

DRAFT OFFICIAL MEXICAN STANDARD
NOM-029-SCT2/1994
SPECIFICATIONS FOR THE CONSTRUCTION
AND RECONSTRUCTION OF INTERMEDIATE
BULK CONTAINERS (IBCs)

1. PURPOSE.

The purpose of this Standard is to set forth the classification and the designatory code for Intermediate Bulk Containers (IBCs), as well as the specifications for the construction, reconstruction, approval, certification and marking of said Intermediate Bulk Containers, and the provisions regarding their utilization, with a view to protecting the general lines of communication and the safety of their users.

2. APPLICABILITY.

This Official Mexican Standard applies compulsorily to the manufacturers of Intermediate Bulk Containers (IBCs) as well as factories authorized by the relevant authority and persons responsible for the reconstruction of these IBCs.

3. REFERENCES.

For the correct implementation of this Standard, it is necessary to consult the following Official Mexican Standard:

| | |
|-------------------|---|
| NOM-007-SCT2/1994 | MARKING OF PACKAGES AND PACKAGINGS INTENDED FOR THE TRANSPORT OF HAZARDOUS SUBSTANCES AND WASTES. |
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4. DEFINITION.

4.1 "Intermediate Bulk Containers" (IBCs) are rigid, semi-rigid or flexible portable packages and packagings, which also:

a) Have a maximum capacity of 3,000 liters (3.0 m³) with the following modalities:

I Maximum capacity of 3,000 liters (3.0 m³) for solids or liquids that belong, under the package and packaging classification, to Groups II and III.

- II Maximum capacity of 1,500 liters (1.5 m³) for solids of Group I, package and packaging in flexible or rigid plastic, wood or fiberboard.
 - III Maximum capacity of 3,000 liters (<Y<3.0 m³) for solids of Group I packed in metal IBCs.
- b) Are designed for mechanical handling.
 - c) Can withstand the stresses that are produced during handling and transport operations, as determined by the tests to which they are subjected.

Body.- This is the receptacle proper, including its coverings [sic] and closures, but exclusive of the service equipment.

Protective Attachments.- These offer additional protection against impacts[;] said protection shall take the form, for example, of multi-layer (sandwich), double-wall construction, or metal lattice-work structure.

Liner.- Tube or bag within the body, without forming an integral part of said body.

Service Equipment.- This means filling or discharge, pressure relief, heating or heat-insulating devices, and measuring instruments.

Structural Equipment.- This means fastening, handling, protective or stabilizing devices that are part of the body.

Handling Devices.- These are the slings loops, eyes or frames attached to the body of the IBC or formed by a continuation of said IBC.

Maximum Permissible Weight.- This means the mass of the body, service equipment, structural equipment and the maximum permissible load.

Maximum Permissible Load.- The maximum net mass for which the IBC was intended and is authorized to transport.

Inner Receptacle.- A receptacle intended to contain a product, and which enters into direct contact with said product, maintaining its physical, chemical and sanitary integrity.

Outer Receptacle.- This means the receptacle that contains the primary receptacle and that serves as its protection.

5. CLASSIFICATION AND DESIGNATORY CODE.

Classification.

5.1 The intermediate bulk containers (IBCs) are classified into three different types:

- a) Rigid
- b) Semi-rigid
- c) Flexible.

5.2 Designatory code.

5.2.1 The code for designating the various types of IBCs consists of two Arabic numerals, as indicated in Table 1, followed by one or more capital letters, such as indicated in Table 2; followed by another Arabic numeral representative of the IBC category.

Table 1.- Arabic Numerals for the IBC Designation.

| TYPE | SOLID SUBSTANCES DISCHARGED | | LIQUIDS |
|------------|-----------------------------|---|---------|
| | BY GRAVITY | UNDER PRESSURE OF MORE THAN 10 kPa (0.1 BAR) | |
| RIGID | 11 | 21 | 31 |
| SEMI-RIGID | 12 | 22 | 32 |
| FLEXIBLE | 13 | -- | -- |

Table 2.- Letters for the IBC Designation.

| LETTER | M A T E R I A L S |
|--------|--|
| A | STEEL (all types and surface treatments) |
| B | ALUMINUM |
| C | NATURAL WOOD |
| D | PLYWOOD |
| F | RECONSTITUTED WOOD |
| G | FIBERBOARD |
| H | PLASTIC |
| L | TEXTILE MATERIALS |
| M | PAPER, MULTI-SHEETS |
| N | METAL (except steel and aluminum) |

5.2.2 For composite IBCs, two capital letters in Latin characters must be used, which letters shall be placed in sequence in the second position of the code. The first shall indicate the material in which the inner package and packaging of the IBC is constructed, and the second that of the outer package and packaging of said IBC.

6. SPECIFICATIONS.

6.1. For the construction and reconstruction.

6.1.1 IBCs must be resistant to the deterioration which may be caused by the external environment, or be adequately protected therefrom.

6.1.2 The construction and closures of the IBCs must be such that there can be no escape or loss of contents under normal conditions of transport.

6.1.3 IBCs and their closures must be constructed of materials that are compatible with the contents, or are protected internally, so that these materials cannot:

- a) Be attacked by the contents so as to make their use dangerous;
- b) Cause the contents to react or decompose or, as a result of the contents coming into contact with the container, form harmful or dangerous compounds.

- 6.1.4 Assuming that sealing gaskets are used, these must be made of materials not subject to attack by the substances transported in IBCs.
- 6.1.5 All items of service equipment shall be so positioned [*missing word*] protected as to minimize the risk of escape of the contents in case of damage during the handling and transport operations.
- 6.1.6 IBCs, their attachment devices and their items of service and structural equipment shall be designed so as to withstand, without loss of contents, the internal pressure of said contents and the stresses resulting from the normal handling and transport operations. IBCs that must be stabilized in stacks shall be designed for this purpose. All elements of the lifting and attachment devices shall be of sufficient strength so as not to incur any gross distortion or imperfection under normal handling and transport conditions, and they shall be so positioned that no excessive stresses occur in any part of the IBC.
- 6.1.7 When the IBC consists of a body within a framework, it must be so constructed that:
- a) The body does not incur any distortion or chafing against the framework to the point of becoming damaged.
 - b) The body remains within the framework at all times, and
 - c) The items of equipment are secured in such a way that they cannot be damaged in the event that the connections between body and frame allow relative expansion or movement.
- 6.1.8 If the container is fitted with a bottom discharge valve, this valve must be capable of remaining secure in its closed position, and the whole discharge device shall be duly protected from damage. Valves with a lever closure shall be fitted with a safety device that prevents them from accidental opening, and the open or closed position shall be perfectly easy to distinguish. In IBCs intended for the transport of liquids, the discharge aperture must also have a second sealing device, for example a blank flange or an equivalent device.
- 6.1.9 All IBCs must pass the relevant resistance tests.

6.2 Operational Specifications

- 6.2.1 Before filling it and presenting it for transport, every IBC must be inspected to check that has no corrosion, contamination or other type of damages, as well as to verify the proper functioning of any item of service equipment. Any IBC which shows signs of reduced

strength as compared with the tested design, shall no longer be used unless it is reconditioned so as to withstand the design tests.

- 6.2.2 When the IBC is filled with liquids, a sufficient empty space will have to be left so that, at the mean temperature of 50EC of the liquid bulk mass, the container is not filled to more than 98% of its water capacity.
- 6.2.3 When two or more closure devices are fitted in series, the nearest to the substance being transported must be closed first.
- 6.2.4 During transport, no dangerous residue must adhere to its outside.
- 6.2.5 Likewise, during transport, IBCs must be perfectly fastened to the transport unit, or securely lodged within said unit so as to avoid lateral or longitudinal movement and impact, and so as to provide adequate external control.
- 6.2.6 Any empty IBC that has contained a hazardous material shall be treated in the same manner as is required for filled IBCs until they have been purged of the residue of that dangerous substance.
- 6.2.7 When IBCs are used for transporting liquids whose flash point is equal to or lower than 60EC (in closed-cup) or powdered materials, appropriate measures shall be taken to avoid a dangerous electrostatic discharge.
- 6.2.8 IBCs used to transport solids that can melt at temperatures likely to be encountered during transport, must be capable of containing the substance in its liquid state.

6.3 Specifications for metal intermediate bulk containers intended for the transport of liquid and solid materials.

6.3.1 Metal IBCs are of three types:

- 1) IBCs for solid substances which are loaded and discharged by gravity (11a, 11g, 11n);
- 2) IBCs for solid substances which are loaded and discharged at a higher gage pressure (1.45 lb/in²) (21A, 21B, 21N); and 0.10 kg/cm² (1.45 lb/in²).
- 3) IBCs for liquids (31A, 31B, 31N)[.] IBCs intended for the transport of liquids and fitted to the conditions provided in this Standard must not be used for the transport

of liquids whose vapor pressure is greater than 50EC, at 55EC, 1.33 kg/cm² (18.81 lb/in²) 1.12 kg/cm² (15.92 lb/in²).

- 6.3.2 The body must be made of suitable ductile metal materials whose weldability has been fully demonstrated. Welds must be well made and afford complete safety. Whenever necessary, low-temperature strength will have to be taken into account.
- 6.3.3 If contact between the substance transported and the material used for the construction of the body causes a progressive decrease in the thickness of the body walls, this thickness must be increased at manufacture by an appropriate amount. This increase added to the wall thickness, so as to offset the effects of the corrosion, must be determined in accordance with paragraph 6.5.7 (see also section 6.1.3).
- 6.3.4 Precautions must be taken to avoid damage due to the galvanic corrosion resulting from the juxtaposition of dissimilar metals.
- 6.3.5 Aluminum IBCs intended for the transport of flammable liquids shall not have any movable components (such as covers, closures, etc.) made of unprotected steel liable to rust, which might cause dangerous reactions by coming into frictional or percussive contact with the aluminum.
- 6.3.6 Metal IBCs shall be made of metals which meet the following conditions:

- a) In the case of steel, the percentage of fracture elongation shall not be less than 10,000/R_m. With an absolute minimum of 20%.

where: R_m = guaranteed minimum tensile strength, in N/mm², of the steel to be used.

