PART 6

REQUIREMENTS FOR MANUFACTURING AND TESTING PACKAGING,

INTERMEDIATE CONTAINERS FOR GRANÉS (IBCs),

BIG PACKS, PORTABLE TANKS,

MULTIPLE GAS ELEMENTS CONTAINERS

(MEGCs) AND CONTAINERS FOR GRANÉIS

CHAPTER 6.1

REQUIREMENTS FOR MANUFACTURING AND TESTING PACKAGING

(EXCL. PACKAGING FOR SUBSTANCES OF SUBCLASS 6.2)

6.1.1 General provisions

6.1.1.1 The requirements of this Chapter do not apply to:

(A) packages containing radioactive materials, which must meet the Established by CNEN, except when it is:

(I) radioactive material with other hazardous properties (risks Subsidiaries), which must also comply with the provisions of the Special nº 172;

(Ii) low specific activity material (BAE) and objects Contaminated surface (SCO), which can be transported In certain packages defined in this Regulation, provided that Additional provisions Established in the CNEN rules.

(B) pressure vessels;

(C) packages with a net mass exceeding 400 kg;

(D) packagings for liquids, provided that they are not Combined, with a capacity exceeding 450 L.

6.1.1.2 The requirements for packaging specified in item 6.1.4 To commonly used packaging. Taking into account progress in science and technology, The use of packaging with specifications other than those indicated in item 6.1.4 is allowed, Provided that such packaging is equally effective, accepted by the competent authority (Inmetro), and capable of withstanding the tests described in items 6.1.1.3 and 6.1.5. Methods of Other than those described in this Regulation are acceptable, provided that they are Equivalents.

6.1.1.3 Every package intended to contain liquids must be approved by one Appropriate leakproofness test and comply with the relevant provisions of the test Indicated in item 6.1.5.4.3:

(A) before being used for transport for the first time;

(B) before being re-used in transport, after having been reconditioned or

Remanufactured.

For this test, the packaging does not need to have its own fasteners Installed. The inner container of composite packaging may be tested without the Packaging, provided that the test results are not affected. This essay Not required for inner packagings of combination packagings.

6.1.1.4 The packages must be manufactured, reconditioned, remanufactured and Tested in accordance with a conformity assessment program Competent authority (Inmetro) in such a way that each package complies with the Of this Chapter.

6.1.1.4.1 Refurbished and remanufactured packaging shall be subject to the same Requirements of this Regulation applied to new packaging and must bear the Performance tests to be used again.

6.1.1.5 Manufacturers and subsequent distributors of packaging shall provide Information on the procedures to be followed, as well as a description of the Types and dimensions of fasteners (including gaskets required) and any other Necessary components to ensure that the volumes as Transport, are able to successfully pass the This Chapter.

6.1.1.6 Plastic and metal packaging can not generate or accumulate electricity Sufficiently static so that a discharge can activate, by means of initiation, ignition or Flammable substances or articles and / or packaged flammable

6.1.2 Code for designation of packaging types

6.1.2.1 The code consists of:

(A) an Arabic numeral to indicate the type of packaging (for example, Drum, cylinder, etc.), followed by:

(B) capital letter (s), in roman characters, to indicate the nature of the Material (eg steel, wood, etc.), then, where necessary, per:

(C) an Arabic numeral to indicate the category of the package within the Type to which it belongs.

6.1.2.2 In the case of composite packagings, the second code position shall Consist of two uppercase letters, in Latin characters. The first to indicate the material Of the inner container and the second, that of the outer package.

6.1.2.3 For combination packagings, only the appropriate code To the outer carton.

6.1.2.4 The letters "T", "V" or "W" may appear in sequence to the code. The letter "T" Indicates that it is a rescue package in accordance with the requirements laid down in In item 6.1.5.1.11. The letter "V" indicates that it is a special packaging, according to the Requirements of item 6.1.5.1.7. The letter "W" indicates that the packaging, although of the type Indicated by the code, was manufactured with specifications different from those in item 6.1.4, and is considered to be equivalent to those complying with the requirements laid down in Item 6.1.1.2.

6.1.2.5 The following types of packaging must be used to indicate the Numerals:

1. Drum;

2. (Reserved);

3. Bottle;

4. Box;

5. Sack;

6. Composite packaging.

6.1.2.6 To indicate the type of material, the following letters capital letters:

A. Steel (all types and surface treatments);

B. Aluminum;

C. Natural wood;

D. Plywood;

F. Reconstituted wood;

G. Cardboard;

H. Plastic material;

L. Textiles;

M. Paper, multileaf;

N. Metal (except steel and aluminum);

P. Glass, porcelain or ceramics.

Note: *other plastic material includes polymeric materials, such as eraser.*

6.1.2.7 The following table indicates the codes to be used to designate the types Of packaging, depending on the material used in its manufacture and its category,

As well as the items that describe the appropriate requirements:

Table 6.1.2.7 Codes for designation of packing types

KIND	MATERIAL	CATEGORY	CODE	ITEM
1. Drums	A. Steel	Non-removable cover	1A1	6.1.4.1
		Removable cover	1A2	
	B. Aluminum	Non-removable cover	1B1	6.1.4.2
		Removable cover	1B2	
	D. Compensated	-	1D	6.1.4.5
	G. Cardboard	-	1G	6.1.4.7
	H. Plastic	Non-removable cover	1H1	6.1.4.8
		Removable cover	1H2	
	N. Metal (except steel and aluminum)	Non-removable cover	1N1	6.1.4.3
		Removable cover	1N2	
2. (Reserved)				

