

**OFFICIAL MEXICAN STANDARD
NOM-024-SCT2/1994
SPECIFICATIONS FOR THE CONSTRUCTION AND
RECONSTRUCTION, AS WELL AS THE METHODS FOR
TESTING THE PACKAGES AND PACKAGINGS OF
HAZARDOUS SUBSTANCES, MATERIALS AND WASTES.**

1. OBJECTIVE.

The purpose of this Official Mexican Standard is to set forth the general provisions and the specifications which apply to the construction, reconstruction and reconditioning of the packages and packagings that are used for the transport of hazardous substances, materials and wastes; as well as the testing methods to which they are subjected.

2. SCOPE.

This Official Mexican Standard applies compulsorily to the shippers, carriers, manufacturers of packages and packagings, and to those responsible for the construction, reconstruction or reconditioning of the packages and packagings intended for the transport of hazardous substances, materials and wastes which transit through the general lines of land communication.

This Official Mexican Standard does not apply to materials of Class 7, Radioactives.

3. REFERENCES.

For the proper implementation of this Official Mexican Standard, the following Official Mexican Standards must be consulted:

NOM-002-SCT2/1994	LIST OF THE MOST COMMONLY CARRIED HAZARDOUS SUBSTANCES AND MATERIALS.
NOM-003-SCT2/1994	CHARACTERISTICS OF THE LABELS FOR PACKAGES AND PACKAGINGS INTENDED FOR THE TRANSPORT OF HAZARDOUS MATERIALS AND WASTES.

NOM-007-SCT2/1994	MARKING OF PACKAGES AND PACKAGINGS INTENDED FOR THE TRANSPORT OF HAZARDOUS SUBSTANCES AND WASTES.
NOM-025-SCT2/1994	SPECIAL PROVISIONS FOR THE CONTAINING AND PACKAGING, AND TRANSPORT OF HAZARDOUS SUBSTANCES AND MATERIALS OF CLASS 5.2, ORGANIC PEROXIDES.
NOM-027-SCT2/1994	SPECIAL PROVISIONS FOR THE PACKAGES AND PACKAGINGS AS WELL AS THE TRANSPORT OF HAZARDOUS SUBSTANCES AND MATERIALS OF DIVISION 5.2, ORGANIC PEROXIDES.

4. DEFINITIONS.

Wooden barrels (*Barriles de madera*).- These are packages and packagings made of natural wood, of round cross-section, having convex walls, consisting of staves and heads and fitted with hoops.

Bags (*Bolsas*).- These are flexible packages and packagings made out of paper, plastic film, textile, woven material or other suitable materials.

Tank-container (*Contenedor cisterna*).- A container with a volumetric capacity greater than 1,000 liters (1 m³), fitted with all elements necessary for the Transport of Hazardous Substances, Materials and Wastes, such as service elements and structural elements.

Boxes (*Cajas*).- These are packages or packagings with completely rectangular or polygonal faces, made of metal, wood, plywood, reconstructed wood, fiberboard, plastic or other suitable material. Small holes are allowable for ease of handling or for opening or for complying with the requirements of their class, so long as the integrity of the package is not compromised during its transport;

Combination packages and packagings (*Combinación de envases y embalajes*).- This is a combination of packages and packagings for transport purposes consisting of one or more inner packages and packagings protected by an outer package and packaging.

Packaging (*Embalaje*).- Materials which duly surrounds, contains and protects the prepacked products[, and] which facilitates and withstands the storage and transport operations.

Package (*Envase*).- Any receptacle or wrapper in which the product is contained, for purposes of its distribution or sale.

Packages and packagings (*Envase y embalaje*).- These are, among other things, any metal drum which is refilled with the same product in a reused form, or with any other similar compatible product, and whose transport is effected within a distribution chain controlled by the same product shipper;

Composite packages and packaging (*Envase y embalaje compuesto*).- These are composite packages and packagings, those formed by one outer package and packaging and one inner receptacle, so constructed that together they form an integral package and packaging. Once assembled, it remains an integral unit which is filled, stored, shipped and emptied as such.

Inner packages and packagings (*Envases y embalajes internos*).- A package and packaging for which an outer package and packaging is required for transport.

Outer package and packaging (*Envase y embalaje externo*).- This is the external protection of a combination packages and packagings together with any absorbent material, and other cushioning components necessary to contain and protect the inner receptacles, packages and packagings.

Reconditioned packages and packagings (*Envases y embalajes reacondicionados*).- This includes metal drums that are:

- a) Cleaned until baring of the original construction material, so as to eliminate the remains of any substance which may have been contained inside, all internal and external corrosion as well as the outside coatings and labels;
- b) Returned to their original shape and contour, with the chimes (if any) straightened and with the removable gaskets replaced with new ones;
- c) Inspected after their cleaning but before painting them, and not presenting any pitting from corrosion, any marked decrease in material thickness, any metal fatigue, any damaged threads or closures, or any major defects.

Dust-tight packages and packagings (*Envases y embalajes a prueba de polvo*).- These are impervious packages and packagings for the transport of dry contents, including fine solid materials.

Reconstructed packages and packagings, including metal drums (*Envases y embalajes reconstruídos, incluye tambores de metal que*):

- a) which are produced for a U.N. type from a non-U.N. type.
- b) which are converted from a U.N. type into another U.N. type; or

- c) whose structurally integral components were replaced (e.g., non-removable heads).

Reused packages and packagings (*Envases y embalajes reusados*).- These are packages and packagings that will be reused and that have been examined and found to be free of any defects likely to affect their ability to withstand the performance tests; this includes those packages and packagings that are reused with the same contents and similar compatible contents and are transported within distribution chains controlled by the consignee of the product.

Maximum capacity (*Máxima capacidad*).- This phrase is used for the maximum volume capacity of an inner receptacle and the packages and packagings; it is expressed in liters.

Maximum net mass (*Masa neta máxima*).- This phrase is used for the maximum net mass of contents in a single package and packaging, or the maximum combined mass of inner packages and packagings and their contents, thus expressed in Kilograms (kg).

Keg (*Porrón*).- A package or packaging, made of metal or plastic, with a rectangular or polygonal cross-section.

Receptacle (*Recipiente*).- A containment vessel intended to hold substances or objects, including any closure device.

Inner receptacle (*Recipiente interno*).- These are used whenever an outer package or packaging /*rest of sentence deleted, presumably by mistake*/.

Sift-proof bags (*Sacos a prueba de tamiz*).- These are leakproof bags for dry contents, including fine-particle solid materials during transport.

Closure (*Sellador*).- These are devices which close an opening in a receptacle.

Drum (*Tambor*).- This is a cylindrical package and packaging with flat or convex endings, made of metal, fiberboard, plastic, plywood, or other suitable material. This definition also includes packages and packagings that may have other shapes, for example, round packages and packagings with a conical neck, or cubical packages and packagings.

