfway between the bottom surface and the top level of the contents. The flexible bulk container shall then be subjected to a uniformly distributed superimposed load equivalent to twice the maximum gross mass of the package. The load must be applied for at least fifteen minutes. A flexible bulk container which is designed to be lifted from the top or the side shall, after removal of the superimposed load, be lifted clear of the floor and maintained in that position for a period of fifteen minutes.

6.8.5.3.9.4 Criterion for passing the test: the cut shall not propagate more than 25 percent of its original length.

6.8.5.3.10 *Stacking test*

6.8.5.3.10.1 Applicability

For all types of flexible bulk containers as a design type test.

6.8.5.3.10.2 Preparation for testing

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.8.5.3.10.3 The flexible bulk container shall be subjected to a force applied to the top surface of the flexible bulk container that is four times the design load-carrying capacity for 24 hours.

6.8.5.3.10.4 Criterion for passing the test: there shall be no loss of contents during the test or after removal of the load.

6.8.5.4 *Test report*

6.8.5.4.1 A test report containing at least the following particulars shall be drawn up and shall be available to the users of the flexible bulk container:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. Unique test report identification;
4. Date of the test report;
5. Manufacturer of the flexible bulk container;
6. Description of the flexible bulk container design type (e.g. dimensions, materials, closures, thickness, etc) and/or photograph(s);
7. Maximum capacity/maximum permissible gross mass;
8. Characteristics of test contents, e.g. particle size for solids;

9. Test descriptions and results;
10. The test report shall be signed with the name and status of the signatory.

6.8.5.4.2 The test report shall contain statements that the flexible bulk container prepared as for transport was tested in accordance with the appropriate provisions 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.

6.8.5.5 Marking

6.8.5.5.1 Each flexible bulk container manufactured and intended for use according to these Regulations shall bear markings that are durable, legible and placed in a location so as to be readily visible. Letters, numerals and symbols shall be at least 24 mm high and shall show:

- (a) The United Nations packaging symbol



This symbol shall not be used for any purpose other than certifying that a packaging, flexible bulk container, a portable tank or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8 ;

- (b) The code BK3;
- (c) A capital letter designating the packing group(s) for which the design type has been approved:
 - (i) Z for packing group III only;
- (d) The month and year (last two digits) of manufacture;
- (e) The State authorizing the allocation of the mark; indicated by the distinguishing sign for motor vehicles in international traffic;
- (f) The name or symbol of the manufacturer and other identification of the FBC as specified by the competent authority;
- (g) The stacking test load in kg.
- (h) The maximum permissible gross mass in kg.

Marking shall be applied in the sequence shown in (a) to (h); each element of the marking, required in these subparagraphs, shall be clearly separated, e.g. by a slash or space and presented in a way that ensures that all of the parts of the mark are easily identified.

6.8.5.2.2 *Example of marking*



BK3/Z/1109
RUS/NTT/MK-14-10
56000/14000

7.1.1.11 Flexible bulk containers shall be transported within a conveyance with rigid sides and ends that extend at least two-thirds of the height of the flexible bulk container.

7.1.1.11.1 Flexible bulk containers shall be secured by suitable means capable of restraining the container in the conveyance in a manner that will prevent any movement during transport which would change the orientation of the container or cause the container to be damaged. Movement of the containers may also be prevented by filling any voids by the use of dunnage or by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation to the flexible bulk container.

7.1.1.11.2 Flexible bulk containers [shall] [should] not be stacked for transport.

ANNEX II

Changes made to the proposals of amendments in ST/SG/AC.10/C.3/2010/58

11. In Chapter 1.2, section 1.2.1 “Definitions”, at the end of the definition for “bulk container”, add “and flexible bulk containers (FBCs)”.