KIND	MATERIAL	CATEGORY	CODE	ITEM
3. Containers	A. Steel	Non-removable cover	3A 1	6.1.4.4
		Removable cover	3A2	
	B. Aluminum	Non-removable cover	3B1	6.1.4.4
		Removable cover	3B2	
	H. Plastic	Non-removable cover	3H1	6.1.4.8
		Removable cover	3H2	
4. Boxes	A. Steel	-	4A	6.1.4.14
	B. Aluminum	-	4B	6.1.4.14
	C. Natural wood	common	4C1	6.1.4.9
		With dustproof walls	4C2	
	D. Compensated	-	4D	6.1.4.10
	F. Reconstituted wood	-	4F	6.1.4.11
	G. Cardboard	-	4G	6.1.4.12
	H. Plastic	expanded	4H1	

		hard	4H2	6.1.4.13
	N. Metal (except steel and aluminum)	-	4N	6.1.4.14
5. Sacks	H. Plastic fabric	Without lining or coating internal	5H1	
		Dustproof	5H2	6.1.4.16
		waterproof	5H3	
	H. Plastic Film	-	5H4	6.1.4.17
	L. Textile	Without lining or coating internal	5L1	
		Dustproof	5L2	6.1.4.15
		waterproof	5L3	
	M. Paper	Multifolium	5M1	6.1.4.18.

KIND	MATERIAL	CATEGORY	CODE	ITEM
		Multifolium, resistant to Water	5M2	
6.	H. Plastic container Packs	In steel barrel	6HA1	
		Crate or carton steel	6HA2	
		In aluminum drum	6HB1	
		Crate or carton aluminum	6HB2	
		In wooden box	6HC	6.1.4.19
		In plywood drum	6HD1	
		In plywood box	6HD2	
		In cardboard drum	6HG1	
		In cardboard box	6HG2	
		In plastic drum	6HH1	
		In hard plastic case	6HH2	
	P. Glass container, porcelain Or ceramic	In steel barrel	6PA1	
		Crate or carton steel	6PA2	
		In aluminum drum	6PB1	

	Crate or carton aluminum	6PB2	
	In wooden box	6PC	6.1.4.20
	In plywood drum	6PD1	
	In wicker basket	6PD2	
	In cardboard drum	6PG1	
	In cardboard box	6PG2	
	In plastic packaging expanded	6PH1	
500			

KIND	MATERIAL	CATEGORY	CODE	ITEM
		In plastic packaging hard	6PH2	

6.1.3 Marking

Note 1: *The marking indicates that the packaging that displays it corresponds to a design-The type prescribed in the prescribed tests and which meets all the requirements laid down in In this Chapter, regarding the manufacture, but not the use of the packaging. Thus, the Does not necessarily guarantee that the packaging can be used for any substance. In general, the type of packaging (for example, Steel), its maximum capacity / mass and any other special Specified in Part 3.2 of this Regulation for each substance.*

Note 2: *The marking aims to assist manufacturers of packaging, reconditioners, Users of packaging, transporters and regulatory and supervisory authorities to Identify their type and indicate that the required performance standards have been met.*

Note 3: *Marking does not always provide full details of test levels, Etc., and these may be provided, for example, by reference to a test certificate, the Test reports or a register of successfully tested packagings. For example, X or Y marked packaging may be used for substances Packaging group, taking into account the maximum permissible value for the relative density (1), determined based on the factor 1.5 or 2.25, according* to *procedures Indicated in the requirements for tests required for packaging 6.1.5. Thus, an approved package for Group I products with Relative to 1.2, can be used for Group II products with a relative density of 1.8, Or Group III products, with a relative density of 2.7, provided that they are attended to Performance criteria with the highest density product.*

Note 4: *The packaging must also contain identification of the competent authority*

(Inmetro) attesting its compliance with the manufacturing and testing requirements This Regulation, in the terms established by the Inmetro Regulations, except for the

(1) Relative density (d) is considered synonymous with Specific Gravity (SG) and is used throughout this text.

Page 9

packages described in item 4.1.1.1.1 and which have not undergone the process of Reconditioning or refurbishing in the country.

6.1.3.1 All packaging intended for use under this Regulation shall display Durable, legible marking with dimensions and location that make it easily visible. In packages with a gross mass exceeding 30 kg, the marking, or its duplicate, Should be applied at the top or on one side. Letters, numbers and symbols must have height Of at least 12 mm, except in the case of packages with a capacity of up to 30 L or 30 kg, When the height must be at least 6mm, and in the case of packages with capacity Of up to 5 L or 5 kg, where such inscriptions must have appropriate dimensions.

The marking must contain:

(A) the United Nations packaging symbol:

This symbol should only be used to certify that the packaging meets the Provisions of this Chapter. For metal packaging in That the mark is engraved in relief, the application of the letters Uppercase "UN" as symbol;

B) the code that designates the type of packaging, according to item 6.1.2;

(C) a two-part code:

(I) A letter indicating the packing group (s) Which (the) type design was approved:

X - for Packing Groups I, II and III;

Y - for Packing Groups II and III;

Z - only for Packing Group III.

(Ii) the relative density, rounded to the first decimal place For which the standard design was tested, in the case of Packaging for dispensing liquids (Information that can be waived if the Not exceed 1,2); Or the maximum gross mass, in

Page 10

Kilograms, for packages intended to contain solids or
For internal packaging;

Note: the calculations for the drop test and stacking
Should be made considering the actual density of the product at
Be carried, rounding being
Package marking only.