5. GENERAL Package AND PACKAGING PROVISIONS.

- 5.1 These general provisions are applicable for the construction and reconstruction, as well as the methods of testing, of packages and packagings for all the various classes of hazardous substances, materials and wastes, except classes 2 and 7.

- 5.2 The hazardous materials must be contained in good-quality packages and packagings which the corresponding tests have shown suitable for containing a specific material[,] which have no signs of having undergone structural changes[,] and which are free of any defects or deteriorations which could cause spontaneous leaks or spills in transport. These must be constructed and closed both for transporting and for preventing any leak from occurring under normal transport conditions due to vibration or to changes in temperature, humidity or pressure (for example, as a result of altitude). No amount of hazardous material may adhere to the outer package and packaging. This provision applies to both new and reused packages and packagings.
- 5.3 The part[s] of the packages and packagings which are in direct contact with the hazardous material, must not be affected by the chemical substance or any other action. Whenever it is necessary that these parts include an internal coating or treatment, no constituents capable of reacting dangerously with the contents, such as by forming hazardous products, or of significantly weakening said contents, may be incorporated into said parts of the packages or packagings.
- 5.4 Each package and packaging must be successfully tested in accordance with the relevant provisions and for each type of design.
- 5.5 Whenever the packages and packagings are filled with liquids, sufficient ullage must be left to ensure that no leakage will occur as a result of an expansion of the liquid caused by temperature changes likely to occur during transportation. The liquids must not completely fill the packages or packagings at temperatures higher than 55EC.
- 5.6 The inner packages and packagings must be packed in outer packages and packagings in such a way that, under normal transport conditions, these could not break, be ruptured nor could their contents leak into the outer package and packaging. The inner packages or packagings which are likely to break easily, such as those made of glass, porcelain or earthenware, or certain plastic materials, etc., must be secured inside the outer packages and packagings with cushioning materials. Any leakage of contents must not substantially damage the cushioning properties of the material nor the outer package and packaging.
- 5.7 Hazardous substances and materials must not share the same outer package and packaging with other hazardous substances or materials or if these react dangerously one with the other and cause the following:
- a) Combustion and/or emanation of considerable heat;
 - b) Emanation of flammable, toxic or asphyxiating gases;

- c) The forming of corrosive substances, or
 - d) The forming of unstable substances.
- 5.8 The leakproofness of the packages and packagings for holding wet or diluted substances or materials must be such that the percentage of liquid (water, solvent or stabilizer) does not fall below the limits established for their transport.
- 5.9 Whenever pressure could develop in a package or packaging due to an emitting of gas by its contents (due to a temperature increase or any other cause), the package and packaging must be fitted with a vent, provided that the emitted gas will not constitute a hazard due to its toxicity, flammability, emitted amount, etc. The vent will be designed so as to preclude, during transport, any leakage of liquid or entry of foreign matter under conditions normally incident to transportation.
- 5.10 The new, remanufactured, reused or reconditioned packages and packagings must be capable of passing the tests described in Sections 6 and 7. Before being filled for purposes of their handling and transport, all packages must be inspected to ensure that they are free of corrosion, contamination or any other type of damage. Any package and packaging which shows signs of weakening compared with the approved design must no longer be used unless it is reconditioned so that it passes all tests.
- 5.11 Liquids must only be filled inside packages and packagings that will withstand the internal pressure likely to develop under normal transport conditions. Packages or packagings that are marked with the hydraulic test pressure described in Standard NOM-007-SCT2 can only be filled with liquids which have a vapor pressure:
- a) Such that the manometric pressure in the package or packaging (e.g., the vapor pressure of the filling substance plus the partial pressure of the air or other inert gases, minus 100 kPa) at 55EC, as determined based on a maximum degree of filling in accordance with paragraph 5.5 and a filling temperature of 15EC, must not exceed two thirds of the indicated test pressure; or
 - b) At 50EC less than [sic] four-sevenths of the sum of the indicated test pressure plus 100 kPa.
 - c) At 55EC less than [sic] two-thirds of the sum of the indicated test pressure plus 100 kPa.

- 5.12 An empty package and packaging that has contained a hazardous substance must be treated the same way as indicated in Standard NOM-002-SCT2/1994 for a filled receptacle until it has been purged of any remnant of the hazardous substance.
- 5.13 Each package and packaging designed for holding liquids must get favorable leakage test results and be able to comply with the level of tests indicated in paragraph 7.4.3:
- a) Before being used for the first time for its transport.
 - b) After being reconstructed or reconditioned and before being reused for its transport.

For this test, the packages and packagings shall have their closure devices in place, whenever so required.

The inner receptacle of the composite packages and packagings may be subjected to the test, without the outer package and packaging, provided that the test results would not be affected. The inner packages and packagings of the combination packages and packagings need not be subjected to this test.

- 5.14 Packages and packagings used for solids which can be transformed to be used as liquids as a result of their temperature during transport, must be able to hold the substance in its liquid state.
- 5.15 The packages and packagings must be manufactured and tested under a program that ensures the level of quality that satisfies the relevant authority, so as to guarantee that each manufactured package and packaging is in compliance with the provisions of this Standard, the certification and verification of the Official Mexican Standards, shall be performed by the Government agencies or by duly accredited and authorized certification organizations, testing laboratories and verification units.
- 5.16 The package and packaging provisions of paragraphs 6.13 and 7 are based on packages and packagings that are commonly used. To keep up with the state-of-the-art, there is no objection to the use of packages and packagings whose specifications differ from those indicated in paragraph 6, since these are just as effective, acceptable to the relevant authority, and capable of passing all the tests described in paragraphs 6.13 and 7. Testing methods that differ from those described in these provisions are acceptable if they can be shown to be equivalent.

6. SPECIFICATIONS FOR THE CONSTRUCTION AND RECONSTRUCTION OF Packages AND PACKAGINGS.

For the construction and reconstruction of the packages and packagings intended for the transport of the hazardous substances, materials and wastes, the specifications indicated in the following paragraphs must be complied with.

6.1 Steel drums.

1A1 with a non-removable head

1A2 with a removable head

- 6.1.1 The body, the head and the bottom must be of steel sheet of suitable type and adequate thickness in relation to the capacity and intended use of the drum.
- 6.1.2 Body seams must be welded on drums intended for the transport of more than 40 liters of liquid. Body seams must be mechanically closed or welded on drums intended for the transport of solid substances or liquid volumes lesser than or equal to 40 liters.
- 6.1.3 Chimes must be mechanically closed or welded; separate reinforcing rings may be used.
- 6.1.4 The body of drums of a capacity greater than 60 liters must, in general, have at least two alternate rolling hoops formed by expansion. If they have separate rolling hoops, these must fit tightly on the body of the drum and be well secured so that they cannot move. The separate rolling hoops must not be spot-welded.
- 6.1.5 Openings for filling, emptying and venting in the body, in the head or in the bottom of the non-removable head (1A1) drums must not be over 7 cm in diameter. Drums with larger openings are considered to be of the removable type (1A2). Closures for openings in the body, in the head or in the bottom of the drums, must be so designed and manufactured that they will remain secure and leakproof under normal conditions of transport. Closure flanges may be secured mechanically or welded. The closures must be fitted with gaskets or other sealing elements unless they are leakproof.
- 6.1.6 Closure devices for removable-head drums must be so designed and manufactured that they will remain secure and drums will remain leakproof under normal conditions of transport. All removable heads must be fitted with gaskets or other sealing elements.