- b) In the case of aluminum, the percentage of fracture elongation shall not be less than 10,000/6 R_m, with an absolute minimum of 8%. Specimens used to determine the fracture elongation must be taken transversely to the direction of rolling, so that:

$$L_o = 5d$$

or

$$L_o = 5.65 \%A$$

where: L_o = reference length of the test tube [sic] before the test, and

d = diameter

A = cross-sectional area of specimen

- 6.3.7 Minimum wall thickness:

- a) in the case of a reference steel in which the product $R_m \times A_o = 10,000$, the wall thickness shall not be less than:

| Thickness of wall in mm | | | | | |
|----------------------------|--------|-------------------------|-----------|---|-----------|
| Capacity in m ³ | | TYPES: 11a, 11b, 11n | | TYPES: 21a, 21b, 21n, 31a, 31b, 31n | |
| | | Without Protection | Protected | Without Protection | Protected |
| > 0.25 | -# 1.0 | 2.0 | 1.5 | 2.5 | 2.0 |
| > 1.0 | -# 2.0 | 2.5 | 2.0 | 3.0 | 2.5 |
| > 2.0 | -# 3.0 | 3.0 | 2.5 | 4.0 | 3.0 |

where: A_o = Minimum percentage of fracture elongation of the reference steel at tension under a stress [sic] (see 6.3.6).

- b) In the case of metals other than the reference steel defined in a), the minimum wall thickness shall be determined according to the following equivalence formula:

$$e_1 = \frac{21.4 \times e_o}{\sqrt[3]{R_{m1} \times A_1}}$$

where: e_1 = equivalent thickness, required in the walls, of the metal to be used (in mm);

e_o = Minimum thickness, required in the walls, for the reference steel (in mm);

R_{m1} = guaranteed minimum tensile strength of the metal to be used (in N/mm²);

A_1 = minimum percentage of elongation of the metal to be used under a stress (see 5.3.6).

In any case, the wall thickness shall never be less than 1.5 mm.

6.3.8 Provisions regarding pressure relief.

- 6.3.8.1 IBCs for liquids shall have the means necessary to release a sufficient amount of vapor in the event of fire engulfment, so as to avoid any rupture in the body. This can be achieved by ordinary relief devices or by other structural means.

- 6.3.8.2 The start-to-discharge pressure shall not be higher than 0.66 Kg/cm² (9.41 lb/in²) nor lower than the total gage pressure produced in the IBC, that is, the vapor pressure of the filling substance plus the partial pressure of the air or other inert gases, minus 1.019 Kg/cm² (14.47 lb/in²) at 55EC; determined as a function of a maximum degree of filling (see 6.2.2). The pressure relief device is fitted in the vapor space.
- 6.4 Special specifications regarding flexible IBCs.
- 6.4.1 The specifications given below are applicable to flexible IBCs of the following types:
- 13H1 Woven plastic without coating or liner.
 - 13H2 Woven plastic, coated.
 - 13H3 Woven plastic, with liner.
 - 13H4 Woven plastic, coated and with liner.
 - 13H5 Plastic film.
 - 13L1 Textile materials, without coating or liner.
 - 13L2 Textile materials, coated.
 - 13L3 Textile materials, with liner.
 - 13L4 Textile materials, coated and with liner.
 - 13M1 Paper, multi-sheet.
 - 13M2 Paper, multi-sheet, water resistant.
- 6.4.2 Flexible IBCs are intended solely for the transport of solid substances.
- 6.4.3 Construction and reconstruction.
- 6.4.3.1 The body shall be manufactured from suitable materials. The strength of the material and the construction of the flexible IBC shall be appropriate to the capacity of said IBC and the use for which it is intended.

- 6.4.3.2 All materials used in the construction of flexible IBC of types 13M1 and 13M2 shall retain, after complete immersion in water during a minimum period of 24 hours, at least 85% of the tensile strength as determined initially with the material previously conditioned to stabilization at a relative humidity of 67% or less.
- 6.4.3.3 Seams shall be made by stitching, heat sealing, gluing or any other similar process. The ends of stitched seams must be duly secured.
- 6.4.3.4 Flexible IBCs shall be sufficiently resistant to aging and decomposition caused by ultraviolet rays, climatic conditions or the very substances they contain, thereby rendering them appropriate to their intended use.
- 6.4.3.5 Where necessary, flexible IBCs made of plastics shall be protected from ultraviolet rays by impregnating the material with carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and retain their efficiency during the useful life of the container body. When use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the design subjected to the tests, the re-testing may be waived if the proportion of these additives does not alter dangerously the physical properties of the material of construction.
- 6.4.3.6 Additives may be incorporated into the material of the body to increase its resistance to aging or for other purposes, provided that its physical or chemical properties are not altered.
- 6.4.3.7 In the manufacture of IBC bodies, use shall not be made of any material originating from used containers. Nevertheless, residues or cuttings from the same serial manufacturing process may be used. This does not prevent the use of components such as fittings and pallets, provided that their components have not in any way been damaged.
- 6.4.3.8 Once the IBC is filled, the ratio of height to width must not be more than 2:1.
- 6.4.3.9 The liner must be designed with a suitable material. The strength of the material thus used and the methods of manufacturing of the liner shall be suitable for the IBC's capacity and for the use intended for said IBC. The joints and closures must be sift-proof and capable of withstanding the pressures and impacts likely to occur under normal conditions of handling and transport.

6.5 Special specifications regarding rigid plastic IBCs.

- 6.5.1 These provisions apply to rigid plastic IBCs for the transport of liquids and solids, which IBCs include the following types:
- 11H1 Fitted with structural elements designed to withstand the loads resulting from stacking the IBCs, for solid substances which are loaded or discharged by gravity.
 - 11H2 Stable;[sic] for solid substances which are loaded or discharged by gravity.
 - 21H1 Fitted with structural elements designed to withstand the loads resulting from stacking the IBCs, for solid substances which are loaded or discharged under pressure.
 - 21H2 Stable; for solid substances which are loaded or discharged under pressure.
 - 31H1 Fitted with structural elements designed to withstand the loads resulting from stacking the IBCs, for liquid substances.
 - 31H2 Stable; for liquid substances.
- 6.5.2 The IBC body must be manufactured from a suitable plastic material, of known characteristics, and must have a suitable strength in relation to its capacity and its intended use. Said material must be sufficiently resistant to aging and decomposition caused by the hazardous material contained in the IBC or, where relevant, ultraviolet rays. If appropriate, its resistance at low temperatures must also be taken into account. Under normal conditions of transport, any infiltrations of the substance must not constitute a danger.
- 6.5.3 Where necessary, the IBC body shall be protected against ultraviolet rays by impregnating the material with carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and remain effective throughout the useful life of the container body. When use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the tested design, re-testing may be waived if the proportion of said additives does not alter the physical properties of the material of construction.
- 6.5.4 Additives may be incorporated into the material of the body to increase its resistance to aging or for other purposes, provided that its physical or chemical properties are not altered dangerously.
- 6.5.5 In the manufacture of rigid plastic IBCs, no used material may be used, except for what is referred to as the residues or the regrindings from the same manufacturing process.

6.5.6 IBCs intended for the transport of liquid substances must be fitted with a pressure relief device, with which it is possible to release vapors in an amount sufficient to prevent the IBC body from rupturing if an internal pressure greater than that for which it was hydraulically tested accumulates inside. For this, conventional decompression devices or other structural means may be used.

6.5.7 Provisions regarding the operation.

6.5.7.1 The period of use of IBCs for the transport of dangerous liquid materials must be five years from the date of manufacture of the container, except where, because of the nature of the liquid to be transported, a shorter period is prescribed. To use them for a longer period than the one mentioned, approval of a relevant authority is required.

6.5.7.2 The liquid materials must only be placed in IBCs that have a resistance to the internal pressure that can accumulate inside under normal conditions of transport. IBCs marked with the hydraulic test pressure must only be filled with liquids whose vapor pressure is:

- a) Such that the total gage pressure in said IBC (that is, the vapor pressure of the material with which it has been filled, plus the partial pressure of air or other inert gases, less 1.019 Kg/cm²) at 55EC; determined as a function of the maximum degree of filling in accordance with paragraph 6.2.2 and a filling temperature of 15EC; does not exceed two-thirds of the test pressure indicated in the container; or
- b) At 50EC, less than four-sevenths of the sum of the indicated test pressure and 1.019 Kg/cm²; or
- c) At 55EC, less than two-thirds of the sum of the test pressure indicated and 1,019 Kg/cm².

6.6 Special provisions regarding composite IBCs, with plastic inner receptacle.

6.6.1 These provisions refer to the following types of composite IBCs intended for the transport of solid and liquid substances:

11HZ1 Composite IBCs, with a rigid plastic inner receptacle, for solid substances that are loaded or discharged by gravity.

11HZ2 Composite IBCs with an flexible plastic inner receptacle, for solid substances that are loaded or discharged by gravity.