12. Add a code “BK3” similar to “BK1” code for the following UN numbers in column (10) of the dangerous goods list of Chapter 3.2:

<i>UN No.</i>	<i>Name and description</i>	<i>Class or division</i>	<i>UN packing group</i>
(1)	(2)	(3)	(5)
1334	NAPHTALENE, CRUDE or NAPHTALENE, REFINED	4.1	III
1350	SULPHUR	4.1	III
1454	CALCIUM NITRATE	5.1	III
1474	MAGNESIUM NITRATE	5.1	III
1486	POTASSIUM NITRATE	5.1	III
1498	SODIUM NITRATE	5.1	III
1499	SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	5.1	III
1942	AMMONIUM NITRATE, with not 5.1 more than 0.2% total combustible material, including any organic substance, calculated as carbon to the exclusion of any other added substances		III
2067	AMMONIUM NITRATE BASED FERTILIZER	5.1	III
2213	PARAFORMALDEHYDE	4.1	III
3377	SODIUM PERBORATE MONOHYDRATE	5.1	III
3378	SODIUM CARBONATE PEROXYHYDRATE	5.1	III

13. Add a code “BK3” similar to “BK2” code for the following UN numbers in column (10) of the dangerous goods list of Chapter 3.2:

<i>UN No.</i>	<i>Name and description</i>	<i>Class or division</i>	<i>UN packing group</i>
(1)	(2)	(3)	(5)
1408	FERROSILICON with 30% or more but less than 90% silicon	4.3	III
3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.	9	III

14. In Chapter 4.3 (Use of bulk containers), 4.3.1.1, insert the following after the description of the meaning of BK1 and BK2:

“BK3: the transport in flexible bulk containers is permitted”.

15. In Chapter 4.3, add a new 4.3.1.16 to read:

“4.3.1.16 Before a flexible bulk container is filled it shall be visually examined to ensure it is structurally serviceable, its textile slings, load-bearing structure straps, body fabric, lock device parts including metal and textile parts are free from protrusions or damages and that ~~any inner liners or substance retaining equipment~~ are free from rips, tears or any damage, ~~that would compromise its cargo retention capabilities. Major defects include:~~

~~(a) Rupture of the handling slings and the handling device textile strap;~~

~~(b) Ruptures of the body rubberized cloth, the body waterproof failure; or~~

~~(c) Locking arms operation failure.”.~~

4.3.1.16.1 For flexible bulk containers, unless otherwise approved by the competent authority, the period of use permitted for the transport of dangerous substances shall be two years from the date of manufacture of the flexible bulk container.

4.3.1.16.2 A venting device shall be fitted if a dangerous accumulation of flammable, corrosive or toxic gases may develop within the flexible bulk container.

16. Amend 4.3.2.2 to read as follows:

“4.3.2.2 Bulk goods of Division 4.3

Closed bulk containers (code BK2) and flexible bulk containers (code BK3) may be used. These goods shall be transported in bulk containers which are waterproof.”.

17. In section 6.8.1, add the following definition:

~~“Flexible bulk container means a waterproof, sealed container for bulk cargoes with a capacity of 3-12 m³ and with a soft body, handling devices and service equipment including a loading sleeve being locked by folding and a discharging sleeve with two contours preventing inadvertent discharging.”.~~

“Flexible bulk container means a flexible container for bulk cargoes with a capacity not exceeding 15 m³ and includes liners, handling devices and service equipment [and shall be transported in a conveyance with rigid sides and ends].

18. In the table of 6.8.2.3, add the following line:

“Flexible bulk container BK3”.

19. Add a new paragraph ~~6.8.3.3.3~~6.8.5.3.5 to read:

~~6.8.3.3.3~~6.8.5.3.5 Flexible bulk containers shall be manufactured and tested under a quality assurance programme which satisfies the competent authority, in order to ensure that each manufactured flexible bulk container meets the requirements of this Chapter.”;

20. At the end of the title of section 6.8.4.1, add “and flexible bulk containers (FBCs)”.

21. Add a new section 6.8.5 to read as follows:

“6.8.5 Requirements for the design, construction, inspection and testing of flexible bulk containers [BK3]

6.8.5.1 Design and construction requirements

6.8.5.1.1 Flexible bulk containers shall be waterproof.

~~6.8.5.1.2 Flexible bulk containers shall be provided with sufficient ventilation to preclude dangerous accumulation of flammable, corrosive or toxic gaseous emissions.~~

6.8.5.1.3 Flexible bulk containers shall be ~~capable of being~~ completely closed to prevent the release of contents, ~~as well as the penetration of rain and water under normal conditions of transport.~~

6.8.5.1.4 Flexible bulk containers shall be sift proof.

6.8.5.1.5 Parts of the flexible bulk container which are in direct contact with dangerous goods:

(a) Shall not be affected or significantly weakened by those dangerous goods.