- 6.1.7 If materials used for the body, head, bottom and fittings are not compatible with the material to be transported, suitable internal protective coatings or treatments must be applied to enable them to retain their properties under normal conditions of transport.
- 6.1.8 The maximum capacity of the drums shall be 450 liters.
- 6.1.9 The maximum net mass shall be 400 kg.
- 6.2 Aluminum drums
- 1B1 with a non-removable head
1B2 with a removable head
- 6.2.1 The body, the head and the bottom must be made of 99% pure aluminum or of aluminum alloy. The material must be of suitable type and adequate thickness in relation to the capacity and the intended use of the drum.
- 6.2.2 All seams must be welded. Chime seams, if any, must be reinforced through separate reinforcing rings.
- 6.2.3 The body of the drums of a capacity greater than 60 liters must, in general, have at least two separate rolling hoops formed by expansion. If they have separate rolling hoops, these must fit perfectly onto the drum body and be so secured that they cannot shift. Rolling hoops must not be spot-welded.
- 6.2.4 Openings for filling, emptying and venting in the body, in the head or in the bottom of the non-removable head (1B1) drums may not exceed 7 cm in diameter. Drums with larger openings are considered to be of the removable-head type (1B2). Closures for openings in the body, in the head or in the bottom of the drums must be designed and manufactured in such a way as to remain secure and leakproof under normal conditions of transport. Closure flanges may be welded in such a way that the weld forms a closed seam. Closures must be fitted with gaskets or other sealing elements, unless they are leakproof.
- 6.2.5 Closure devices for removable-head drums must be designed and manufactured so that they remain secure and that the drums remain leakproof under normal conditions of transport. All removable heads must be fitted with gaskets or other leakproof elements.
- 6.2.6 The maximum capacity of the drums shall be 450 liters.

- 6.2.7 The maximum net mass shall be 400 kg.
- 6.3 Steel kegs.
- 3A1 with a non-removable head
3A2 with a removable head
- 6.3.1 The body, the head and the bottom of the drums must be of steel sheet of suitable type and adequate thickness in relation to the capacity and intended use of the drum.
- 6.3.2 Chimes of all kegs must be mechanically sealed or welded. Body seams must be welded on kegs intended to transport over 40 liters of liquid. Body seams must be mechanically sealed or welded on kegs intended to transport 40 liters or less.
- 6.3.3 Openings for kegs (3A1) must not exceed 7 mm in diameter. Kegs with larger openings are considered to be of the removable-lid type (3A2). Closures must be designed in such a way that they remain secure and leakproof under normal conditions of transport. Closures must be fitted with gaskets or other sealing elements, unless they are leakproof.
- 6.3.4 If materials used for the body, the head, the bottom and the fittings are not compatible with the substance to be transported, suitable internal protective coatings or treatments must be applied. These coatings or treatments must tr their protective properties under normal conditions of transport.
- 6.3.5 The maximum capacity of the kegs shall be 60 liters.
- 6.3.6 The maximum net mass shall be 120 kg.
- 6.4 Plywood drums. (1D)
- 6.4.1 The wood used must be well-seasoned, commercially dry and free from any defect likely to lessen the effectiveness of the drum for the intended use of the drum. If a material other than plywood must be used for manufacturing the head and the bottom, said material must be of a quality equivalent to that of said type of wood.
- 6.4.2 The plywood thus used must be at least two-ply for the body and at least three-ply for the head and bottom; the plies must be firmly bonded

together with a water-resistant adhesive and must be located in such a way that the grains of each ply are at right angles with those of the previous one.

- 6.4.3 The body, the head, the bottom, and the joints of the drum must be of a design suitable for the capacity of the drum and the use for which it is intended.
- 6.4.4 To avoid losses of contents, the heads must be lined with kraft paper or other equivalent material, which must be securely fastened to the lid and extend to the outside along its full circumference.
- 6.4.5 The maximum capacity of the drum shall be 250 liters.
- 6.4.6 The maximum net mass shall be 400 kg.

- 6.5 Wooden barrels.
 - 2C1 with a bung
 - 2C2 with a removable head
- 6.5.1 The wood used therefor must be of a good quality, straight-grained, well-seasoned and free from knots, bark, rotten parts or any other defects likely to lessen the effectiveness of the barrel.
- 6.5.2 The body, the head and the bottom must be of a design appropriate to the capacity and intended use of the barrel.
- 6.5.3 The staves, the head and the bottom must close in the direction of the grain so that no annual ring extends over more than half the thickness of these parts of the barrel.
- 6.5.4 The barrel hoops must be of steel or iron of good quality. The hoops of the 2C2 barrels may be of a suitable hardwood.
- 6.5.5 For wooden barrels 2C1, the diameter of the bung-hole may not exceed half the width of the stave in it is placed.
- 6.5.6 For wooden barrels 2C2, the head and the bottom must fit perfectly into the grooves which are provided for this purpose.
- 6.5.7 The maximum capacity of the barrels shall be 250 liters.

- 6.5.8 The maximum net mass shall be 400 kg.
- 6.6 Fiberboard drums. (1G)
- 6.6.1 The body of the fiberboard drum (1G) must be made of multiple plies of heavy paper or fiberboard (non-corrugated) firmly glued or laminated together, and may include one or several protective layers of bitumen, waxed kraft paper, metal foil, plastic, etc.
- 6.6.2 The head and the bottom must be of natural wood, fiberboard, metal, plywood or plastic and may include one or several protective layers of bitumen, waxed kraft paper, metal foil, plastic, etc.
- 6.6.3 The body, the head and the bottom of the drum and their joints must be of a design appropriate to the capacity and intended use of the drum.
- 6.6.4 The assembled package and packaging must be sufficiently water-resistant so that the plies do not delaminate under normal conditions of transport.
- 6.6.5 The maximum capacity of the drums shall be 450 liters.
- 6.6.6 The maximum net mass shall be 400 kg.
- 6.7 Plastic drums and kegs.
- 1H1 Drums with a non-removable head
 - 1H2 Drums with a removable head
 - 3H1 Kegs with a non-removable head
 - 3H2 Kegs with a removable head
- 6.7.1 The package and packaging must be of a suitable plastic and be of adequate strength in relation to its capacity and intended use. No already used material may be used, except for production residues production or triturated materials resulting from the same manufacturing process. The package and packaging must be adequately resistant to aging and to degradation caused by the hazardous material contained therein or by ultra-violet radiation. Any possible permeation of the hazardous substance or material contained therein may not constitute a danger under normal conditions of transport.
- 6.7.2 The period of use allowed for the transport of hazardous substances and materials must be five years from the date of manufacturing of the

package and packaging, except when a shorter period of time is indicated based on the nature of the substance to be transported.