(D) one of the following information: the letter "S" indicating that the packaging
Is intended to contain solids or inner packagings; Or the pressure
Test equipment which the packaging has shown to withstand, in
KPa (bar), rounded to the nearest 10 kPa (0,1 bar) multiple,
For containers intended to contain liquids (other than packagings
Combined);

(E) the last two digits of the year of manufacture of the packaging. For
Packaging of types 1H and 3H, the indication of the month
Which can be placed in a different place from the others.
A suitable method for this last indication is:

***** The last two digits of the year of manufacture may be indicated
Place. In this case, the two digits of the manufacturing year contained in
And the inner circle of that watch must be identical.

Notice: *Other methods for indicating the information*
Minimum, in a legible, visible and durable form, are also acceptable.

(F) the country of the country which authorizes the affixing of the mark, used in
Motor vehicles;

G) the manufacturer's name or other identification of the specified packaging
By the competent authority.

503

Page 11

6.1.3.2 In addition to the durable marking prescribed in item 6.1.3.1, any metal drum

With a capacity exceeding 100 L shall display the marking described in points "a" to "E" of item 6.1.3.1, in the background, together with an indication of the nominal thickness of the metal Which constitutes the body (in mm, with precision of 0,1 mm) permanently (for example, In relief). When the nominal thickness of any of the metal drum Lower than that of the body, the marking of the nominal thicknesses of the top, body and bottom Should be applied to its bottom (for example, "1.0-1.2-1.0" or "0.9-1.0-1.0"). Permanent (for example, embossed). The nominal thickness of the metal shall be determined In accordance with the appropriate ISO standard (eg for steel, ISO 3574: 1999). THE Marking indicated in items "f" and "g" of item 6.1.3.1 can not be applied Permanent, except in the case provided for in item 6.1.3.5.

6.1.3.3 All packaging, except that mentioned in item 6.1.3.2, which may suffer Reconditioning, shall display the marking specified in items "a" through "e" of item 6.1.3.1, applied permanently. Permanent marking is the one that can withstand To the reconditioning process (for example, in relief). Except in the case of drums With a capacity greater than 100 L, this permanent marking may replace the Corresponding durable marking described in item 6.1.3.1.

6.1.3.4 In the case of remanufactured metal drums, if there is no change in the Type of packaging, nor replacement or removal of structural components, marking Can be applied in a durable way. Any other remanufactured metal drum Shall display the marking provided for in items "a" to "and" of item 6.1.3.1, applied in a manner (For example, embossed) at the top or body.

6.1.3.5 Metal drums made of material the nature of which allows reuse (For example, stainless steel), shall bear the marking indicated in points "f" and "G" of item 6.1.3.1, applied permanently (for example, in relief).

6.1.3.6 Packaging made from recycled plastic material as defined in Item 1.2.1 shall bear the "REC" mark, which shall be applied close to the prescribed marking In item 6.1.3.1.

6.1.3.7 The marking must be applied in the sequence indicated in the item items 6.1.3.1. All elements of the marking required, including items "h" to "j" of item 6.1.3.1.8, where applicable, shall be clearly separated by, for example, a bar

Oblique or a space, so that they are easily identifiable. Examples are Presented in item 6.1.3.10.

Additional marking authorized by the competent authority shall not The correct identification of the parts of the marking elements prescribed in item 6.1.3.1.

6.1.3.8 After the reconditioning of a packaging, the reconditioner shall Apply, in sequence to the marking required in item 6.1.3.1, durable marking, indicating:

(H) the acronym of the country in which the reconditioning was carried out, used in International traffic by motor vehicles;

(I) the name of the reconditioner or other identification of the Specified by the competent authority;

J) the year of refurbishment; The letter 'R'; And, for approved packagings In the leakproofness test prescribed in item 6.1.1.3, additionally, the Letter "L".

6.1.3.9 Where, after reconditioning, the marking required in points "a" to "D" of item 6.1.3.1 is no longer visible on the top or body of a metal drum, the Reconditioner must also apply them durably, followed by marking Prescribed in items "h" to "j" of item 6.1.3.8. Such marking can not indicate Than the original test design and marked.

6.1.3.10. Sample marking for NEW packages

4G / Y145 / S / 02 BR / VL823	As in item 6.1.3.1 a) to e) As in item 6.1.3.1 f) and g)	For a new box of Cardboard.
1A1 / Y1,4 / 150/98 BR / VL824	As in item 6.1.3.1 a) to e) As in item 6.1.3.1 f) and g)	For a new steel drum Containing liquids.
1A2 / Y150 / S / 01 BR / VL825	As in item 6.1.3.1 a) to e) As in item 6.1.3.1 f) and g)	For a new steel drum Containing solids, or Packaging.
4HW / Y136 / S / 98 BR / VL826	As in item 6.1.3.1 a) to e) As in item 6.1.3.1 f) and g)	For a new plastic box With equivalent specification

1A2 / Y / 100/01 BR / MM5 REFAB	As in item 6.1.3.1 a) to e) As in item 6.1.3.1 f) and g)	For remanufactured steel drum For liquids.
1A1 / X1,3 / 250/10 **1A1 / Y2,0 / 250/10** **BR / TF - 18X20X18 / 1010-06**	As in item 6.1.3.1 a) to e) As in item 6.1.3.1 f) and g)	For a new steel drum Containing liquids
4G / X / 20/16 **4G / Y / 30/16** **4G / Z / 45/16** **BR / TF - 18X20X18 / 1010-06**	As in item 6.1.3.1 a) to e) As in item 6.1.3.1 f) and g)	For a new cardboard box
1A1 / X2,0 / 250/10 **BR / TF-18X20X18 / 1010-06 REFAB**	As in item 6.1.3.1 a) to e) As in item 6.1.3.1 f) and g)	For a steel drum Remanufactured for liquids