(b) Shall not cause a dangerous effect e.g. catalyzing a reaction or reacting with the dangerous goods.

(c) Shall not allow permeation of the dangerous goods that could constitute a danger under normal conditions of transport. ~~When liners are used in flexible bulk containers, they shall be of a material and design that corresponds to the flexible bulk container’s capacity and intended application.~~

~~6.8.5.1.6 Flexible bulk containers shall be fitted with a handling device in the form of lifting straps (slings) integral to the strength of the body of the container.~~

~~6.8.5.1.7 Flexible bulk containers structure should be adapted for periodic safety coefficient test, performance without failure in its integrity and strength. Handling slings FBC structure should be provided with the backup patch details taking an active part in the FBC operation, should be used during testing and can be cut out in case of safety coefficient periodic inspection, at the same time, the detectors being cut shall not lead to the safety coefficient decrease.~~

~~6.8.5.1.8 Construction and dimensions of Flexible bulk containers shall ensure maximum stability at transportation.~~

~~6.8.5.1.9 — Construction of Flexible bulk containers shall allow for safe fixation of FBC on board of the transport according to «European Practice Guidelines on Cargo Securing for Road Transport».~~

6.8.5.2 Service equipment and handling device

6.8.5.2.1 Filling and discharge devices shall be so constructed as to be protected against damage during transport and handling. The filling and discharge devices shall be capable of being secured against unintended opening.

6.8.5.2.2 Slings of the flexible bulk container, if fitted, should withstand pressure and dynamic forces which can appear in normal conditions of handling and transportation.

6.8.5.2.3 The handling devices shall be strong enough to withstand repeated use.

6.8.5.3 Inspection and testing

6.8.5.3.1 Each flexible bulk container design type shall successfully pass the tests prescribed in this Chapter before being used.

6.8.5.3.2 Tests shall also be repeated after each modification of design type which alters the design, material or manner of construction of a flexible bulk container.

~~6.8.5.3.3 — Each flexible bulk container shall be inspected for waterproofing once every 1.5 years in accordance with 6.8.5.3.11. Skeleton grid straps shall be checked for safety (safety coefficient test) once every 3 years in accordance with 6.8.5.3.12.~~

6.8.5.3.4 Tests shall be carried out on flexible bulk containers prepared as for transport. Flexible bulk containers shall be filled to the maximum mass at which they may be used and the contents shall be evenly distributed. The substances to be transported in the flexible bulk container may be replaced by other substances except where this would invalidate the results of the tests. When another substance is used it shall have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. 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.

6.8.5.3.5 Drop test

6.8.5.3.5.1 Applicability

For all types of flexible bulk containers, as a design type test.

6.8.5.3.5.2 Preparation for testing

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.8.5.3.5.3 The flexible bulk container shall be dropped onto a target surface that is rigid, non-resilient, smooth, flat and horizontal, surface. The target surface shall be:

(a) Integral and massive enough to be immovable;

(b) Flat with a surface kept free from local defects capable of influencing the test results;

(c) Rigid enough to be non-deformable under test conditions and not liable to become damaged by the tests; and

(d) Sufficiently large to ensure that the test package falls entirely upon the surface.

Following the drop, the flexible bulk container shall be restored to the upright position for observation.

6.8.5.3.5.4 Drop heights are as follows:

Packing group III: 0.8 m

6.8.5.3.5.5 Criteria for passing the test:

(a) There shall be 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 flexible bulk container provided that no further leakage occurs after the container has been restored to the upright position;

(b) There shall be no damage which renders the flexible bulk container unsafe to be transported for salvage or for disposal, and no loss of contents.

6.8.5.3.6 *Top lift test*

6.8.5.3.6.1 Applicability

For all types of flexible bulk containers as a design type test.

6.8.5.3.6.2 Preparation for testing

FBCs-Flexible bulk containers shall be filled to six times the maximum net mass, the load being evenly distributed.