- 6.7.3 In order that the drums and kegs be protected, whenever necessary, from ultraviolet radiation, carbon black or other suitable pigments or inhibitors must be used. These additives must be compatible with the contents and remain effective throughout the life of the package and packaging. If use is made of carbon black, pigments or inhibitors other than those used in manufacturing the approved model, the requirement to conduct new tests may be waived if the carbon black content does not exceed 2% by mass or if the pigment content does not exceed 3% by mass; in the case of the ultra-violet radiation, the inhibitor content is not limited.
- 6.7.4 Additives used for purposes other than protection against ultra-violet radiation may be used as constituents of the plastic provided that the chemical and physical properties of the package and packaging material are not altered.
- In such a case, the requirement to conduct new test may be waived.
- 6.7.5 The wall thickness at every point of the package and packaging must be appropriate to its capacity and its intended use, taking into account the stresses to which each point may be exposed.
- 6.7.6 Openings for filling, emptying and venting in the body, head or bottom of the non-removable head (1H1) drums and the non-removable head (3H1) kegs may not exceed 7 cm in diameter. Drums and kegs with larger openings are considered to be of the removable-head type (1H2 and 3H2). Closures for openings in the body, head and bottom of the drums and kegs must be so designed and manufactured that they remain secure and leakproof under normal conditions of transport. Closures must be fitted with gaskets or other leakproof elements.
- 6.7.7 Closure devices for removable-head drums and kegs must be so designed and manufactured that they remain secure and leakproof under normal conditions of transport. All removable heads must be fitted with gaskets unless the drum or keg design is such as to make said drum or keg inherently leakproof.
- 6.7.8 Maximum capacity of the drums and kegs:
1H1, 1H2: 450 liters
3H1, 3H2: 60 liters
- 6.7.9 Maximum net mass:

1H1, 1H2: 400 kg
3H1, 3H2: 120 kg

6.8 Boxes of natural wood

- 4C1 Ordinary boxes
- 4C2 With dust-tight walls

6.8.1 The wood used must be well-seasoned, commercially dry and free from defects that could materially lessen the strength of any part of the box. The strength of the material thus used and the construction method must be appropriate to the capacity and intended use of the box. The top part and the bottom may be of water-resistant reconstituted wood, such as pressured wood or particle boards or other suitable types.

6.8.2 The joining pieces must withstand the vibration experienced under normal conditions of transport. Nailing at the end of the box must be avoided as much as possible. Joints exposed to stresses must be restrained with nailed annual rings or equivalent means.

6.8.3 4C2 boxes: each part must be of one piece or equivalent to a single piece. Parts are considered to equivalent to one piece when one of the following methods of glued assembly is used: dovetail (Landerman) joint; tongue and groove joint; rabbet joint at half wood or butt joint with at least two corrugated metal fasteners at each joint.

6.8.4 Maximum net mass 400 kg.

6.9 Plywood boxes. (4D)

6.9.1 Plywood used must be at least three ply. It must also be made from well-seasoned plies, cut with a rotary or stationary cutter, commercially dry and free from defects that would materially lessen the strength of the box. The strength of the material used and the method of construction must be appropriate to the capacity and intended use of the box.

All adjacent plies must be glued with a water-resistant adhesive. Other suitable materials may be used together with plywood in the manufacturing of the boxes. Box panels must be firmly nailed or secured in any other way to the corner posts or to the ends or be assembled with other equally suitable devices.

- 6.9.2 Maximum net mass: 400 kg.
- 6.10 Reconstituted wood boxes. (4F)
 - 6.10.1 The walls of boxes must be made of water-resistant, reconstituted wood (4F) such as pressured wood or particle boards or other suitable types. The strength of the material used and the method of construction must be appropriate to the capacity of the box and its intended use.
 - 6.10.2 Other parts of the box may be made of other materials.
 - 6.10.3 Boxes must be securely assembled by means of suitable devices.
 - 6.10.4 Maximum net mass: 400 kg
- 6.11 Fiberboard boxes. (4G)
 - 6.11.1 Strong and good-quality, compact or corrugated, double-faced, single or multi-wall, appropriate to the capacity and intended use of the box (4G). The water resistance of the outer surface must be such that the increase in mass, as determined 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/sq.m. The fiberboard must have the proper ability to bend without breaking. The fiberboard must be cut, creased without tearing through and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting of the corrugated fiberboard must be firmly glued to the facings.
 - 6.11.2 The ends of the boxes may have a wooden frame or be entirely of wood or other available material. As reinforcement, wooden battens or battens of other material may be used.
 - 6.11.3 The assembly joints of the body of the boxes must be manufactured with adhesive tape, by overlapping the edges and/or by overlapping the edges and stitching them with metal staples. The overlapped parts of the joints must be sufficiently wide. Where closing is effected by gluing or taping, the adhesive product must be water-resistant.
 - 6.11.4 Boxes must be designed so that its contents may fit snugly inside.
 - 6.11.5 Maximum net mass: 400 kg.
- 6.12 Plastic boxes (4H)
 - 4H1 Expanded plastic boxes

4H2 Solid plastic boxes

- 6.12.1 The boxes must be of a suitable plastic and be of adequate strength in relation to its capacity and intended use. They must be adequately resistant to aging and to degradation caused by the substance contained or by ultra-violet radiation.
- 6.12.2 The expanded plastic boxes must have two parts made of molded expanded plastic; a bottom part containing cavities for the inner packages and packagings, and a top part covering and interlocking with the bottom part. The top and bottom parts must be so designed that the inner packages and packagings fit snugly between the two without shifting. The closure cap of the inner packages and packagings must not be in contact with the inside surface of the top part of the box.
- 6.12.3 To be shipped, the expanded plastic boxes must be closed with a self-adhesive tape having sufficient tensile strength to prevent the box from opening. The self-adhesive tape must be weather-resistant and its adhesive products must be compatible with the expanded plastic of the box; other equally effective closing systems may be used.
- 6.12.4 Whenever it is necessary to protect the solid plastic boxes against ultra-violet radiation, carbon black or other suitable pigments or inhibitors must be used. These additives must be compatible with the contents and remain effective throughout the life of the box. If use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the approved model, the requirement to proceed with new tests may be waived if the carbon black content does not exceed 2% by mass or if the pigment content does not exceed 3% by mass; the content of inhibitors of ultra-violet radiation is not limited.
- 6.12.5 Additives used for purposes other than ultra-violet protection may be included in the composition of the plastic, provided that the chemical and physical properties of the box material are not altered. In this event, the obligation to proceed with new tests may be waived.
- 6.12.6 Solid plastic boxes must have closure devices made of a suitable material of adequate strength and so designed as to prevent the box from unintentionally opening.
- 6.12.7 Maximum net mass 4H1: 60 kg
 4H2: 400 kg
- 6.13 Steel or aluminum boxes

- 4A1 Steel boxes
- 4A2 Steel boxes with inner liner or coating.
- 4B1 Aluminum boxes
- 4B2 Aluminum boxes with inner liner or coating.