6.1.3.11 ***Examples of marking for PACKAGED CONTAINERS***

1A1 / Y1,4 / 150/97	As in item 6.1.3.1 a) to e)	For a steel drum
BR / RB / 01 RL	As in item 6.1.3.8 (h) to (j)	Reconditioned and approved in Sealing test
1A2 / Y150 / S / 99	As in item 6.1.3.1 a) to e)	For a steel drum
USA / RB / 00 R	As in item 6.1.3.8 (h) to (j)	recondicioned

6.1.3.12 ***Example of marking for RESGATE packages***

1A2T / Y300 / S / 01	As in item 6.1.3.1 a) to e)	For a rescue steel barrel
BR / abc	As in item 6.1.3.1 f) and g)	

Note 1: *Markings exemplified* in items *6.1.3.10,* 6.1.3.11 *and* 6.1.3.12 *may Be applied in a single line or in multiple lines, provided that the sequence is respected All the information required under (c) and (d) of Item 6.1.3.1.*

Note 2: *The markings arranged in accordance with the ANTT Resolution 420/04 shall be valid until December 31, 2019, or until the period of validity of the Packaging, including IBC, if any.*

6.1.3.13 Conformity Identification Seal

6.1.3.13.1 Manufacturers, assemblers and importers of packaging The Compliance Identification Seal, in accordance with the requirements of the Established by the National Institute of Metrology, Quality and Technology - Inmetro Competent authority to regulate and monitor Compliance with the requirements set out in this Chapter. The Identification Conformity indicates that the packages correspond to the standard design indicated by Marked "UN", approved in the tests provided for in this Regulation.

6.1.3.13.2 *The Conformity Identification Seal,* established by Inmetro must Be placed on the same face as the "UN" marking, in an easily visible place and Prevent the display of other markings.

Notice: The Seal of Identification of Conformity required in item 6.1.3.13 shall not IBCs provided in item 4.1.1.1.1, except when submitted to Reconditioning or refurbishing in the country.

6.1.4 Requirements for packaging

6.1.4.0 General requirement

Any infiltration of substance or product contained in a packaging

Can not be endangered under normal conditions of carriage.

6.1.4.1 Steel drums

1A1 - non-removable cover;

1A2 - removable cover.

6.1.4.1.1 The body and the covers shall be of

Appropriate to the capacity of the drum and its intended use.

Notice: *In the case of carbon steel drums, "suitable" steels are*

Identified in the norms ISO 3573: 1999 "Hot rolled carbon steel sheet of commercial and drawing

Qualities "and ISO 3574: 1999" Cold-reduced carbon steel sheet of commercial and drawing qualities ".

For carbon steel drums with a capacity of less than 100 L, "suitable" steels meet

Also identified in ISO 11949: 1995 "Cold-reduced electrolytic tinplate", ISO

11950: 1995 "Cold-reduced electrolytic chromium / chromium oxide-coated steel" and ISO 11951: 1995

"Cold-reduced blackplate in coil form for the production of tinplate or electrolytic chromium / chromium-

Oxide coated steel ".

6.1.4.1.2 The seams of the body of drums intended to contain liquids containing

Capacity greater than 40 L must be welded; The body seams of drums

Intended to contain solids or up to 40 L of liquid shall be welded or

Mechanically.

6.1.4.1.3 The edges must be welded or mechanically sewn. Hoops

Can be applied.

6.1.4.1.4 The body of a drum with greater than 60 L capacity should be generally

At least two reinforcing rims pressed for rolling or, alternatively, at least,

Two separate bearing rings. In the latter case, the rolling

Firmly attached to the body and fastened so that they can not move. Rings for

Bearing can not be welded by stitches.

6.1.4.1.5 The openings for potting, emptying and venting the bodies or

Non-removable cap drum covers (1A1) may not have a diameter greater than 7 cm;

If the aperture is larger, are considered removable cap type (1A2). The latches

Of the openings in the bodies and covers shall be designed and placed in such a way

Remain sealed and sealed under normal conditions of carriage. Flanges of

Can be welded or clamped mechanically. If the latches are not

Seals, gaskets or other sealing elements must be used.

6.1.4.1.6 Closure devices for removable cover drums should be

Designed and placed so that they remain secure, and

Normal conditions of carriage. The removable covers should be placed with gaskets

Or other sealing elements.

6.1.4.1.7 If the materials used for the body, the covers, the latches and the Accessories are not compatible with the product to be transported, it must be applied Treatment or coating, and shall maintain its Under normal conditions of carriage. In that case, when the packaging is Intended for the carriage of flammable products, the dissipation of Static electricity, with additive in the coating or other suitable device, keeping Their watertight properties under normal transport conditions.

6.1.4.1.8 Maximum drum capacity: 450 L

6.1.4.1.9 Maximum net mass: 400 kg

6.1.4.2 Drums, aluminum

1B1 - non-removable cover;

1B2 - removable cover.

6.1.4.2.1 Body and lids should be made of aluminum with minimum purity Of 99% or of an aluminum-based alloy. The material must be of type and thickness Appropriate to the capacity of the drum and its intended use.

6.1.4.2.2 All seams should be welded. The seams of the edges, if any, Should be reinforced by the application of separate reinforcing hoops.