6.8.5.3.6.3 A flexible bulk container shall be lifted in the manner for which it is designed until clear of the floor and maintained in that position for a period of five minutes.

~~6.8.5.3.6.4—Other equally effective methods of top lift testing and preparation may be used with approval of the competent authority.~~

6.8.5.3.6.5 Criteria for passing the test: there shall be no ~~permanent~~ damage to the flexible bulk container or its lifting devices which renders the flexible bulk container unsafe for transport or handling, and no loss of contents.

6.8.5.3.7 *Topple test*

6.8.5.3.7.1 Applicability

For all types of flexible bulk containers as a design type test.

6.8.5.3.7.2 Preparation ~~of the FBCs for test~~ for testing

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.8.5.3.7.3 Flexible bulk container shall be toppled onto any part of its top by lifting the side furthest from the drop edge upon a target surface that is non-resilient and horizontal. The target surface shall be:

(a) Integral and massive enough to be immovable;

(b) Flat with a surface kept free from local defects capable of influencing the test results;

(c) Rigid enough to be non-deformable under test conditions and not liable to become damaged by the tests; and

(d) Sufficiently large to ensure that the test package falls entirely upon the surface.
upon a rigid, non-resilient, smooth, flat, and horizontal surface.

6.8.5.3.7.4 For all flexible bulk containers, the topple height is specified as follows:

Packing group III: 0.8 m

6.8.5.3.7.5 Criteria for passing the test: there shall be no loss of contents. A slight discharge, (e.g., from closures or stitch holes), upon impact ~~is shall~~ not ~~be~~ considered to be a failure of the flexible bulk container; provided that no further leakage occurs.

6.8.5.3.8 *Righting test*

6.8.5.3.8.1 Applicability

For all types of flexible bulk containers designed to be lifted from the top or side, as a design type test.

6.8.5.3.8.2 Preparation for testing

The flexible bulk container shall be filled to not less than 95% of its capacity and to its maximum permissible gross mass.

6.8.5.3.8.3 The flexible bulk container, lying on its side, shall be lifted at a speed of at least 0.1 m/s to an upright position, clear of the floor, by no more than half of the a half of provided lifting devices.

6.8.5.3.8.4 Criteria for passing the test: there shall be no damage to the flexible bulk container or its lifting devices which renders the flexible bulk container unsafe for transport or handling.

6.8.5.3.9 *Tear test*

6.8.5.3.9.1 Applicability

For all types of flexible bulk containers as a design type test.

6.8.5.3.9.2 Preparation for testing

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.8.5.3.9.3 With the flexible bulk container placed on the ground, a ~~100mm-300mm~~ cut, completely penetrating all layers of the flexible bulk container on a the wall of a wide face. The cut shall be, is made at a 45° angle to the principal axis of the flexible bulk containers, halfway between the bottom surface and the top level of the contents. The flexible bulk containers shall then be subjected to a uniformly distributed superimposed load equivalent to twice the maximum ~~net-gross~~ mass of the package. The load must be applied for at least ~~five-fifteen~~ minutes. ~~A~~ flexible bulk container which is designed to be lifted from the top or the side shall, after removal of the superimposed

load, be lifted clear of the floor and maintained in that position for a period of **five fifteen** minutes.

6.8.5.3.9.4 Criterion for passing the test: the cut shall not propagate more than 25 percent of its original length.

6.8.5.3.10 *Stacking test*

6.8.5.3.10.1 Applicability

For all types of flexible bulk containers as a design type test.

6.8.5.3.10.2 Preparation for testing

The flexible bulk container shall be filled to its maximum permissible gross mass.

6.8.5.3.10.3 The flexible bulk container shall be subjected to a force applied to the top surface of the flexible bulk container that is four times the design load-carrying capacity for 24 hours.

6.8.5.3.10.4 Criterion for passing the test: there shall be no loss of contents during the test or after removal of the load.