- 6.13.1 The strength of the metal and the construction of the box must be appropriate to the capacity and intended use of the box.
- 6.13.2 The boxes must be internally covered with fiberboard or felt as cushioning materials, as required, or must have an inner liner or coatings of suitable material. If a double seamed metal liner is used, steps must be taken to prevent the ingress of hazardous material.
- 6.13.3 Closures may be of any suitable type and must remain sealed under normal conditions of transport.
- 6.13.4 Maximum net mass: 400 kg.
- 6.14 Textile bags
- 5L1 Without inner liner or coating
 - 5L2 Dust-proof
 - 5L3 Water-resistant
- 6.14.1 The textile materials used must be of good quality. The strength of the fabric and the construction of the bag must be appropriate to the capacity and intended use of the bag.
- 6.14.2 Dust-tight bags 5L2; to make the bags dust-tight, the following must be used, for example:
- a) Paper bonded to the inner surface of the bag by a water-resistant adhesive such as cement, or
 - b) A plastic film bonded to the inner surface of the bag, or
 - c) One or more inner liners made of paper or plastic.
- 6.14.3 Water-resistant bags, 5L3; to prevent the entry of moisture, the bag must be waterproofed by using:
- a) Separate water-resistant inner liners (for example, waxed kraft paper or plastic-coated kraft paper), or
 - b) A plastic film bonded to the inner surface of the bag, or
 - c) One or several inner plastic liners.

6.14.4 Maximum net mass: 50 kg.

6.15 Woven plastic bags

5H1 Without an inner lining or coating

5H2 Dust-proof

5H3 Water-resistant

6.15.1 The bags must be made from stretched tapes or monofilaments of a suitable plastic. The strength of the material used and the construction of the bag must be appropriate to the capacity and intended use of the bag.

6.15.2 If the fabric is flat, the bags must be made by sewing or otherwise closing the bottom and one side. If the textile is tubular, the bottom of the bags must be closed by sewing it, weaving it or by any other equally strong method of closure.

6.15.3 Dust-tight bags, 5H2; for the bag to be dust-tight the following must be used:

a) Paper or plastic film bonded to the inner surface of the bag, or

b) One or several separate inner liners made of paper or plastic.

6.15.4 Water-resistant bags, 5H3: to prevent the entry of moisture, the bag must be waterproofed by using:

a) Separate inner liners made of water-resistant paper (for example, waxed kraft paper, double-tarred kraft paper or plastic-coated kraft paper), or

b) A plastic film bonded to the inner or outer surface of the bag, or

c) One or several inner plastic liners.

6.15.5 Maximum net mass: 50 kg.

6.16 Plastic film bags. (5H4)

6.16.1 The bags must be made of a suitable plastic. The strength of the material thus used and the construction of the bag must be appropriate to the capacity and the intended use of the bag. The joints and closures must withstand pressures and impacts liable to occur under normal conditions of transport.

6.16.2 Maximum net mass: 50 kg.

6.17. Paper bags

- 5M1 With several walls
- 5M2 With several water-resistant walls

6.17.1 The bags must be made of a suitable kraft paper, or of an equivalent paper with at least three plies; the strength of the paper and the construction of the bag must be appropriate to the capacity and intended use of the bag. The joints and closures must be dust-tight.

6.17.2 5M2 bags; to prevent the entry of moisture, the bags having four plies or more must be waterproofed by the use of one water-resistant ply as one of the two outermost plies or a water-resistant layer made of a suitable protective material between the two outermost plies; the bags with three plies must be waterproofed by use of a water-resistant ply as the outermost ply. If there is danger that the contents reacting with moisture or if the contents is packed damp, a water-resistant ply or layer must also be placed in contact with the contents. The joints and closures must be waterproof.

6.17.3 Maximum net mass: 50 kg.

6.18 Composite packages and packagings (plastic)

6HA1 Plastic receptacle with an outer steel drum.

6HA2 Plastic receptacle with an outer steel crate or box.

6HB1 Plastic receptacle with an outer aluminum drum.

6HB2 Plastic receptacle with an outer aluminum crate or box.

6HC Plastic receptacle with an outer wooden box.

6HD1 Plastic receptacle with an outer plywood (3-ply) drum.

6HD2 Plastic receptacle with an outer plywood (3-ply) box.

6HG1 Plastic receptacle with an outer fiberboard drum.

6HG2 Plastic receptacle with an outer fiberboard box.

6HH1 Plastic receptacle with an outer plastic drum.

6HH2 Plastic receptacle with an outer solid plastic box.

6.18.1 Inner receptacle.

6.18.1.1 The provisions of paragraphs 6.7.1 and 6.7.4 through 6.7.7 apply to the inner plastic receptacles.

6.18.1.2 The inner plastic recipient must fit snugly into the outer package or packaging, which must have no asperity which may abrade the plastic.

6.18.1.3 Maximum capacity of the inner receptacle.

- a) 6HA1, 6HB1, 6HD1, 6HG1, 6HH1: 250 liters
- b) 6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2: 60 liters.

6.18.1.4 Maximum net mass:

- a) 6HA1, 6HB1, 6HD1, 6HG1, 6HH1: 400 kg.
- b) 6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2: 75 kg.

6.18.2 Outer package and packaging

6.18.2.1 Plastic receptacle with an outer steel or aluminum drum (6HA1 or 6HB1); the outer package or packaging must be constructed as provided in paragraphs 6.1 or 6.2, as the case may be.

6.18.2.2 Plastic receptacle with an outer steel or aluminum crate or box (6H2 or 6HB2): the outer package or packaging must be constructed as provided in section 6.13.

6.18.2.3 Plastic receptacle with an outer wooden box (6HC); the outer package or packaging must be constructed as provided in Section 6.8.

6.18.2.4 Plastic receptacle with an outer plywood drum (6HD1); the outer package or packaging must be constructed as provided in Section 6.4.

6.18.2.5 Plastic receptacle with an outer plywood box (6HD2); the outer package or packaging must be constructed as provided in Section 6.9.

6.18.2.6 Plastic receptacle with an outer fiberboard drum (6HG1); the outer package or packaging must be constructed as provided in paragraphs 6.6.1 through 6.6.4.

6.18.2.7 Plastic receptacle with an outer fiberboard box (6HG2); the outer package and packaging must be constructed as provided in Section 6.11.

6.18.2.8 Plastic receptacle with an outer plastic drum (6HH1); the outer package and packaging must be constructed as provided in paragraphs 6.7.1 and 6.7.3 through 6.7.7.