6.1.4.2.3 The body of a drum with greater than 60 L capacity should be generally At least two reinforcing rims pressed for rolling or, alternatively, at least, Two separate bearing rings. In the latter case, the rolling Firmly attached to the body and fastened so that they can not move. Hoops Bearing can not be welded by stitches.

6.1.4.2.4 The openings for potting, emptying and venting the bodies or Non-removable cap drum covers (1B1) may not have a diameter greater than 7 cm; If the opening is larger, are considered of the type with removable lid (1B2). The latches Of the openings in the bodies and covers shall be designed and placed in such a way Remain sealed and sealed under normal conditions of carriage. Flanges of Should be welded, so that the weld provides a watertight seal. If If the catches are not watertight, gaskets or other Fence.

6.1.4.2.5 Closure devices for removable cover drums should be Designed and placed so that they remain secure, and Normal conditions of carriage. The removable covers should be placed with gaskets Or other sealing elements.

6.1.4.2.6 If body materials, covers, catches and attachments are not compatible

With the product to be transported, treatment or internal coating must be applied
Which must maintain its protective properties under normal conditions of use.

transport. In this case, where the packaging is intended for the carriage of products

The coating composition must contain an additive capable of preventing accumulation of

Without any adverse effect on the chemical or

Page 17

Physical characteristics of the packaging material. Antistatic devices can be

That have no adverse effect on the chemical or physical properties of the material

The packaging.

6.1.4.2.7 Maximum capacity of drums: 450 L.

6.1.4.2.8 Maximum net mass: 400 kg.

6.1.4.3 Drums, metal, except steel and aluminum

1N1 - non-removable cap;

1N2 - removable cover.

6.1.4.3.1 Body and lids should be made of a metal or alloy of metal except steel

Or aluminum. The material must be of type and thickness appropriate to the capacity of the drum and

To the intended use.

6.1.4.3.2 Edge seams, if any, shall be reinforced by the application of

Separate reinforcing rings. All seams, if any, must be joined (welded,

Etc.) with the most modern techniques available for metal or metal alloy.

6.1.4.3.3 The body of a drum with greater than 60 L capacity should be generally

At least two reinforcing rings pressed to the bearing or, alternatively, at least

Two separate bearing rings. In the latter case, the rolling

Firmly attached to the body and fastened so that they can not move. Hoops

Bearing can not be welded per stitch.

6.1.4.3.4 The openings for potting, emptying and venting the bodies or

Non-removable lid (1N1) drum covers may not have a diameter greater than 7 cm;

If the opening is larger, they are considered of the type with removable lid (1N2). The latches

Of the openings in the bodies and covers shall be designed and placed in such a way that

Remain sealed and sealed under normal conditions of carriage. Flanges of

Close (welded, etc.) with the most modern techniques available

To the metal or metal alloy used, so that the seam is sealed. If the

Be sealed, they must be used with gaskets or

Fence.

6.1.4.3.5 Closure devices for removable cover drums should be

Designed and placed so that they remain secure, and

Page 18

Normal conditions of carriage. The removable covers should be placed with gaskets
Or other sealing elements.

6.1.4.3.6 If body materials, covers, catches and attachments are not compatible
With the product to be transported, treatment or internal coating must be applied
Which must maintain its protective properties under normal conditions of use.
transport. In this case, where the packaging is intended for the carriage of products
Flammable, the coating composition must contain an additive capable of preventing accumulation
Without any adverse effect on the chemical or
Physical characteristics of the packaging material. Antistatic devices can be
That have no adverse effect on the chemical or physical properties of the material
The packaging.

6.1.4.3.7 Maximum capacity of drums: 450 L.

6.1.4.3.8 Maximum net mass: 400 kg.

6.1.4.4 Steel or aluminum enclosures

3A1 - steel, non-removable cover;

3A2 - steel, removable cover;

3B1 - aluminum, non-removable cover;

3B2 - aluminum, removable cover.

6.1.4.4.1 Body and covers shall be made of sheet steel, aluminum with
Grade of purity of at least 99% or of an aluminum-based alloy. The material must be of
Type and thickness appropriate to the cylinder capacity and intended use.

6.1.4.4.2 The edges of steel cylinders should be welded or sewn
Mechanically. The body seams of steel cylinders intended to contain more than 40
Liquid must be welded and the seams of those intended to contain up to 40 L must be
Welded or mechanically made. All seams of aluminum
Be welded. Edge seams, if any, shall be reinforced by application of
Of a separate reinforcing ring.

6.1.4.4.3 The openings in cylinders of types 3A1 and 3B1 may not exceed 7 cm
Of diameter. If the opening is larger, they are considered to be of the type with lid
(3A2 and 3B2). The latches shall be so designed as to remain secure

And tanks under normal conditions of transport. If the latches that are not watertight
Gaskets or other gaskets must be used.

6.1.4.4.4 If the materials used in the manufacture of the body, lids, closures and
Accessories are not compatible with the content to be transported, it must be applied
Adequate internal coating or treatment, which shall maintain its
Under normal conditions of carriage. In that case, when the packaging is
Intended for the carriage of flammable products, the coating composition shall contain
Additive capable of preventing the accumulation of static electricity, without presenting an adverse effect
On the chemical or physical properties of the packaging material. Devices
Anti-static agents may be employed provided they do not have an adverse effect on the
Chemical properties of the packaging material.

6.1.4.4.5 Maximum capacity of drums: 60 L.

6.1.4.4.6 maximum net mass: 120 kg.

6.1.4.5 plywood drums

1D

6.1.4.5.1 The wood used shall be well seasoned, commercially free
moisture and free from any defect that could reduce the effectiveness of the drum for the purpose for
it is intended. If the covers are made of another material, it must have quality
equivalent to the plywood.