- 21HZ1 Composite IBCs, with a rigid plastic inner receptacle, for solid substances that are loaded or discharged under pressure.
 - 21HZ2 Composite IBCs, with a flexible plastic inner receptacle, for solid substances that are loaded or discharged under pressure.
 - 31HZ1 Composite IBCs, with a rigid plastic inner receptacle, for liquid substances.
 - 31HZ2 Composite IBCs, with a flexible plastic inner receptacle, for liquid substances.
- 6.6.1.1 The code corresponding to each of the IBC types must be completed by replacing the letter "Z" by a capital letter, as provided in Table 2 of paragraph 5.2.1 [t]o indicate the material of construction of the outer package and packaging.
- 6.6.2 The inner receptacle is not intended to perform its containment function without its outer package and packaging.
- 6.6.3 Normally, the outer package and packaging consists of a rigid material configured so as to protect the inner receptacle from possible [sic] damages during the handling and transport operations, but it is not intended to perform a containment function. It includes, where appropriate, a load pallet as a base.
- 6.6.4 Composite IBCs in whose outer package and packaging the inner receptacle is to be totally enclosed, must be so designed that the integrity of the latter may be easily verified when checking the results of the leakproofness test and the hydraulic pressure test.
- 6.6.5 Inner receptacle
- 6.6.5.1 The inner receptacle of the IBC must be manufactured from a suitable plastic material of known characteristics and must have an adequate resistance in relation to its capacity and intended use. Said material must be sufficiently resistant to aging and decomposition caused by the substance contained in the IBC or, where relevant, of ultraviolet rays. If appropriate, its resistance at low temperatures must also be taken into account. Under normal conditions of transport, any infiltrations of the substance must not constitute a danger.
 - 6.6.5.2 If necessary, the inner receptacle shall be protected against ultraviolet rays by impregnating the material with carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and remain effective throughout the useful life of the inner receptacle. Where use is made of carbon black, pigments

or inhibitors other than those used in the manufacture of the tested model, re-testing may be waived if the proportion of said additives does not alter dangerously the physical properties of the material of construction.

6.6.5.3 Additives may be incorporated into the material of the inner receptacle to increase its resistance to aging or for other purposes, providing that they do not alter dangerously its physical or chemical properties.

6.6.5.4 In the manufacture of inner receptacles, no used material may be used, except for what is referred to as the residues or regrindings from the same manufacturing process.

6.6.5.5 IBCs intended for the transport of liquid materials must be fitted with pressure relief devices with which it is possible to release vapors in a sufficient amount to prevent the inner receptacle from rupturing in case of a pressure greater than that for which it was hydraulically tested. For this, conventional decompression devices or other structural means may be used.

6.6.6 Outer package and packaging

6.6.6.1 The strength of the material and the construction of the outer package and packaging must be adequate for the capacity of the composite IBC and its intended use.

6.6.6.2 The outer package and packaging must have no projection that might damage the inner receptacle.

6.6.6.3 Steel or aluminum that are used in the construction of outer packages and packagings must be of a suitable type and sufficient thickness.

6.6.6.4 Natural wood that is used in the construction of outer packages *[missing word]* packagings must be well seasoned, commercially dry and free from defects that could noticeably lessen the strength of the receptacle in any of its parts. The top and bottom may be made of reconstituted wood that is water-resistant, such as hardboard or particle board, or other suitable types.

6.6.6.5 The plywood that is used in the construction of outer packages and packagings must be made of well seasoned, rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the receptacle. All adjacent plies must be glued together with water-resistant adhesive. For the construction of the receptacles, other suitable materials may be used together with

plywood. The walls must be firmly nailed or secured to the corner posts or castings,[sic] or be assembled by other equally efficient means.

6.6.6.6 The reconstituted wood used to make the walls of the outer packages and packagings must be water-resistant, such as hardboard or particle board, or be of other suitable types. Other elements of the receptacle may be made of other suitable material.

6.6.6.7 The fiberboard used in the construction of outer packages and packagings must be strong and good-quality, compact or double-faced corrugated, single- or multi-sheet, and be appropriate to the capacity of the receptacle and to its intended use. The water resistance of the outer surface must be such that the increase in mass, as measured in a test carried out over 30 minutes by the Cobb method of verifying water absorption, is not greater than 155 g/m² (see International Standard 535-1991, of the ISO). The fiberboard must have adequate bending characteristics, and must be cut, creased without any crevices forming, and slotted so as to permit assembly of the elements without cracking, surface breaks or excessive bending. The fluting of corrugated fiberboard must be firmly glued to the facings.

6.6.6.8 The ends of the fiberboard outer packages and packagings may have a wooden frame or be entirely of wood. As reinforcements, wooden battens may be used.

6.6.6.9 In the body of the fiberboard outer packages and packagings, the joints must be secured with adhesive tape, or lapped and glued, or stitched with metal staples. The lapped edges [sic] must be suitably overlapped. When the joints are secured by gluing or adhesive tape, the adhesive product must be water-resistant.

6.6.6.10 If the outer package and packaging is made of plastic, the specifications for construction set forth in paragraphs 6.6.5.1 through 6.6.5.4 must be observed.

6.6.7 Other items of structural equipment

6.6.7.1 The load pallet forming part of an IBC and the detachable pallets must be suitable for handling by mechanical means with the IBC filled to its maximum permissible gross mass.

6.6.7.2 The fixed or detachable pallet must be designed so as to prevent the forming of any protrusions in the base of the IBC which may be damaged during handling operations.

6.6.7.3 Where a detachable pallet is used, the outer package and packaging must be secured thereto in order to retain its stability during handling and transport, and in the top part of the pallet must be free from sharp protrusion that might damage the IBC.

6.6.7.4 To increase the resistance under stacking conditions, use may be made of strengthening elements such as timber supports, but they must be joined externally to the inner receptacle.

6.6.7.5 In IBCs intended for stacking, the bearing surface must meet all appropriate conditions so that the load exerted on said surface is distributed in a safe manner[;] such IBCs must be designed so that the load is not supported [by] the inner receptacle.

6.6.8 Provisions regarding the operation.

6.6.8.1 The period of use of the IBCs as regards the transport of hazardous liquid materials must be five years from the date of manufacture of the container, except where, due to the nature of the liquid to be transported, a shorter period is prescribed. To be used for a longer period than the one mentioned, the approval of a competent authority must be obtained.

6.6.8.2 Liquid materials must only be filled into IBCs which are resistant to the internal pressure that may accumulate inside under normal conditions of transport. Those IBCs shall only be filled with liquids whose vapor pressure is:

- a) Such that the total gage pressure in the IBC (that is, the vapor pressure of the material with which said IBC has been filled, plus the partial pressure of air or other inert gases, minus 1.019 Kg/cm²) at 55EC, determined as a function of the maximum degree of filling that is 98%, and of a filling temperature of 15EC, does not exceed two-thirds of the test pressure indicated on the container; or
- b) At 50EC, lower than four-sevenths of the sum of the indicated test pressure plus 1.019 Kg/cm²; or
- c) At 55EC, less than two-thirds of the sum of the test pressure indicated plus 1.019 Kg/cm².

6.7 Special specifications for fiberboard IBCs.

6.7.1 These specifications apply to fiberboard IBCs intended for the transport of solid materials that are loaded or discharged by gravity. Fiberboard IBCs are of the 11g type.

6.7.2 Fiberboard IBCs must not be fitted with top lifting devices.

- 6.7.3 Strong and good-quality compact or double-faced corrugated fiberboard must be used, single- or multi-sheet, and appropriate to the capacity of the IBC and its intended use. The water resistance of the outer surface must be such that the increase in mass, as measured in a test carried out over a period of 30 minutes by the Cobb method of determining water absorption, is not greater than 155 g/m². Fiberboard must have suitable bending characteristics, so as to permit assembly of elements without cracking, surface breaks or excessive bending. The fluting of the corrugated fiberboard must be firmly glued to the facings.
- 6.7.4 The walls, including top and bottom, must have a puncture resistance of at least 15J.
- 6.7.5 In the body of the IBC, the joins must be suitably overlapped, and must be effected with adhesive tape, glue or metal staples, or by any other means that is at least equally effective. Where joins are effected by gluing or adhesive tape, the adhesive product must be water-resistant. If metal staples are used, these must pass completely through the pieces to which they apply, and they must be formed or insulated so that they cannot abrade or puncture the inner liner.
- 6.7.6 The inner liner must be of a suitable material. The strength and the construction of the liner must be appropriate to the capacity of the IBC and to its intended use. Joins and closures must be sift-proof and
resistant to the pressures and impacts liable to occur under normal conditions of handling and transport.
- 6.7.7 The pallet that forms an integral part of an IBC and the detachable pallets must be suitable for the handling by mechanical means with the IBC filled to its maximum permissible gross mass.
- 6.7.8 The pallet, whether stationary or detachable, must be designed so as to prevent the forming, in the lower part of the IBC, of protrusions that may damage it during handling operations.
- 6.7.9 Where a detachable pallet is used, the body of the IBC must be secured thereto, so as to retain its stability during handling and transport, and the top part of the pallet must be free from any sharp protrusion that might damage the IBC.
- 6.7.10 To increase resistance under stacking conditions, use may be made of strengthening elements such as timber supports, but they must be placed externally to the inner liner.
- 6.7.11 Where IBCs are intended for stacking, the bearing surface must meet appropriate conditions so that the load exerted on said surface is distributed in a safe manner.

6.8 Special specifications related to wooden IBCs.

6.8.1 These specifications apply to wooden IBCs intended for the transport of solid materials which are loaded or discharged by gravity. Wooden IBCs are of the following types:

11C Natural wood, with inner liner.

11D Plywood, with inner liner.

11F Reconstituted wood, with inner liner.

- 6.8.2 Wooden IBCs must not be fitted with top lifting devices.
- 6.8.3 The strength of the materials used and the method of construction must be appropriate to the capacity of the IBC and its intended use.
- 6.8.4 Natural wood must be well seasoned, commercially dry and free from defects that would materially lessen the strength of the IBC in any of its parts. Each of these parts must be of one piece or be equivalent thereto. Parts [are] considered to be equivalent to one piece when they are assembled by gluing by a method at least as efficient as, for example, any of the following: dovetail joint, tongue and groove joint, rabbet joint, rabbet joint formed midway in the wood, or butt joint with at least two corrugated metal staples.
- 6.8.5 Plywood used in the construction of the body of the IBC must be three-ply as a minimum. It must be made of well seasoned rotary cut, sliced or sawn veneer. And it must be commercially dry and free from defects that would materially lessen the strength of the body. For the construction of the body, use may be made of *[missing phrase]* [A]ll adjacent plies must be joined with a water-resistant adhesives.[sic] *[missing phrase]* together with plywood, other suitable materials.
- 6.8.6 Reconstructed wood used in the construction of the body of the IBC must be water-resistant, such as hardboard or particle board or other suitable types.
- 6.8.7 The walls of IBCs must be firmly nailed or secured to the corner posts or castings or be assembled by other equally efficient means.
- 6.8.8 The inner liner must be of a suitable material. The strength and the construction of the liner must be appropriate to the capacity of the IBC and its intended use. Joins and closures must be sift-proof and resistant to the pressures and impacts liable to occur under normal conditions and [sic] handling and transport.