~~6.8.5.3.11 — *Waterproofness (Weatherproofness) test*~~

~~6.8.5.3.11.1 — Applicability~~

~~For all flexible bulk containers types as a design type test and for periodic testing required by 6.8.5.3.3.~~

~~6.8.5.3.11.2 — FBC shall be filled with air to 100 kPa~~

~~6.8.5.3.11.3 — A water jet is discharged from a nozzle (ID 12.5 mm) to all FBC outside welds and grooves, its pressure being approximately 100 kPa. The tip is kept 1.5 m away from the container being tested, and the water jet is moved with 100 mm/s.~~

~~6.8.5.3.11.4 — Criterion for passing the test: There shall be no water spots on the internal surface.~~

~~6.8.5.3.12 — *Safety coefficient test*~~

~~6.8.5.3.12.1 — Applicability~~

~~For all flexible container types as a test for periodic inspection of used flexible bulk containers required by 6.8.5.3.3.~~

~~6.8.5.3.12.2 — The flexible bulk container shall be disassembled and cleaned.~~

~~6.8.5.3.12.3 — 30 mm sections of load-bearing straps shall be cut out in three points equally spaced along its circumference. The residual tearing strength of the strap is determined using the tensile testing machine. The residual tearing strength of the strap is compared to its minimal acceptable value noted in the FBC passport.~~

~~The minimal acceptable value shall be pre-defined by calculations for each FBC type based on the strength of 6:1.~~

~~6.8.5.3.12.4 — Criterion for passing the test: The average statistical value of the tearing strength of the strap shall exceed its minimal acceptable value.~~

~~6.8.5.3.12.5 Other equally effective methods of safety coefficient testing and preparation may be used with approval of the Competent Authority.~~

6.8.5.4 Test report

6.8.5.4.1 A test report containing at least the following particulars shall be drawn up and shall be available to the users of the flexible bulk container:

1. Name and address of the test facility;
2. Name and address of applicant (where appropriate);
3. Unique test report identification;
4. Date of the test report;
5. Manufacturer of the flexible bulk container;
6. Description of the flexible bulk container design type (e.g. dimensions, materials, closures, thickness, etc) and/or photograph(s);
7. Maximum capacity/maximum permissible gross mass;
8. Characteristics of test contents, e.g. particle size for solids;
9. Test descriptions and results;
10. The test report shall be signed with the name and status of the signatory.

6.8.5.4.2 The test report shall contain statements that the flexible bulk container prepared as for transport was tested in accordance with the appropriate provisions 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.

6.8.5.5 Marking

6.8.5.5.1 Each flexible bulk container manufactured and intended for use according to these Regulations shall bear markings that are durable, legible and placed in a location so as to be readily visible. Letters, numerals and symbols shall be at least 24 mm high and shall show:

- (a) The United Nations packaging symbol 
This symbol shall not be used for any purpose other than certifying that a packaging, flexible bulk container, a portable tank or a MEGC complies with the relevant requirements in Chapter 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8 ;
- (b) The code BK3;
- (c) A capital letter designating the packing group(s) for which the design type has been approved:
 - (ii) Z for packing group III only;
- (d) The month and year (last two digits) of manufacture;

(e) The State authorizing the allocation of the mark; indicated by the distinguishing sign for motor vehicles in international traffic;

(f) The name or symbol of the manufacturer and other identification of the FBC as specified by the competent authority;

(g) The stacking test load in kg.

(gh) The maximum permissible gross mass in kg.

Marking shall be applied in the sequence shown in (a) to (gh); each element of the marking, required in these subparagraphs, shall be clearly separated, e.g. by a slash or space and presented in a way that ensures that all of the parts of the mark are easily identified.

6.8.5.2.2 *Example of marking*



BK3/Z/11 09
RUS/NTT/MK-14-10
4200056000/14000".

7.1.1.11 Flexible bulk containers shall be transported within a conveyance with rigid sides and ends that extend at least two-thirds of the height of the flexible bulk container.

7.1.1.11.1 Flexible bulk containers shall be secured by suitable means capable of restraining the container in the conveyance in a manner that will prevent any movement during transport which would change the orientation of the container or cause the container to be damaged. Movement of the containers may also be prevented by filling any voids by the use of dunnage or by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation to the flexible bulk containers.

7.1.1.11.2 Flexible bulk containers [shall][should] not be stacked for transport.