6.1.4.5.2 offset it should be used at least two sheets to the body and
three sheets for covers; the leaves should be firmly glued together, with
their cross-fibers, and the adhesive used should be water resistant.

6.1.4.5.3 The body covers and their joints must be suitable to the project
drum capacity and the use to which it is intended.

6.1.4.5.4 To prevent leakage of the contents, lids shall be lined with paper
kraft , or equivalent material, which must be firmly secured to the cover and extend towards
outwardly along the entire circumference.

6.1.4.5.5 Maximum capacity of drum: 250 L.

6.1.4.5.6 maximum net mass: 400 kg.

6.1.4.6 Deleted.

6.1.4.7 cardboard drums

1G

6.1.4.7.1 The barrel body should consist of multiple sheets of thick paper or
cardboard (non-corrugated) firmly glued or laminated together and may include one or more

protective layers of bitumen, paper *kraft* wax, metal foil, plastic, etc.

6.1.4.7.2 The covers should be of natural wood, cardboard, metal, plywood, plastic, or other suitable material and may include one or more protective layers bitumen, paper *kraft* waxed, foil, plastic, etc.

6.1.4.7.3 The body covers and their joints must be suitable to the project drum capacity and the use to which it is intended.

6.1.4.7.4 The assembled packaging shall be sufficiently water resistant so not desfolhe under normal conditions of transport.

6.1.4.7.5 Maximum capacity of drum: 450 L.

6.1.4.7.6 maximum net mass: 400 kg.

6.1.4.8 Drums and plastic pails

1H1 - Non-removable cover;

1H2 - removable cover.

3H1 - Non-removable cover;

3H2 - removable cover.

6.1.4.8.1 The packaging should be made of suitable plastic material and have adequate strength for its capacity and the use to which it is intended. Except for materials recycled plastics, as defined in item 1.2.1, can not be used reused material not the production or regrind wastes from the same process production (burrs or shavings). The packaging must be strong enough to aging and degradation caused by the substance or by ultraviolet radiation.

6.1.4.8.2 If necessary protection against ultraviolet radiation, it must be obtained by addition of lampblack or other suitable pigments or inhibitors. such additives must be compatible with the contents and remain effective throughout the life of the packing. When are carbon black smoke employees, pigments or inhibitors those used in the manufacture of the tested design type, may be exempted new

testing if the lampblack content does not exceed 2% by mass or if the pigment content is not more than 3% by weight; The content of ultraviolet inhibitors is not limited.

6.1.4.8.3 Other additives, different from those intended for protection against radiation ultraviolet, may be included in the plastic composition, having no adverse effect on the chemical or physical properties of the packing material. In such circumstances, dispense up new tests. When the packaging is intended to transport of flammable products should be used in its composition or additive other suitable device capable of preventing the buildup of static electricity without exhibit adverse effect on the chemical or physical properties of the material packing.

6.1.4.8.4 The thickness of the walls at all points of the package should be appropriate to their ability and the use for which it is, taking into account the efforts to each point may be subjected.

6.1.4.8.5 Openings for filling, emptying and breathe in the bodies or Drum covers (1H1), or drums (3H1) non-removable cover may not be diameter greater than 7 cm; If the opening is larger, the drums and pails should be considered removable cover (1H2 and 3H2). openings latches in body and Cover drums and pails should be designed and placed so that remain secure and leakproof under normal conditions of transport. If the latches do not are watertight gaskets or other sealing elements should be placed.

6.1.4.8.6 closing devices for drums and removable cover jerricans They should be designed and placed so that they are safe and watertight in normal transport. Any removable lid should be placed with gaskets, except when the drum or bombona has been designed so that when the cover is properly secured, the drum or bombona become watertight.

6.1.4.8.7 Maximum capacity of drums and jerricans:

1H1, 1H2: 450 L

3H1, 3H2: 60 L.

6.1.4.8.8 maximum net mass:

1H1, 1H2: 400 kg

3H1, 3H2: 120kg.

Page 22

6.1.4.9 ***natural wood boxes***

4C1 - common;

4C2 - with dust-proof walls.

6.1.4.9.1 The wood used shall be well seasoned, commercially free moisture and without defects that may reduce the strength of any part of the box. THE resistance of the material used and the manufacturing method must be appropriate for capacity of the box and the use to which it is intended. The tops and bottoms may be made reconstituted wood waterproof, such as fiberboard, particleboard or other appropriate type.

6.1.4.9.2 The fixings shall be resistant to vibration conditions found in normal transport. Wherever possible, nails should be avoided at the ends the boxes in the direction of the fibers. Together they can be subjected to great stress They must be made with the use of nails locked with rings or equivalent fasteners.

6.1.4.9.3 4C2 box: each part shall consist of or be equivalent to one piece. Parts are considered equivalent to one piece when connected by gluing,

according to one of the following methods: link Lindemann (Dovetail), the tongue and female joint lap or rabbet, or butt joint with at least two corrugated metal fasteners at each joint.

6.1.4.9.4 maximum net mass: 400 kg.

6.1.4.10 Wooden boxes compensated

4D

6.1.4.10.1 The plywood should be at least three sheets. It must be made of leaves and cured, obtained by unwinding, cutting or sawing, commercially free moisture and without defects that may reduce the cash resistance. The strength of the material employee and the manufacturing method must be appropriate for housing capacity and use that is intended. The leaves must be glued together with resistant adhesive Water. Other suitable materials may be used along with the offset manufacture of boxes. Boxes shall be firmly nailed or secured the amounts of corner or top, or mounted by means of devices equally suitable.