- 6.8.9 The load pallet forming an integral part of an IBC and the detachable pallets must be suitable for handling by mechanical means with the IBC filled to its maximum permissible gross mass.
- 6.8.10 The pallet, whether stationary or detachable, must be designed so as to prevent the forming, in the lower part of the IBC, of protrusions that might be liable to damage during handling operations.
- 6.8.11 Where a detachable pallet is used, the body of the IBC must be secured thereto, so as to retain its stability during handling and transport, and the top part of the pallet must be free from any sharp protrusion that might damage the IBC.
- 6.8.12 To increase the resistance under stacking conditions, use may be made of strengthening elements such as timber supports, but they must be placed externally to the inner liner.
- 6.8.13 In IBCs intended for stacking, the bearing surface must meet the appropriate conditions so that the load exerted on said surface is distributed in a safe manner.

7. GENERAL SPECIFICATIONS REGARDING TESTING AND CERTIFICATION.

- 7.1 Before an IBC is used, the corresponding design type must have passed various tests. An IBC design type is defined by its design, size, material and thickness, manner of construction and means of filling and discharging, but may present varying surface treatments. This design type also includes IBCs which only differ from said design type in their lesser external dimensions.
- 7.2 Tests shall be carried out on IBCs already prepared for transport. IBCs is [sic] filled in the form indicated in the relevant sections. The materials to be transported in said IBCs may be replaced by other materials, unless said replacement would weaken [sic] the results of the tests. In the case of solid materials, if a replacement material is used, the latter must have the same physical characteristics (mass, grain size, etc.) as the material to be transported. It will be permissible to use additional loads, such as bags of lead shot, to obtain the requisite total package mass, provided that such loads are placed so as not to influence test results.
- 7.3 In the drop tests for liquids, the material [to be] substituted must be of a relative density and viscosity similar to those of the material to be transported. In said drop tests, water may also be used, under the following conditions:

- a) When the relative density of the materials to be transported is no higher than 1.2, the drop height is as indicated in the relevant paragraphs for the various types of IBCs[;]
- b) When the relative density of the substances to be transported is higher than 1.2, the drop height is calculated based on the relative density of the substance to be transported, rounding off the figure to the first decimal as is shown below:

| PACKAGE AND PACKAGING | | |
|-----------------------|------------------|------------|
| GROUP I | GROUP II | GROUP III |
| | d x 1.5m x 1.0 m | d x 0.67 m |

- 7.4 All IBCs intended to contain liquids shall undergo the leakproofness test prescribed under the relevant paragraphs for the various types of IBCs:
- a) Before they are first used for transport.
 - b) After undergoing any reconditioning, before they are reused for transport[;] for this test, the IBCs need not have their closures sealed[;] the inner receptacle of the composite IBCs may be tested without their outer package and packaging.
- 7.5 The competent authorities may at any time require the demonstration, by tests prescribed in this Standard, that IBCs meet the requirements to the design type tests.
- 7.6 With respect to the certification of each type of IBC, a certificate and marking shall be issued (NOM-007-SCT2-1993, MARKING OF PACKAGES AND PACKAGINGS INTENDED FOR THE TRANSPORT OF HAZARDOUS SUBSTANCES AND WASTES and section 8) stating that the IBC, together with its items of equipment, meet the test requirements.
- 7.7 The test report includes the results of said tests, as well as an identification of the type assigned by the competent authorities, and shall be valid for all IBCs that correspond to said tested type.
- 7.7.1 A test report shall be drawn up, in which the following particulars shall be set forth:

- a) Name and address of person performing the test.
- b) Name and address of person applying said test.
- c) An identification of the test report.
- d) Date of the test report.
- e) Manufacturer of the IBC.
- f) Description of the IBC design type (dimensions, materials, closures, thickness, etc.), method of manufacture (for example, injection) which may include photography and/or drawing.
- g) Maximum capacity.
- h) Characteristics of test contents (for example, viscosity, relative density, particle size, etc.).
- i) Test description and results.
- j) The test report must be signed with the name and status of person responsible for said test.

The test report must assert that the IBC, prepared for transport, was tested in accordance with the provisions described in this Standard, and that its use for other containment and packaging methods and components can invalidate it.

8. TESTS, CERTIFICATION AND INSPECTION FOR THE VARIOUS TYPES OF IBCs.

8.1 Metal IBCs.

8.1.1 Metal IBCs must be subject to:

- a) Approval procedure for the design prototype, including the design type tests in accordance with the provisions pertaining thereto.
- b) Initial and periodic tests in accordance with the provisions in said tests by units.
- c) Inspections in accordance *[missing phrase]*.

8.1.2 Metal IBCs must be submitted to design type tests in the same order as shown in the table below, in the form described in the bottom and top lift test, stacking test, leakproofness test, hydraulic pressure test inclusive[;] the various IBC design types according to their dimensions, thickness of walls, and mode of construction in the drop test[;] another IBC can be used if it is of the same type of construction.

| TESTS | TYPES OF IBCs | |
|--------------------|---------------|--------------------------------|
| | 11a, 11b, 11n | 21a, 21b, 21n 31a, 31b, 31n |
| Bottom lift | Required (1) | Required (1) |
| Top lift | Required (1) | Required (1) |
| Stacking | Required (2) | Required (2) |
| Leakproofness | Not required | Required |
| Hydraulic pressure | Not required | Required |
| Drop | Required | Required |

(1) Concerns IBCs designed for this form of handling.

(2) Concerns IBCs designed for stacking.

- 8.1.3 The competent authorities may permit selective testing with IBCs which differ only in minor respects from a tested type; for example, somewhat smaller external dimensions.
- 8.1.4 The initial and periodic tests of the IBCs, by units, shall be carried out under the conditions that are established by the competent authorities.
- 8.1.5 IBCs shall correspond in all respects to their respective design type, and shall be subjected to the leakproofness test.
- 8.1.6 Said tests shall be repeated at intervals of not more than two and a half years.
- 8.1.7 The results of tests are recorded in a report to this effect, which is kept by the owner.
- 8.1.8 The IBC shall be inspected under the conditions dictated by the competent authorities, before being put into service, and thereafter at intervals not exceeding five years, so as to verify:
- a) Conformity to design type including marking;
 - b) Its internal and external condition;
 - c) The proper functioning of the items of service equipment.
- 8.1.8.1 It will not be necessary to remove the thermal insulation, unless it is a specific step in the proper inspection of the body of the IBC.
- 8.1.8.2 All IBCs shall be subjected to a visual inspection, under the conditions dictated for this purpose, at intervals of not more than two and a half years, in order to verify:

- a) Their external condition;
- b) The proper functioning of the items of service equipment. Thermal insulation need not be removed, except to the extent necessary for a proper examination of the body of the IBC.

8.1.8.3 A report of each inspection shall be kept at least until the date of the next inspection.

8.1.9 If an IBC is structurally damaged as a result of an impact (for example, in an accident) or by any other cause, it shall be repaired and then subjected to an exhaustive test and inspection in accordance with its respective design type.

8.1.10 Bottom lift test.

8.1.10.1 This test applies to all types of IBCs which are fitted with elements suitable for lifting them by the base, as a design type test.

8.1.10.2 The IBC must, for this test, be loaded to 125% of its maximum permissible gross mass, the load being uniformly distributed.

8.1.10.3 To carry out the tests, the IBC shall be raised and lowered twice, by a lift truck or similar system, with the fork centered and the arms so positioned that the separation between the two is equivalent to 75% of the dimension of the face of the IBC to which the fork is applied (unless said fork has fixed points of entry). The arms of the fork must penetrate to 75% of the length of said entrances. The test must be repeated in all directions in which the fork may be applied.

8.1.10.4 To make a determination that the IBC has passed the test, there must occur no permanent deformation rendering the IBC unsafe for transport and no loss of contents.

8.1.11 Top lift test.

8.1.11.1 This test applies to all the types of IBCs which are fitted with elements suitable for lifting them by the top part, as a design type test.

3.1.11.2 Preparation of the IBCs for the test consists in loading the IBC to twice its maximum permissible gross mass.

8.1.11.3 The IBC is lifted in the manner for which it was designed, until it no longer touches the ground, and it is maintained in that position for a period of five minutes.

8.1.11.4 To make a determination that the IBC has passed the test, there must occur no permanent deformation rendering the IBC unsafe for transport and no loss of contents.

8.1.12 Stacking test.

8.1.12.1 This test applies to all types of IBC designed to be stacked on each other, as a design type test.

8.1.12.2 Preparation of IBCs for this test consists in loading the IBC to its maximum permissible gross mass.

8.1.12.3 The IBC is placed on its base on a level hard ground, and subjected to a uniformly distributed superimposed test load (see 8.1.12.4) for a period of 5 minutes as a minimum.

8.1.12.4 The load placed on the IBC shall be equivalent to 180% of the combined maximum permissible gross mass of the similar containers that can be stacked on the top part of the IBC during transport.

8.1.12.5 To determine if the IBC has passed the test, there must be no permanent deformation rendering it unsafe for transport and no loss of contents.

8.1.13 Test of leakproofness.

8.1.13.1 This test applies to those types of IBCs intended for the transport of liquids or solids loaded or discharged under pressure, as a design type test and as an initial and periodic test.