6.18.2.9 Plastic receptacle with an outer solid plastic box (including the corrugated plastic material) 6HH2; the outer package and packaging must be constructed as provided in paragraphs 6.12.1 and 6.12.4 through 6.12.6.

6.19. Composite packages and packagings (glass or porcelain)

6PA1 Receptacle with an outer steel drum.

6PA2 Receptacle with an outer steel crate or box.

6PB1 Receptacle with an outer aluminum drum.

6PB2 Receptacle with an outer aluminum crate or box.

6PC Receptacle with an outer wooden box.

6PD1 Receptacle with an outer plywood drum.

6PD2 Receptacle with an outer wickerwork hamper.

6PG1 Receptacle with an outer fiberboard drum.

6PG2 Receptacle with an outer fiberboard box.

6PH1 Receptacle with an expanded plastic outer package and packaging.

6PH2 Receptacle with an outer solid plastic package and packaging.

6.19.1 Inner receptacle

6.19.1.1 The receptacle must be of a suitable shape (cylindrical or pear-shaped) and of a good-quality material, which must be free from any defect likely to lessen its strength. The walls must be sufficiently thick at all points.

- 6.19.1.2 As receptacle closures, use must be made of threaded plastic closures, ground glass caps or other closures that are at least equally effective. All parts of the closures that may come into contact with the contents of the receptacle must be resistant to said contents. Care must be taken that closures are fitted so as to be leakproof and secured to prevent any loosening during transport.
- 6.19.1.3 The receptacle must be held securely in the outer package and packaging with cushioning and/or absorbing materials.
- 6.19.1.4 Maximum capacity of receptacle: 60 liters
- 6.19.1.5 Maximum net mass: 75 kg.
- 6.19.2 Outer package and packaging
- 6.19.2.1 Receptacle with an outer steel drum (6PA1): the outer package and packaging must comply with the construction specifications set forth in Section 6.1. The removable lid necessary for this type of package or packaging may have the shape of a cap.
- 6.19.2.2 Receptacle with an outer steel crate or box (6PA2); the outer package and packaging must comply with the construction specifications set forth in Section 6.13. If the receptacles are cylindrical, the outer package or packaging must be higher than the receptacle and their closure in vertical position. If the crate surrounds a pear-shaped receptacle and is of matching shape, the outer package and packaging must be fitted with a protective cover (cap).
- 6.19.2.3 Receptacle with an outer aluminum drum (6PB1); the outer package and packaging must comply with the construction specifications set forth in Section 6.2.
- 6.19.2.4 Receptacle with an outer aluminum crate or box (6PB2); the outer package and packaging must comply with the construction specifications set forth in Section 6.13.
- 6.19.2.5 Receptacles with an outer wooden box (6PC); the outer package and packaging must comply with the construction specifications set forth in Section 6.8.
- 6.19.2.6 Receptacle with an outer plywood drum (6PD1); the outer package and packaging must comply with the construction specifications set forth in Section 6.4.

- 6.19.2.7 Receptacle with an outer wickerwork hamper (6PD2); the wickerwork hamper must be properly made of a good-quality material and be fitted with a protective cover (cap) to ensure that the receptacle does not deteriorate.
- 6.19.2.8 Receptacle with an outer fiberboard drum (6PG1); the outer package and packaging must comply with the construction specifications set forth in paragraphs 6.6.1 through 6.6.4.
- 6.19.2.9 Recipient with an outer fiberboard box (6PG2); the outer package and packaging must comply with the construction specifications set forth indicated in Section 6.11.
- 6.19.2.10 Receptacle with an outer expanded plastic or solid plastic package and packaging (6PH1 or 6PH2); the materials of the two outer packages and packagings must comply with the specifications of Section 6.12. The solid plastic packages and packagings must be of high-density polyethylene or other similar plastic. The removable lid for this type of package and packaging may be a cap.

7. Testing methods for the packages and packagings.

The testing procedures to which the packages and packagings will be subjected to ensure compliance with the requirements set forth in Section 6 regarding the transport of hazardous materials, shall be as follows.

- 7.1 Performance and frequency of the tests.
- 7.1.1 Each package and packaging model must be subjected to the tests set forth in Section 7, following the procedures established by the Secretariat of Communications and Transportation and other competent authorities.
- 7.1.2 Each package and packaging model is defined by its design, its size, the materials used and its thickness, its mode of construction and its mode of restraint as well as various surface treatments.
- 7.1.3 The tests must be repeated with mass-produced samples, at the frequency required for maintaining the prototype in accordance with the initial draft, on a semiannual basis. When the paper or fiberboard packages and packagings are subjected to a test, the preparation of the ambient conditions shall be considered equivalent to those detailed in paragraph 7.2.3. The tests must be repeated with mass-produced samples, with the frequency set forth by the Secretariat of Communications and Transportation and the other competent authorities.

- 7.1.4 The tests must also be repeated after each change which modifies the design, material or mode of construction of a package and packaging.
- 7.1.5 The appropriate authorities may order selective testing of packages and packagings that differ only in minor respects from the already approved models; for example: packages and packagings that contain smaller inner packages and packagings or inner packages and packagings of lesser net mass, as well as packages and packagings such as kegs, bags and boxes that have one or several slightly smaller outside dimensions.
- 7.1.6 If an outer package and packaging of a combination package and packaging has passed the tests with various types of inner packages and packagings, then within this outer package and packaging, a variety of such inner package and packaging combinations may also be assembled.
- 7.1.7 The relevant authorities may at any time require the demonstration, through the performance of the tests prescribed in this section, that the mass-produced packages and packagings comply with the same requirements as the model subjected to the test.
- 7.1.8 If for safety reasons use must be made of an inner treatment or coating, this treatment or coating must maintain its protective properties after the tests.
- 7.2 Preparation of packages and packagings for testing.
- 7.2.1 The tests must be performed with packages and packagings prepared for transport, including the inner packages and packagings of the combined packages and packagings. The inner or single receptacles or packages and packagings must be filled to at least 95% of their capacity in the case of liquids or materials, unless this would invalidate the test results. In the case of solids, if another substance is used, the latter must have the same physical characteristics (mass, particle size, etc.) as the substance to be transported. Additional loads may be used, such as bags of lead shots, so that the package reaches the total required mass, provided that these loads are placed in such a way that would do not invalidate test results.
- 7.2.2 As regards drop tests for liquids, whenever another material is used, it must have a relative density and a viscosity similar to that of the materials to be transported. In such drop tests for liquids, use may also be made of water under the conditions set forth in paragraph 7.3.4.
- 7.2.3 Paper or fiberboard packages and packagings must be conditioned for at least 24 hours in an atmosphere having a controlled temperature and

relative humidity. In this respect, there are three possibilities, one of which must be chosen. The preferable atmosphere for this conditioning is a temperature of 23EC + 2EC and a relative humidity of 50% + 2%. The other two possibilities are a temperature of 20EC + 2EC and a temperature of 27EC ± 2EC, as well as a relative humidity of 65% ± 2% in both cases.