6.1.4.10.2 maximum net mass: 400 kg.

6.1.4.11 reconstituted wood boxes

4F

6.1.4.11.1 The walls of boxes shall be made of reconstituted wood-proof water, such as fibreboard, chipboard or other suitable type. The strength of the material used and the manufacturing method must be appropriate to the capacity of boxes and the use to which they are intended.

6.1.4.11.2 The other parts of the boxes may be manufactured in other materials appropriate.

6.1.4.11.3 The boxes must be firmly mounted by means of devices appropriate.

6.1.4.11.4 maximum net mass: 400 kg.

6.1.4.12 apply Cardboard boxes

4G

6.1.4.12.1 Cardboard must be employed strong and good quality corrugated both sides (single or multiwall), or compact, suitable to the housing capacity and the use for which it is. Water resistance of the outer surface should be such that the mass increase, determined by the test performed in a period of 30 minutes by Cobb method of determining water absorption, is not greater than 155 g / m 2 - see ISO 535: 1991. It shall have proper bending qualities, be cut,

creased without scoring, and slotted so as to permit assembly without cracking, breaking surface or undue bending. The fluting of corrugated fibreboard shall be firmly glued to the walls.

6.1.4.12.2 The ends of boxes may have a wooden frame or its edge be entirely of wood or other suitable material. They may also be used wooden battens reinforcements or other suitable material.

6.1.4.12.3 Manufacturing joins in the body of boxes shall be taped together with tape adhesive, lapped and glued, or lapped and stitched with metal staples. together superposed must have an appropriate overlap.

6.1.4.12.4 Where closing is effected by means of glue or tape, must be employed water resistant adhesive.

6.1.4.12.5 The boxes should be designed to accommodate the content well.

6.1.4.12.6 maximum net mass: 400 kg.

6.1.4.13 plastic boxes

4H1 - expanded plastic boxes

4H2 - hard plastic boxes

6.1.4.13.1 The box should be made of suitable plastic material and have strength appropriate to their ability and the use to which it is intended. It should be suitably Resistant aging and degradation caused by the substance or by ultraviolet radiation.

6.1.4.13.2 The expanded plastic boxes should consist of two plastic parts molded expanded, a lower section containing hollows for packaging internal and a top section covering and interlocking with the bottom. The lower sections and higher should be designed so that the inner packagings fit perfectly. Covers the inner packaging can not contact the Inside the upper housing part.

6.1.4.13.3 For shipment of a foamed plastic box should close it with adhesive tape resistant to enough traction to prevent the box from opening. The tape adhesive must resist the weather and your sticker must be compatible with the material used in the box. They can be employed other closing devices, which are as effective as this.

6.1.4.13.4 For rigid plastic boxes, if necessary radiation protection Ultraviolet, it may be obtained by addition of lampblack, pigments or other Suitable inhibitors. These additives shall be compatible with the contents and remain effective throughout the life of the package. When are carbon black smoke employees, pigments or inhibitors other than those used in the manufacture of the tested design type, They may be exempted from further testing if the carbon black smoke content does not exceed 2% in

mass or if the pigment content does not exceed 3% by weight; the content of inhibitors Ultraviolet radiation is not limited.

6.1.4.13.5 Other additives not intended for protection against radiation Ultraviolet may be included in the plastic composition, having no adverse effect on the chemical or physical properties of the housing material. In such circumstances, dispense up new tests. plastic containers for the transport of

flammable products should contain in its additive composition or other device suitable able to prevent the buildup of static electricity without giving effect about adverse chemical or physical properties of the packing material.

6.1.4.13.6 Hard plastic boxes shall have closure devices made of suitable resistance material and be designed so as to avoid opening non-Wilful box.

6.1.4.13.7 maximum net mass:

4H1: 60 kg.

4H2: 400 kg.

6.1.4.14 apply ***stainless steel, aluminum or other metal***

4A - steel boxes

4B - aluminum cans

4N - metal boxes, not steel or aluminum

6.1.4.14.1 The metal resistance and the manufacture of the box shall be appropriate to capacity of the box and the use to which it is intended.

6.1.4.14.2 The boxes should be covered with cardboard or felt pieces packing, or having an inner lining of suitable material as needed. If using double metal tailored jacket, steps should be taken to prevent the entry of substances, particularly explosives, in vain the seams.

6.1.4.14.3 The latches can be of any suitable type and should remain firm under normal conditions of transport.

6.1.4.14.4 maximum net mass: 400 kg.

6.1.4.15 ***textile bags***

5L1 - bags without lining or lining;

5L2 - bags dustproof;

5L3 - resistant bags to water.

6.1.4.15.1 Textile Employees must be of good quality. The tissue resistance and the construction of the bag shall be appropriate to the capacity and the use to which it is intended.

Page 26

6.1.4.15.2 Bags, dust-proof, 5L2: should be made dust-proof, using, for example:

a) paper bonded to the inner surface of the bag by resistant adhesive water (e.g., tar);

b) plastic film bonded to the inner surface of the bag; or

c) one or more liners made of paper or plastic material.

6.1.4.15.3 Bags, water resistant, 5L3: to prevent the entry of moisture, the bags They must be waterproofed, for example, by employing:

a) separate inner liners made of water resistant paper (e.g., paper *kraft* wax, tar paper, paper, *kraft* plasticized);

b) plastic film bonded to the inner surface of the bag; or

c) one or more liners made of plastic material.

6.1.4.15.4 maximum net mass: 50 kg.