8.1.13.2 The initial test is carried out before the thermoinsulating components are installed. The vented closures must be replaced by other similar non-vented closures or said vent must be must be sealed.

8.1.13.3 The test has a duration of 10 minutes as a minimum, using air at a gage pressure of not less than 0.20 Kg/cm² (2.89 lb/in²). The leakproofness of the IBC shall be verified by a suitable method, such as: covering the seams and joints with a soap solution, or by the differential pressure test, or by immersing the IBC in water. In the latter case, a correction factor shall be applied for the hydrostatic pressure.

8.1.13.4 To make a determination that the IBC has passed the test to which it was subjected, there must be no leakage of air.

8.1.14 Hydraulic pressure tests

8.1.14.1 This test is [sic] applicable to IBCs of types 21A, 21B, 21N, 31A, 31B and 31N, as a design type test.

8.1.14.2 The test is performed before the thermoinsulating components are installed. The pressure relief devices are removed and its vents are plugged or rendered inoperative by some other way.

8.1.14.3 The test must have a duration of at least 10 minutes, the IBC must not be mechanically restrained during the test, [and] a hydraulic pressure not less than that indicated below must be applied:

- a) For IBCs of types 21A, 21B and 21N, for the containment and packaging of solids of Group I, a gage pressure of 2.55 Kg/cm² (36.17 lb/in²).
- b) For all IBCs of types 21A, 21B, 21N, 31A, 31B and 31N, for the containment and packaging of substances of Group II or Group III, a gage pressure of 2.038 Kg/cm² (28.94 lb/in²).
- c) In addition, a gage pressure of 0.66 Kg/cm² (9.41 lb/in²) shall be applied to all IBCs of types 31A, 31B and 31N. This test shall be carried out before the 2.038 Kg/cm² (28.94 lb/in²) test.

8.1.14.4 In the case of IBCs of types 21A, 21B, 21N, 31B, and 31N (in a and b) there must be no leakage when they are subjected to the test pressure indicated.

8.1.14.5 In the case of IBCs of types 31A, 31B, and 31N (in c) there must be no permanent deformation rendering the IBC unsafe for transport and no leakage when they are subjected to the test pressure indicated.

8.1.15 Drop test.

8.1.15.1 This test applies to all types of IBCs, as a design type test.

8.1.15.2 The IBC is filled to at least 95% of its capacity in the case of solid materials or 98% in the case of liquids, in accordance with the design type. The pressure relief devices shall be removed and their vents plugged or otherwise rendered inoperative.

8.1.15.3 The IBC is dropped onto a horizontal, rigid, non-resilient, smooth and flat surface, in such a manner that the point of impact is that part of the container base considered

to be the most vulnerable. An IBC of 450 liters (0.45 m³) or less capacity is also tested in vulnerable parts other than its base.

The drop height shall be given by:

| PACKING GROUP I | PACKING GROUP II | PACKING GROUP III |
|-----------------|------------------|-------------------|
| 1.8 m | 1.2 m | 0.8 m |

8.1.15.4 To make a determination that the IBC has passed the test, it must be verified that no loss of contents has occurred.

8.2 Flexible IBCs.

8.2.1 IBCs shall be subjected to the design type test referred to in the design type tests and, if successful, the corresponding certificate shall be issued in accordance with the provisions of section 7.7.1.

| T e s t s |
|--|
| Top lift (1) Tear Stacking Drop Topple Righting (1) |

(1) For IBCs designed to be lifted from the top or from a side.

8.2.2 The tests may be conducted with the IBCs which differ only in minor respects from a type already subjected to tests; for example, external dimensions somewhat smaller. An IBC that has passed one test may be used for others.

8.2.3 Paper IBCs shall be conditioned for at least 24 hours, in an atmosphere having a controlled temperature and relative humidity (r.h.). There are three options, among which one must be chosen. The preferred atmosphere is 23Ec ± 2EC and 50% ± 2% r.h. The two other options are: 20EC ± 2EC and 65% ± 2% of r.h., and 27EC ± 2EC and 65% ± 2% r.h.

NOTE: The average values must fall within these limits[. Short-term fluctuations and measurement limitations cause individual measurements that vary up to $\pm 5\%$ relative humidity, without significant impairment of test reproducibility.

8.2.4 Top lift test.

8.2.4.1 This test applies to all types of IBCs designed to be lifted from the top or from a side, as a design type test.

8.2.4.2 For the test, the IBC is filled to six times its maximum permissible load, the contents being uniformly distributed.

8.2.4.3 The IBC is lifted in the manner for which it is designed, until it no longer touches the floor, and it is maintained in that position for a period of five minutes.

8.2.4.4 Other methods of top lift testing and test preparation may be used if they are at least equally effective.

8.2.4.5 To make a determination that the IBC has passed the test, there must be no damage in the IBC or its lifting devices which renders the IBC unsafe for transport or handling.

8.2.5 Tear test

8.2.5.1 This test applies to all types of IBCs as a design type test.

8.2.5.2 For this test, the IBC shall be filled to at least 95% of its capacity and to its maximum permissible load, the contents being uniformly distributed.

8.2.5.3 Once the IBC is placed on the ground, it is perforated with a knife in the wall of one of its wide faces, making a cut 100 mm long that forms a 45° angle to the principal axis of the IBC, at a height midway between the bottom surface and the top level of the contents. Next, the IBC is subjected to a uniformly distributed superimposed load equivalent to twice the maximum permissible load. Said load is applied for at least five minutes.

8.2.5.4 In the following, if this is an IBC designed to be lifted by the top or by one of its sides, and once the superimposed load has been removed, it is lifted until it no longer touches the ground, and maintained in that position for a period of five minutes.

8.2.5.5 To make a determination that the cutting test has been passed, the cut must not increase more than 25% of its original length.

8.2.6 Stacking test.

8.2.6.1 This test applies to all types of IBCs, as a design type test.

8.2.6.2 For the test, the IBC shall be filled to at least 95% of its capacity and to the maximum permissible load, with the contents being uniformly distributed.

8.2.6.3 The IBC is placed, resting on its base, on a level hard ground, and is subjected to a uniformly distributed superimposed test load for a period of 24 hours. Said load is applied by one of the following methods:

- a) Stacking on the IBC being tested one or more containers of the same type, filled to the maximum permissible load;
- b) Placing appropriate weights onto a smooth plate that rests on the IBC being tested.

8.2.6.4 The load placed on the IBC shall be equivalent to 180% of the combined maximum permissible gross mass of the similar IBCs that may be stacked on top of it during transport.

8.2.6.5 To make a determination that the test has been passed, there must be, in the body of the IBC, no deterioration rendering it unsafe for transport and no loss of contents.

8.2.7 Drop test.

8.2.7.1 This test applies to all types of IBCs, as a design type test.

8.2.7.2 For this test, the IBC is filled to at least 95% of its capacity and up to the maximum permissible load, with the contents being uniformly distributed.

8.2.7.3 The IBC must fall on its base onto a rigid, non-resilient, smooth, flat and horizontal surface. An IBC of 450 liters (0.45 m³) or less capacity is also tested in its vulnerable parts other than its base (See Drop Height Table in paragraph 8.1.15.3).

8.2.7.4 To make a determination that the test has been passed, there must be no loss of contents. A small discharge through, for example, closures or stitch holes, caused by

the impact, shall not be attributed to an IBC defect,[sic] so long as there is no other loss of contents after the IBC has been raised until it is off the ground.

8.2.8 Topple test

8.2.8.1 This test applies to all IBC types, as a design type test.

8.2.8.2 For this test, the IBC is filled to at least 95% of its capacity and to the maximum permissible load, with the contents being uniformly distributed.

8.2.8.3 The IBC is knocked down in such a manner that it hits, with any part of its top end, against a rigid, non-resilient, smooth, flat and horizontal surface (see Table in section 8.1.15.3 for the topple height).

8.2.8.4 To make a determination that it has passed the test, there must be no loss of contents. A small discharge through, for example, the closures or stitch holes, caused by the impact, shall not be attributed to an IBC defect, so long as there is no further loss of contents.

8.2.9 Righting test.

8.2.9.1 This test applies to all IBCs designed to be lifted by the top or by a side, as a design type test.

8.2.9.2 For this test, the IBC is filled to at least 95% of its capacity and to the maximum permissible load, with the contents being uniformly distributed.

8.2.9.3 Once the IBC has been placed on one of its sides, it is lifted at a speed of at least 0.1 m/s by one of its lifting devices, or by two of these if four are provided, until it is maintained in upright position without touching the ground.

8.2.9.4 To make a determination that the test has been passed, there must be no damage, in the IBC or its lifting devices, that makes the container unsafe for transport or handling.

8.3 Rigid plastic IBCs.

8.3.1 Rigid plastic IBCs must be subjected to:

- a) The design type tests referred to, in case they are successful, a certificate shall be issued in accordance with the provisions of paragraph 7.7.1.

- b) Initial and periodic test of conformity.
- c) Inspections in accordance with the provisions related thereto.

8.3.2 The various design types of IBCs must be subjected to the design type tests, in the order shown in the table below, and in the form described in the relevant paragraphs, according to their dimensions and mode of construction.

| TESTS | IBC TYPES | |
|--------------------|--------------|--------------------------|
| | 11h1, 11h2 | 21h1, 21h2 31h1, 31h2 |
| Bottom lift | Required | Required |
| Top lift | Required (1) | Required (1) |
| Stacking | Required (2) | Required (2) |
| Leakproofness | Not required | Required |
| Hydraulic pressure | Not required | Required |
| Drop | Required | Required |

- 1) With respect to IBCs designed to be lifted by their top part.
- 2) With respect to IBCs designed to be stacked.

8.3.3 In special cases, selective tests shall be permitted for IBCs that only differ in minor respects from a type already tested; for example: external dimensions somewhat reduced.