7.2.4 Natural wood barrels of the bung type must have been filled with water uninterruptedly for at least 24 hours before the tests.

7.2.5 Steps must be taken to ensure that the plastic used for the manufacture of the plastic drums and kegs and the composite (plastic) packages and packagings

/missing word(s)/

that the parts of the packages and packagings that are in direct contact with the hazardous material must not be affected by the chemical action of other type of action of such materials. Whenever necessary, they must be provided with an appropriate inner coating or be subjected to an appropriate inner treatment. Such parts of the packages and packagings must not contain components that may react dangerously with the contents in such a way as to form hazardous products or to considerably weaken the package and packaging. To this end, samples of the receptacles or packages and packagings may be subjected to a preliminary test that extends over a large period of time, e.g., six months, during which these samples must remain filled with the materials which they are intended to contain, after which the tests samples must be subjected to the tests listed in sections 7.3 through 7.6. in the case of substances that may give rise to stress cracks or to a weakening of the plastic drums or kegs.

The sample, filled with such material or other material known to have an at least equally great stress cracking effect on the plastic in question, must be subjected to a superimposed load equivalent to the total mass of the identical packages that could be stacked above it during transport. The minimum height of the stack, including the sample subjected to the test, must be 3 meters.

7.3 Drop test.

7.3.1 Number of samples for the test (by type of construction and by manufacturer) and orientation of the sample for the drop.

In the various tests of the flat drops, the center of gravity must be vertically over the point of impact. Table 1 contains the main aspects to be considered to this end:

When more than one orientation is possible for a drop test, use must be made of the orientation which is most likely to result in a package and packaging failure.

TABLE 1 (DROP TESTS)

TEST Package and packaging	NUMBER OF SAMPLES FOR THE TEST	ORIENTATION OF THE SAMPLE FOR THE TEST
STEEL DRUMS ALUMINUM DRUMS STEEL KEGS PLYWOOD DRUMS WOODEN BARRELS fiberboard DRUMS PLASTIC DRUMS AND JERRICANS DRUM-SHAPED COMPOSITE Package AND PACKAGING	<p>SIX</p> <p>(THREE FOR EACH FALL)</p>	<p>FIRST FALL (FOR THREE SAMPLES): THE Package/PACKAGING MUST STRIKE THE TARGET SURFACE DIAGONALLY ON THE CHIME OR, IF IT HAS NO CHIME, ON A SEAM OF THE PERIPHERY OR ON AN EDGE.</p> <p>SECOND FALL (WITH THE OTHER THREE SAMPLES): THE Package AND PACKAGING MUST STRIKE THE TARGET SURFACE ON THE WEAKEST PART NOT TESTED IN THE FIRST DROP. FOR EXAMPLE, A CLOSURE OR, IN THE CASE OF SOME CYLINDRICAL JERRICANS, THE WELDED LONGITUDINAL SEAM OF THE BODY.</p>
NATURAL WOOD BOXES PLYWOOD BOXES (3-PLY) RECONSTITUTED WOOD BOXES FIBERBOARD BOXES PLASTIC BOXES STEEL OR ALUMINUM BOXES BOX-SHAPED COMPOSITE Packages AND PACKAGINGS	<p>FIVE</p> <p>(ONE FOR EACH TEST)</p>	<p>FIRST DROP: FLAT ON THE BOTTOM.</p> <p>SECOND DROP: FLAT ON THE TOP PART.</p> <p>THIRD DROP: FLAT ON ONE OF THE WIDEST SIDE.</p> <p>FOURTH DROP: FLAT ON ONE OF THE SHORTEST SIDE.</p> <p>FIFTH DROP: ON A CORNER.</p>

BAGS -- SINGLE-PLY WITH A SIDE SEAM	THREE (THREE DROPS PER BAG)	FIRST DROP: FLAT ON A WIDE FACE. SECOND DROP: FLAT ON A NARROW FACE. THIRD DROP: ON AN END OF THE BAG
BAGS -- SINGLE-PLY WITHOUT A SIDE SEAM, OR MULTI-PLY	THREE (TWO DROPS PER BAG)	FIRST DROP: FLAT ON A WIDE FACE. SECOND DROP: ON AN END OF THE BAG.

7.3.2 Special preparation of the samples for the drop test:

The test sample temperature and its contents must be lowered to -18EC or less for the following packages and packagings:

- a) Plastic drums (see 6.7)
- b) Plastic drums (see 6.7).
- c) Plastic boxes other than the expanded polyester boxes (see 6.12);
- d) Composite (plastic) packages and packagings (see 6.18).
- e) Packages and packagings with inner plastic packages and packagings;
- f) Textile bags with inner plastic coating (see 6.14);
- g) Woven plastic bags (see 6.16)
- h) Plastic film bags (see 6.16).

When samples of this form are prepared, the requirements under 7.2.3 may be waived. Tests with liquids must be maintained in the liquid state by adding anti-freeze, as necessary.

7.3.3 Target surface

The drop must be made on a rigid, non-resilient, flat and horizontal surface.

7.3.4 Drop height

In the case of solids and liquids, if the test is made with the solid or liquid to be transported or with other material having essentially the same physical characteristics, the drop height shall be as follows:

Package and packaging GROUP I	Package and packaging GROUP II	Package and Packaging GROUP III
1,8 m	1,2 m	0,8 m

In the case of liquids, if the test is performed with water:

- a) If the material to be transported has a relative density no higher than 1.2, the drop height shall be:

Package and Packaging GROUP I	Package and Packaging GROUP II	Package and Packaging GROUP III
1.8 m	1.2 m	0.8 m

- b) If the material to be transported has a relative density higher than 1.2, the drop height must be computed according to the relative density (D) of the material to be transported, rounded off to the first decimal, as follows:

Package and packaging GROUP I	Package and packaging GROUP II	Package and packaging GROUP III
D x 1,5 (m)	D x 1,0 (m)	D x 0,67 (m)

7.3.5 Criteria for passing the test:

7.3.5.1 Each package and packaging containing a liquid must not leak once an equilibrium has been reached between the internal pressure and the external pressure, except in the case of inner packages and packagings of the combination packages and packagings, for which stresses need not be equal.

7.3.5.2 In the case of a package and packaging for solids that has been subjected to a drop test and has struck against the target surface on its top face, the sample is considered to have passed the test if the entire contents is retained by an inner package or packaging or by an inner receptacle (for example, a plastic bag), even if the closure is no longer dust-proof.

7.3.5.3 The package and packaging, or the outer package and packaging of a composite or combination package and packaging, must not show any deterioration likely to affect the safety during transport. There must be no leak

of the substance contained in the inner receptacle or in the inner packages and packagings.