8.3.4 These tests shall be performed under the conditions dictated by the competent authorities for such a purpose.

8.3.5 The IBCs must correspond in all respects to their respective design type. Those intended for the transport of liquid or solid materials that are loaded or discharged under pressure must be subjected to the leakproofness test.

8.3.6 The leakproofness test mentioned in paragraph (8.3.18) must be repeated at intervals of not more than two and a half years.

8.3.7 The results of the tests are recorded in a report to that effect which remains in the possession of the owner of the IBC.

- 8.3.8 All IBCs must be inspected, under the conditions dictated therefor, before being put into service, and thereafter at intervals of not more than five years, in order to verify:
- a) Their conformity to the design type, including what the marking refers to.
 - b) Their internal and external condition;
 - c) The proper functioning of their items of service equipment.
- 8.3.9 All IBCs must be visually inspected, under the conditions dictated therefor, at intervals of not more than two and a half years, in order to verify:
- a) Their external condition.
 - b) The proper functioning of their items of service equipment.
- 8.3.10 A report of each inspection must be kept at least up until the date of the next inspection.
- 8.3.11 If the structure of an IBC is damaged as a result of impact (for example, in an accident) or by any other cause, it shall be repaired, after which it shall be subjected to an exhaustive test and inspection, as provided in paragraphs 8.3.5., 8.3.6 and 8.3.8.
- 8.3.12 All necessary steps shall be taken to ascertain that the plastic material used in the manufacture of rigid plastic IBCs complies with the construction specifications (6.5.2).
- 8.3.13 This can be done, for example, by submitting various IBCs, as samples, to a preliminary test extending over a long period (for example: six months), in the course of which said IBC samples shall remain filled with the substances of the same type as those they are intended to transport, or other substances known to have on the plastic materials in question, an effect of at least equal intensity in terms of stress-cracking, weakening of strength, or molecular decomposition, and at the end of which the samples shall be subjected to the bottom lift, top lift, stacking, leakproofness, top hydraulic pressure, and drop tests.
- 8.3.14 If the operational characteristics of the plastic have been verified by some other means, the above-described compatibility test may be dispensed with.
- 8.3.15 Bottom lift test.
- 8.3.15.1 This test applies to all types of IBCs which are designed to be lifted from the base, as a design type test.

8.3.15.2 For this test, the IBC is loaded to 125% of its maximum permissible gross mass, with the load being uniformly distributed.

8.3.15.3 The IBC shall be raised and lowered twice, by a lift truck or a similar system, with the fork being centered and the arms positioned so that the separation between both is equivalent to 75% of the dimension of the face of the IBC to which the fork is applied (unless it has fixed points of entry). The arms of the fork must penetrate to 75% of the length of said entrances. The test must be repeated in all directions in which the fork can possibly be applied.

8.3.15.4 To make a determination that the test has been passed, there must be no permanent deformation rendering the IBC unsafe for transport and no loss of contents.

8.3.16 Top lift test.

8.3.16.1 This test applies to all types of IBCs which are designed to be lifted from the top.

8.3.16.2 For this test, the IBC is loaded to twice its maximum permissible gross mass.

8.3.16.3 The IBC shall be lifted by restraining it by [sic] each pair of diagonally opposite lifting accessories, so that the gravity precipitation forces [sic] are applied vertically, and it is maintained in this suspended position for a period of five minutes; and

8.3.16.4 The IBC is lifted by restraining it by each pair of diagonally opposite lifting accessories, so that the gravity precipitation forces are applied towards the center at a 45EC angle with the vertical, for a period of five minutes.

8.3.16.5 To make a determination that the test has been passed, there must be no permanent deformation rendering the IBC unsafe for transport and no loss of contents.

8.3.17 Stacking test.

8.3.17.1 This test applies to all types of IBCs which are designed to be stacked on top of each other, as a design type test.

8.3.17.2 For this test, the IBC shall be loaded to the maximum permissible gross mass.

8.3.17.3 The IBC is placed on its base on a level hard ground, and it is subjected to a uniformly distributed imposed [sic] test load. IBCs of types 11H1, 21H1 and 31H2 must be subjected to the test for 24 hours, and those of types 11H2, 21H2

and 31H2, for 28 days and at 40EC. The test load is applied by one of the following methods:

- a) One or several IBCs of the same type are loaded to the maximum permissible gross mass, and are stacked on the IBC being tested;
- b) A smooth plate or an element reproducing the base of the container is placed on top of the IBC being tested, and appropriate weights are positioned on said plate or element.

8.3.17.4 The load placed on the IBC shall be equivalent to 180% of the combined maximum permissible gross mass of the similar containers that may be stacked on the top part of the IBC during transport.

8.3.17.5 To make a determination that the test has been passed, there must be no permanent deformation rendering the IBC unsafe for transport and no loss of contents.

8.3.18 Leakproofness test.

8.3.18.1 This test applies to types of IBCs intended for the transport of liquids or solid materials loaded or discharged under pressure, as a design type test or as initial and periodic test.

8.3.18.2 For this test, the vented closures must be replaced by other similar non-vented closures, or said vent must be plugged.

8.3.18.3 This test has a minimum duration of 10 minutes, and a gage pressure not less than 0.20 Kg/cm² (2.89 lb/in²) is applied. The leakproofness of the IBC is verified by a suitable method such as, for example, the differential pressure test, or by immersing the IBC in water. In the latter case, a correction factor must be applied due to the hydrostatic pressure. Other methods at least equally effective may be used.

8.3.18.4 To make a determination that the test has been passed, there must be no leakage.

8.3.19 Hydraulic pressure test.

8.3.19.1 This test applies to types of IBCs intended for the transport of liquids or solids loaded or discharged under pressure, as a design type test.

8.3.19.2 For this test, the pressure relief devices and the vented closures must be removed, and the corresponding vents plugged; or they will otherwise be rendered inoperative.

8.3.19.3 The test must have a duration of 10 minutes, during which time a hydraulic gage pressure not less than that indicated in the following paragraph shall be applied, [and] the IBC shall not be mechanically restrained.

8.3.19.4 The pressures that must be applied are as follows:

- a) For IBCs of types 21H1 and 21H2, a gage pressure of 0.76 Kg/cm² (10.85 lb/in²).
- b) For IBCs of types 31H1 and 31H2, the greater of the following values:
 - i) The total gage pressure measured in the IBC (that is, the vapor pressure of the material with which it has been filled, plus the partial pressure of the air or other inert gases, minus 1.019 Kg/cm²) at 55EC, multiplied by a safety factor of 1.5. This total gage pressure must be determined as a function of the maximum degree of filling at 15EC, in accordance with section 6.2.2.
 - ii) 1.75 times the vapor pressure, at 50EC, of the material to be transported, minus 1.019 Kg/cm², provided that the resulting value is not less than 1.019 Kg/cm²;
 - iii) 1.5 times the vapor pressure, at 55EC, of the material to be transported, minus 1.019 Kg/cm², provided that the resulting value is not less than 1.019 Kg/cm².
 - iv) Twice the static pressure of the material to be transported, provided that the resulting value is not less than twice the static pressure of water.

8.3.19.5 To make a determination that the test has been passed, there must be no permanent deformation rendering the IBC unsafe for transport and no leakage.

8.3.20 Drop test.

8.3.20.1 This test applies to all IBC types, as a design type test.

8.3.20.2 For this test, the IBC must be filled to at least 95% of its capacity in the case of solid materials, or 98% in the case of liquids, in accordance with the design type. The pressure relief devices may be removed, or somehow rendered inoperative. The test must be carried out once the temperature of the IBC and its contents has been lowered to -18EC or less. Test liquid materials must be kept in said liquid state, if necessary by addition of antifreeze. This conditioning may be disregarded if the materials in question are of sufficient ductility and tensile strength at low temperatures.

8.3.20.3 The IBC shall be dropped onto a rigid, non-resilient, smooth, flat and horizontal surface, in such a manner that the point of impact is that part of the base of the container considered to be the most vulnerable (See Drop Height Table in Section 8.1.15.3).

8.3.20.4 To make a determination that the test has been passed, there must be no loss of contents[;] a small discharge through a closure, caused by the impact, shall not be attributed to an IBC defect, provided that no further loss of contents occurs.

8.4 Composite IBCs.

8.4.1 Composite IBCs must be subjected to:

- a) The design type tests to which tests 8.4.2 refer, regarding which tests, if successfully passed, a certificate shall be issued stating that the design type, including its items of equipment, meets the specifications for the tests[;]
- b) Initial and periodic tests.
- c) Inspections.

8.4.2 The composite IBCs must be subjected to the design type tests, in the order shown in the table below, and in the manner described for the various IBC models, in accordance with their dimensions and construction design type, as required by a competent authority.

| TESTS | IBC TYPES | |
|-------|--------------|------------------------------|
| | 11HZ1, 11HZ2 | 21HZ1, 21HZ2 31HZ1, 31HZ2 |

| | | |
|--------------------|--------------|--------------|
| BOTTOM LIFT | REQUIRED | REQUIRED |
| TOP LIFT | REQUIRED (2) | REQUIRED (1) |
| STACKING | REQUIRED (2) | REQUIRED (2) |
| LEAKPROOFNESS | NOT REQUIRED | REQUIRED |
| HYDRAULIC PRESSURE | NOT REQUIRED | REQUIRED |
| DROP | REQUIRED | REQUIRED |

For those IBCs designed to be lifted by the top. (2)

- 8.4.3 In special cases, it shall be permissible to carry out selective tests with IBCs that differ only in minor respects (for example, exterior dimensions somewhat smaller) from a type already tested.
- 8.4.4 If detachable pallets are used in the tests, the corresponding report shall include a technical description of said pallets. The tests shall be carried out under the conditions required by the competent authority.
- 8.4.5 The IBCs must correspond in all respects to their respective design types. Those intended for the transport of liquid and solid materials which are loaded or discharged under pressure must be subjected to the leakproofness test.
- 8.4.6 The leakproofness test mentioned in paragraph 8.4.19 must be repeated at intervals of not more than two and a half years.
- 8.4.7 The results of the tests are recorded in a report to this effect, which is kept by the owner of the IBC.
- 8.4.8 All IBCs must be inspected, under the conditions dictated by the competent authorities, before being put into service, and thereafter at intervals of not more than five years, in order to verify:
- a) Their conformity to the design type, including what the marking refers to.
 - b) Their internal and external condition.
 - c) The proper functioning of their items of service equipment.
- 8.4.9 All IBCs must be subject to a visual inspection, under the conditions dictated therefor, at intervals of not more than two and a half years, in order to verify:

- a) Their external condition
- b) The proper functioning of their items of service equipment.