7.3.5.4 Neither the outer face of a bag nor an outer package and packaging must show any deterioration likely to affect safety during transport.

7.3.5.5 A slight leak from the closure or closures upon impact should not be attributed to package or packaging deficiencies so long as no other leaks can be shown.

7.3.5.6 In the case of packages and packagings for Class 1 freight, no rupture is permitted which would permit spillage of loose explosive substance or material from the outer package or packaging.

7.4 Leakproofness test.

All package and packaging models intended for the transport of liquids must be subjected to the "dustproofness" test; however, it is not necessary that inner packages and packagings of combination packages and packagings be subjected to this test.

7.4.1 The number of samples to be used are [sic] three samples per model and per manufacturer.

7.4.2 Special preparation of the test samples; if the closures are vented, they must be replaced by similar non-vented closures, that is, dust-proof closures.

7.4.3 Testing method and pressure to be applied; the packages and packagings, including their closures, must be restrained under water while an internal air pressure is applied; the method used to maintain the package and packaging under water must not affect the test results. Use may be made of other methods which are considered equally effective. The air (manometric) pressure to be applied must be as shown in the following table:

Package and Packaging GROUP I	Package and Packaging GROUP II	Package and Packaging GROUP III
AT LEAST 30kPa (0,3 bar)	AT LEAST 20 kPa (0,2 bar)	AT LEAST 20kPa (0,2 bar)

7.4.4 Criteria for passing the test; there must be no leak.

7.5 Internal (hydraulic) pressure test

7.5.1 All metal or plastic packages and packagings, and all composite packages and packagings intended for the transport of liquids must be subjected to the internal (hydraulic) pressure test.

7.5.2 Number of samples: three samples per model and per manufacturer.

7.5.3 Special preparation of packages and packagings for testing; if the closures are vented, they must be replaced by similar non-vented closures.

7.5.4 Testing method and pressure to be applied; metal and composite (glass or porcelain) packages and packagings, including their closures, must be subjected to the test pressure for five minutes, while plastic packages or packagings [and] composite (plastic) packages and packagings, including their closures, must be subjected to the test pressure for 30 minutes. This pressure is as prescribed in Standard NOM-007-SCT2-1994. The manner in which the packages and packagings are restrained for the test must not invalidate the results. The test pressure must be applied in a continuous and regular manner throughout the test. The hydraulic (manometric) pressure to be applied, as determined by any of the following methods, must be:

- a) At least the average total manometric pressure in the package and packaging (that is, the vapor pressure of the material with which the sample was filled plus the partial pressure of the air or other inert gases minus 100 kPa) at 55EC multiplied by a safety coefficient of 1.5. To determine this total manometric pressure, the package and packaging must not be filled with more than what is provided and necessary to avoid any leakage of the contents and any permanent deformation of the package and packaging due to the liquid dilatation by effect of a temperature variation during transport, and the filling temperature must be 15EC, while the maximum degree of filling must be as provided under paragraph 5.4.
- b) At least 1.75 times the vapor pressure at 50EC of the material to be transported minus 100 kPa; in any case, the pressure must be 100 kPa as a minimum.
- c) At least 1.5 times the vapor pressure at 55EC of the material to be transported, minus 100 kPa; in any case, the pressure must be 100 kPa as a minimum.

- 7.5.5 In addition, the packages and packagings intended to hold substances and materials of the Package and Packaging Group I must be subjected to a minimum test manometric pressure of 250 kPa during a period of 5 or 30 minutes, depending on the construction material of the package and packaging.
- 7.5.6 Criteria for passing the test: no package and packaging must show any leak.
- 7.6 Stacking test
- All packages and packagings, with the exception of the bags, must be subjected to a stacking test.
- 7.6.1 The number of samples to be used is three samples per model and per manufacturer.
- 7.6.2 Testing method: the sample must be subjected to a force applied to its top surface, equivalent to the total weight of identical packages which might be stacked on it during transport; if the test sample contents is a non-hazardous liquid whose relative density is different from the density of the liquid to be transported, the force must be calculated as a function of the latter. The minimum height of the stack, including the sample, must be 3 meters.
- Test duration must be 24 hours, except in the case of plastic drums and jerricans and plastic composite packages and packagings 6HH1 and 6HH2, intended for the transport of liquids, which must be subjected to the stacking test for 28 days at a temperature of at least 40EC.
- 7.6.3 Criteria for passing the test: none of the samples must show any leaks. In the case of composite or combination packages and packagings, there must be no leakage of the hazardous material contained in the receptacle or in the inner package and packaging. No sample may show any deterioration likely to compromise safety during the transport nor any distortion likely to reduce its strength or cause any instability in the stack of packages and packagings. In the cases in which stack stability is assessed after the test has been concluded (such as the guided load tests conducted with drums and kegs), the stability may be considered sufficient when two filled packages and packagings of the same type placed on each test sample maintain their position during one hour. The plastic packages and packagings must be refrigerated at ambient temperature before this assessment.
- 7.7 Load test for the wooden barrels.

- 7.7.1 Sample number: one barrel
- 7.7.2 Testing method: remove all hoops located above the body of an empty barrel that has been empty for at least two days.
- 7.7.3 Criteria for passing the test: the diameter of the top part of the barrel must not increase by more than 10%.
- 7.8 Test report
- 7.8.1 A test report must contain at least the following data in the form of a Table and must be available for the users of the packages and packagings:
- 1.- Number and address of the facilities where tests were conducted;
 - 2.- Name and address of the applicant (when appropriate);
 - 3.- Sole identification of the test report;
 - 4.- Date of the test report;
 - 5.- Manufacture of the package and packaging;
 - 6.- Description of the type of package or packaging design (for example, blow molding), which can include drawings and/or photographs;
 - 7.- Maximum capacity;
 - 8.- Characteristics of the contents of the test, for example: viscosity and relative density for liquids and particle size for solids;
 - 9.- Description of the tests and results;
 - 10.- The report of the tests must be signed with the name and position of the signee.
- 7.8.2 The test report must contain a statement on the preparation of the packages and packagings which were tested for transport purposes in accordance with the provisions of this Standard, and use of any other package and packaging method shall not be permitted. A copy of the test report must be delivered to the Secretariat of Communications and Transportation or to any authority that requests it.

- 7.9 Leakproofness test for sprays and small receptacles for gases.
- 7.9.1 Each receptacle must be subjected to a test performed in a hot water bath, and the duration of the test must be such that the contents exerts a pressure equal to the pressure that would be reached at 55EC. (50EC if the liquid phase does not exceed 95% of the recipient capacity at 50EC).
- If the content is heat-sensitive or if the receptacle is made of a plastic material that softens at test temperature, the bath temperature must be between 20EC and 30EC but, in addition, one receptacle every 2000 must be tested at high temperature.
- 7.9.2 There must be no content leakage or permanent distortion of the receptacle, but if the latter is plastic, a distortion due to softening will be allowed, provided that there are no leaks.

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