8.4.10 A report of each inspection must be kept, at least until the date of the next inspection.

8.4.11 If the structure of an IBC is damaged as a consequence of an impact (for example, in an accident) or any other cause, it shall be repaired, after which it shall be subjected to exhaustive testing and inspecting as set forth in the leakproofness test and inspection.

8.4.12 For these tests, all the necessary steps must be taken to ascertain that the plastic material used in the manufacture of composite IBCs complies with the construction specifications (6.6.4.1 through 6.6.4.4).

8.4.13 This may be done, for example, by submitting various IBCs, as samples, to a preliminary test extending over a long period (for example, six months[]), during which course said samples shall remain filled with materials of the same type as those they are intended to transport, or other materials known to have on the plastic materials in question an effect of at least equal intensity in terms of stress-cracking, weakening of strength, or molecular decomposition[;] at the end of said preliminary test, the samples shall be subjected to the bottom lift, top lift, stacking, leakproofness, hydraulic pressure, and drop tests.

8.4.14 If the operational characteristics of the plastic have been verified by some other means, the above-described compatibility test may be waived.

8.4.15 Composite IBCs with outer receptacles made of fiberboard must be conditioned for at least 24 hours, at an atmosphere having a controlled temperature and relative humidity (r.h.). There are three options, one of which must be selected. The preferred atmosphere is $23\text{EC} \pm 2\text{EC}$ and $50\% \pm 2\%$ r.h. The two other options are: $20\text{EC} \pm 2\text{EC}$ and $65\% \pm 2\%$ r.h., and $27\text{EC} \pm 2\text{EC}$ and $65\% \pm 2\%$ r.h. See note in paragraph 8.2.3.

8.4.16 Bottom lift test

8.4.16.1 This test applies to all types of IBCs that are designed to be lifted from the bottom, as a design type test.

8.4.16.2 For this test, the IBC is loaded to 125% of its maximum permissible gross mass, with the load being uniformly distributed.

8.4.16.3 The IBC shall be raised and lowered twice by a truck lift, with the fork being centered and the arms being positioned in such a manner that the separation

between both is equivalent to 75% of the dimension of the face of the IBC to which the fork is applied (unless said fork has fixed points of entry). The arms of the fork must penetrate to 75% of the length of said entrances. The test must be repeated in all directions in which the fork can possibly be applied.

8.4.16.4 To make a determination that the test has been passed, there must be no permanent deformation rendering the IBC, including the pallet base, unsafe for transport, and no loss of contents.

8.4.17 Top lift test.

8.4.17.1 This test applies to all types of IBCs that are designed to be lifted by their top part, as a design type test.

8.4.17.2 For this test, the IBC is loaded to twice its maximum permissible gross mass.

8.4.17.4 The IBC is lifted by subjecting it by [sic] each pair of diagonally opposite lifting accessories, so that the that the tensile forces [sic] are applied vertically, and it shall be maintained in this suspended position for five minutes; and

8.4.17.4 The IBC is lifted by subjecting it by each pair of diagonally opposite lifting accessories, so that the tensile forces are applied towards the inside [sic] at an angle of 45E with the vertical, and it shall be maintained in this suspended position for five minutes.

8.4.17.5 To make a determination that the test has been passed, there must not occur in the whole IBC, including the pallet, any permanent deformation rendering it unsafe for transport, and there must be no loss of contents.

8.4.18 Stacking test.

8.4.18.1 This test applies to all types of IBCs that are designed to be stacked on top of each another, as a design type test.

8.4.18.2 For this test, the IBC is loaded to the maximum permissible gross mass.

8.4.18.3 The IBC is placed on its base on a level hard ground, and it is subjected to a uniformly distributed superimposed test load. IBCs of types 11HZ1, 21HZ1 and 31HZ1 must be subjected to the test for 24 hours, and those of types 11HZ2, 21HZ2 and 31HZ2, for 28 days and at 40EC. The test load is applied by one of the following methods:

- a) One or several same-type IBCs are loaded to their maximum permissible gross mass, and they are stacked above the IBC being tested;
- b) A smooth plate or an element reproducing the base of the IBC is placed on top of the IBC being tested, and appropriate weights are positioned on said plate or element.

8.4.18.4 The load placed on the IBC shall be equivalent to 180% of the combined maximum permissible gross mass of the similar IBCs that can be stacked on the top part of the IBC during transport.

8.4.18.5 To make a determination that the test has been passed, there must not occur in the whole IBC, including the pallet, any permanent deformation rendering it unsafe for transport, nor any loss of contents.

8.4.19 Leakproofness test.

8.4.19.1 This test applies to types of IBCs intended for the transport of liquids or solids loaded or discharged under pressure, as a design type test and as initial and periodic test.

8.4.19.2 For this test, the vented closures must be replaced by other similar non-vented closures, or said vent must be plugged.

8.4.19.3 This test shall have a minimum duration of 10 minutes, and a constant gage pressure not less than 0.20 Kg/cm² (2.89 lb/in²) shall be applied. The leakproofness of the IBC shall be verified by a suitable method such as, for example, the differential pressure test or by immersing the IBC in water. In the latter case, a correction factor must be applied owing to the hydrostatic pressure. Other methods at least equally effective may be used.

8.4.19.4 To make a determination that the test has been passed, there must be no leakage.

8.4.20 Hydraulic pressure test.

8.4.20.1 This test applies to types of IBCs intended for the transport of liquids or solids loaded or discharged under pressure, as a design type test.

8.4.20.2 For this test, the pressure relief devices and the vented closures must be removed, and the corresponding vents plugged; or they shall otherwise be rendered inoperative.

8.4.20.3 This test must have a duration of 10 minutes, during which course a hydraulic gage pressure not less than that indicated in the following paragraph shall be applied, and the IBC shall not be mechanically restrained.

8.4.20.4 Pressures to be applied.

- a) For IBCs of types 21HZ1 and 21HZ2, a gage pressure of 0.76 Kg/cm² (10.85 lb/in²).
- b) For IBCs of types 31H1 and 31H2, the greater of the following values:
 - i) The total gage pressure measured in the IBC (that is, the vapor pressure of the material with which said IBC has been filled, plus the partial pressure of the air or other inert gases, minus 1.019 Kg/cm²) at 55EC, multiplied by a safety factor of 1.5. This total gage pressure must be determined as a function of the maximum degree of filling at 15EC, in accordance with section 6.2.2.
 - ii) 1.75 times the vapor pressure, at 50EC, of the material to be transported, minus 1.019 Kg/cm², provided that the resulting value is not less than 1.019 Kg/cm²;
 - iii) 1.5 times the vapor pressure, at 55EC, of the material to be transported, minus 1.019 Kg/cm², provided that the resulting value is not less than 1.019 Kg/cm².
 - iv) Twice the static pressure of the material to be transported, provided that the resulting value is not less than twice the static pressure of water.

8.4.20.5 To make a determination that the test has been passed, there must be no permanent deformation rendering the IBC unsafe for transport and no leakage.

8.4.21 Drop test.

8.4.21.1 This test applies to all types of IBCs, as a design type test.

8.4.21.2 For this test, the IBC must be filled to at least 95% of its capacity in the case of solid materials, or 98% in the case of liquids, in accordance with the design type. The pressure relief devices shall be removed and their vents plugged, or they shall somehow be rendered inoperative. The test must be carried out once the

temperature of the IBC or its contents has been lowered to -18EC or less. Test liquid materials must be kept in said liquid state, if necessary by the addition of anti-freeze. This conditioning may be waived if the materials in question are of sufficient ductility and tensile strength at low temperatures.

- 8.4.21.3 The IBC shall be dropped onto a rigid, non-resilient, smooth, flat and horizontal surface, in such a manner that the point of impact is that part of the base of the container considered to be the most vulnerable[;] an IBC of 450 liters (0.45 m³) or less capacity shall also be dropped on a side, on its top part and on any corner (see Drop Height Table in Section 8.1.15.3).
- 8.4.21.4 To make a determination that the test has been passed, there must be no loss of contents[;] a small discharge through a closure, caused by the impact, shall not be attributed to an IBC defect, provided that no further loss of contents occurs.

8.5 Fiberboard IBCs.

- 8.5.1 Fiberboard IBCs must be subjected to the bottom lift, stacking, and drop design type tests, with regard to which, if successfully passed, a certificate shall be issued stating that the design type, including its elements of equipment, meets the specifications pertaining to said tests.
- 8.5.2 Fiberboard IBCs must be subjected to the design tests in the order shown in the following table and in the manner described above for the various IBC design types, in accordance with their dimensions and mode of construction.

| T E S T | 11G |
|-------------|--------------|
| BOTTOM LIFT | REQUIRED |
| STACKING | REQUIRED (1) |
| DROP | REQUIRED |

(1) Relates to those IBCs designed to be stacked.

- 8.5.3 The carrying out of selective tests shall be permissible with IBCs that only differ in minor respects from a type already subjected to the tests; for example, exterior dimensions somewhat smaller.
- 8.5.4 If detachable pallets are used in the tests, the corresponding report shall include a technical description of said pallets.

8.5.5 Fiberboard IBCs must be conditioned for at least 24 hours, in an atmosphere having a controlled temperature and relative humidity (r.h.). There are three options, one of which must be selected. The preferred atmosphere is $23E \pm 2EC$ and $50\% \pm 2\%$ r.h. The two other options are: $20EC \pm 2EC$ and $65\% \pm 2\%$ r.h., and $27E \pm 2EC$ and $65\% \pm 2\%$ r.h.[:] see note in paragraph 8.2.3.

8.5.6 Bottom lift test.

8.5.6.1 This applies to all types of IBCs, as a design type test.

8.5.6.2 For this test, the IBC is loaded to 125% of its maximum permissible gross mass, with the load being uniformly distributed.

8.5.6.3 The IBC shall be lifted twice, by a lift truck or a similar system, with the fork centered and the arms positioned in such a way that the separation between the two is equivalent to 75% of the dimension of the face of the IBC to which the fork is applied (unless said fork has fixed points of entry). The arms of the fork shall penetrate to 75% of the length of said entrances. The test must be repeated in all the directions in which the fork can possibly be applied.

8.5.6.4 To make a determination that the test has been passed, there must not be in the whole IBC, including the pallet, any permanent deformation rendering it unsafe for transport nor any loss of contents.

8.5.7 Stacking test.

8.5.7.1 This test applies to all types of IBCs which are designed to be stacked on top of each other, as a design type test.

8.5.7.2 For this test, the IBC is loaded to its maximum permissible gross mass.

8.5.7.3 The IBC is placed on its base on a level hard ground, and it is subjected for 24 hours to a uniformly distributed superimposed test load (see method of computation of the test). Said load is applied by one of the following methods:

- a) One to [sic] several IBCs of the same type are loaded up to their maximum permissible gross mass and are stacked on the IBC being tested;
- b) A smooth plate or an element reproducing the base of the container is placed on top of the IBC being tested, and appropriate weights are placed on said plate or element.

- 8.5.7.4 The load to be placed on the IBC shall be equivalent to 180% of the combined maximum permissible gross mass of the similar containers that can be stacked on the top part of [sic] the IBC during transport.
- 8.5.7.5 To make a determination that the test has been passed, there must not be in the whole IBC, including the pallet, any permanent deformation rendering it unsafe for transport, nor any loss of contents.
- 8.5.8 Drop test.
- 8.5.8.1 This applies to all types of IBCs, as a design type test.
- 8.5.8.2 For this test, the IBC must be filled to at least 95% of its capacity in accordance with the design type.
- 8.5.8.3 The IBC is dropped onto a rigid, non-resilient, smooth, flat and horizontal surface, in such a manner that the point of impact is that part of the base of the container considered to be the most vulnerable[;] an IBC of 450 liters (0.45 m³) or less capacity shall also be dropped on any of its sides, on its top face or on any corner. (See Drop Height Table in Section 8.1.15.3).
- 8.5.8.4 To make a determination that the test was passed, there must be no loss of contents[;] a small discharge through a closure, caused by the impact, shall not be attributed to an IBC defect, provided that there is no further loss of contents.
- 8.6 Wooden IBCs.
- 8.6.1 Wooden IBCs must be subjected to the design type tests in the order described below, bottom lift, stacking, and drop tests, with respect to which, should they be successful, a certificate shall be issued stating that the design type, including its items of equipment, meets the specifications pertaining to said tests.
- 8.6.2 Wooden IBCs must be subjected to the design type tests, in the order shown in the table below and in the manner described above for the various IBC design types, in accordance with their dimensions and mode of construction.

| TEST | 11C, 11D, 11F |
|-------------|---------------|
| BOTTOM LIFT | REQUIRED |
| STACKING | REQUIRED (1) |
| DROP | REQUIRED |

(1) With respect to those IBCs designed to be stacked.

8.6.3 The carrying out of selective tests shall be permissible for IBCs that differ only in minor respects from a type already subjected to the tests; for example, exterior dimensions somewhat smaller.

8.6.4 If detachable pallets are used in the tests, the corresponding report must include a technical description of said pallets.

8.6.5 Bottom lift test.

8.6.5.1 This test applies to all types of IBCs, as a design type test.

8.6.5.2 For this test, the IBC is loaded to 125% of its maximum permissible gross mass, with the load being uniformly distributed.

8.6.5.3 The IBC shall be raised and lowered twice by a lift truck or a similar system, with the fork being centered and the arms positioned in such a way that the separation between the two is equivalent to 75% of the dimension of the face of the IBC to which the fork is applied (unless said fork has fixed points of entry). The arms of the fork shall penetrate to 75% of the length of said entrances. The test must be repeated in all the directions in which the fork can possibly be applied.

8.6.5.4 To make a determination that the test has been passed, there must not be in the whole IBC, including the pallet, any permanent deformation rendering it unsafe for transport nor any loss of contents.

8.6.6 Stacking test

8.6.6.1 This test applies to all types of IBCs that are designed to be stacked on top of each other, as a design type test.

8.6.6.2 For this test, the IBC is loaded to the maximum permissible gross mass.

- 8.6.6.3 The IBC shall be placed on its base on a level hard ground, and it shall be subjected for 24 hours to a uniformly distributed assumed [sic] test load (see method of computation of the test 8.6.6.4). Said load shall be applied by one of the following methods:
- a) One to [sic] several same-type IBCs are loaded to their maximum permissible gross mass, and they are stacked on the IBC being tested;
 - b) A smooth plate or an element reproducing the base of the IBC is placed on top of the IBC being tested, and appropriate weights are placed on said plate or element.
- 8.6.6.4 The load to be placed on the IBC shall be equivalent to 180% of the combined maximum permissible gross mass of the similar IBCs that may be stacked on the top part of the IBC during transport.
- 8.6.6.5 To make a determination that the test has been passed, there must not be in the whole IBC, including the pallet, any permanent deformation rendering it unsafe for transport, nor any loss of contents.
- 8.6.7 Drop test.
- 8.6.7.1 This test applies to all types of IBCs, as a test method.
- 8.6.7.2 For this test, the IBC must be filled to at least 95% of its capacity in accordance to the design type.
- 8.6.7.3 The IBC shall be dropped onto a rigid, non-resilient, smooth, flat and horizontal surface, in such a manner that the point of impact is that part of the base of the container considered to be the most vulnerable[;] an IBC of 450 liters (0.45 m³) capacity or less shall also be dropped on a seam,[sic] top face or any corner. (See Drop Height Table in Section 8.1.15.3).
- 8.6.7.4 To make a determination that the test has been passed, there must be no loss of contents[;] a small discharge through a closure, caused by the impact, shall not be attributed to an IBC defect, provided that there is no further loss of contents.

9. MARKING.

- 9.1 Each IBC manufactured and intended to be use in accordance with these recommendations must display durable and easily legible markings that indicate:
- a) The "UN" package and packaging symbol of the United Nations:
- 9.1.1 In the case of metal IBCs with embossed or inlaid markings, the capital letters "UN" may be used instead of the symbol.
- b) The code number that designates the type of IBC.
 - c) A capital letter that represents the group or groups of package and packaging for which the design type concerned has been approved:
 - X, for Groups I and III (for solids).
 - Y, for Groups II and III.
 - Z, solely for Group III.
 - d) The month and year (last two digits) of manufacture.
 - e) The country authorizing the allocation of the mark,
 - f) The name or symbol of the manufacturer.
 - g) The stacking test load, in kg. In the case of those IBCs not designed for stacking, the figure "0" must be shown.
 - h) The maximum permissible gross mass or, in the case of flexible IBCs, the maximum permissible load in kg.
- 9.1.2 The primary marking described above must be applied in the sequence indicated by the preceding paragraphs. The marking prescribed and any other marking authorized by a competent authority must permit, in any case, the correct identification of all marking elements.
- 9.1.3 The marking must indicate that the IBCs correspond to a design type that has passed the tests, and that the requirements referred to in the certificate have been met (6.6.1).
- 9.2 Additional marking for the metal IBCs.

9.2.1 Each IBC shall display a corrosion-resistant metal plate, permanently attached to the body or items of structural equipment, and in a place readily accessible for inspection. It shall also display the prescribed markings, as well as the following data:

- a) Capacity, in liters (l) of water at 20EC.
- b) Tare, in kg.
- c) Date of last leakproofness test, if applicable (month and year).
- d) Maximum loading and discharge pressure, in Kg/cm² or in (lb/in²), as applicable.
- e) Material of manufacture of the body and its minimum thickness, in mm;
- f) Serial number assigned by the manufacturer.

Note: (1) the unit used must be indicated.

9.3 Additional marking for flexible IBCs.

9.3.1 All IBCs shall display the markings already described in Sections 9.1 through 9.1.3[;] they may display a pictograph of recommended lifting methods.

9.4 Additional marking for rigid plastic IBCs[;] all IBCs shall display the markings already described in Sections 9.1 through 9.1.3, as well as the following data, which may be shown on a corrosion-resistant plate permanently attached to the IBC, in a place readily accessible for inspection:

- a) Capacity in liters at 20EC;
- b) Tare weight, in kg;
- c) Test (gage) pressure, in kpa or in kg/cm² or in (lb/in²), as applicable;
- d) Maximum filling and discharge pressure, in Kg/cm² or in (lb/in²), if applicable;
- e) Date of last leakproofness test, if applicable (month and year).
- f) Date of last inspection (month and year).

* Note: The unit used must be indicated.

- 9.5 Additional marking for composite IBCs[;] all IBCs shall display the markings set forth in Sections 9.1 through 9.1.3, as well as the data described in 9.4.
- 9.6 Additional marking for fiberboard IBCs.
 - 9.6.1 All IBCs must display the markings already described in Sections 9.1 through 9.1.3, as well as the tare weight, in kg.
- 9.7 Additional marking for wooden IBCs.
 - 9.7.1 All IBCs must display the markings already described in Sections 9.1 through 9.1.3, as well as the tare weight, in kg.

-END-