6.1.4.16 plastic woven bags

5H1 - bags without lining or lining;

5H2 - bags dustproof;

5H3 - resistant bags to water.

6.1.4.16.1 The bags must be made of strips or monofilament material suitable plastic. The strength of the material and the manufacture must be appropriate to the capacity of the bag and the use to which it is intended.

6.1.4.16.2 If the fabric is opened, the bags shall be made by sewing or By another method that ensures closure of the bottom and one side. If the fabric is tubular, the bag shall be closed by sewing, weaving or other closure method equally strong.

6.1.4.16.3 Bags, dust-proof, 5H2: should be made dust-proof, using, for example:

a) paper or plastic film bonded to the inner surface of the bag; or

b) one or more separate internal linings, made of paper or plastic material.

66.4 Bags water resistant 5H3: to prevent the entry of moisture, the bags must It is sealed using, for example:

a) separate linings, made of water-resistant paper (example, paper *kraft* waxed, double-tarred or plastic);

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

c) one or more internal plastic liners.

6.1.4.16.5 Maximum net mass: 50 kg.

6.1.4.17 plastic film bags

5H4

6.1.4.17.1 The bags must be made of suitable plastic material. The resistance of the material used and the manufacturing of the bag shall be appropriate to its capacity and the use for which it is. Joins and closures shall withstand pressures and impacts occur under normal conditions of transport.

6.1.4.17.2 maximum net mass: 50 kg.

6.1.4.18 Paper bags

5M1 - multiwall bags;

5M2 - multiwall bags, water-resistant.

6.1.4.18.1 The bags must be made of paper *kraft* appropriate or paper equivalent to at least three plies. The intermediate sheet may be woven fabric and bonded to the outer layer of paper. The strength of the paper and making bags are be appropriate to its capacity and the use to which they are intended. Seals and closures shall be dustproof.

6.1.4.18.2 Bags 5M2: to prevent the entry of moisture, a bag of four or more sheets must be waterproofed employing a sheet of water resistant material as one of the two outer sheets, or by placing a water resistant barrier made suitable protective material between the two outer leaves; a bag of three plies shall be waterproofed using a water resistant sheet and the outer sheet. When there is danger of the contents to react with moisture, or when a product is packed

humidity, a barrier or water resistant sheet (e.g., double kraft paper tarry or plastic, or plastic film bonded to the inner surface of the bag, or or more internal plastic coatings) should be placed in the content. together and

closures shall be waterproof.

6.1.4.18.3 maximum net mass: 50 kg.

6.1.4.19 composite packaging (plastic)

These conditions apply to the following composite packaging with inner container of plastic material:

CODE	CONTAINER INTERNAL	OUTER CARTON
6HA1	inner plastic container	steel drum
6HA2	inner plastic container	crate or steel box
6HB1	inner plastic container	aluminum drum
6HB2	inner plastic container	crate or aluminum box
6HC	inner plastic container	wooden box
6HD1	inner plastic container	plywood drum
6HD2	inner plastic container	plywood box
6HG1	inner plastic container	cardboard drum
6HG2	inner plastic container	cardboard box
6HH1	inner plastic container	plastic drum
6HH2	inner plastic container	Hard Plastic Case

6.1.4.19.1 inner container

6.1.4.19.1.1 The provisions contained in items 6.1.4.8.1 and 6.1.4.8.3 to 6.1.4.8.6 are applicable to internal recipients.

6.1.4.19.1.2 The inner plastic container should be well adjusted within the package external, which must be free from sharp protrusions that might abrade the material plastic.

6.1.4.19.1.3 Maximum capacity of inner receptacle:

6HA1, 6HB1, 6HD1, 6HG1, 6HH1: 250 L

6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2: 60 L.

6.1.4.19.1.4 Maximum net mass:

6HA1, 6HB1, 6HD1, 6HG1, 6HH1: 400 kg

6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2: 75 kg.

6.1.4.19.2 outer carton

6.1.4.19.2.1 In the manufacture of the outer packaging, for each related code in Column 1, their manufacturing requirements must be met prescribed in items listed in Column 2 of Table below:

CODE (1)	NUMBER APPLICABLE ITEM (2)
6HA1	**6.1.4.1**
6HA2	**6.1.4.14 apply**
6HB1	**6.1.4.2**
6HB2	**6.1.4.14 apply**
6HC	**6.1.4.9**
6HD1	**6.1.4.5**
6HD2	**6.1.4.10**
6HG1	**6.1.4.7.1 to 6.1.4.7.4**
6HG2	**6.1.4.12 apply**
6HH1	**6.1.4.8.1 to 6.1.4.8.6**
6HH2 (including corrugated plastic)	**6.1.4.13.1 and 6.1.4.13.4 to 6.1.4.13.6**

6.1.4.20 Composite packagings (glass, porcelain or ceramic)

CODE	CONTAINER INTERNAL	OUTER CARTON
PA1	glass, porcelain or ceramic	steel drum
6PA2	glass, porcelain or ceramic	crate or steel box
6PB1	glass, porcelain or ceramic	aluminum drum
6PB2	glass, porcelain or ceramic	crate or aluminum box
6PC	glass, porcelain or ceramic	wooden box
6PD1	glass, porcelain or ceramic	plywood drum
6PD2	glass, porcelain or ceramic	wicker basket
6PG1	glass, porcelain or ceramic	cardboard drum
6PG2	glass, porcelain or ceramic	cardboard box
6PH1	glass, porcelain or ceramic	of foamed plastic
6PH2	glass, porcelain or ceramic	hard plastic

6.1.4.20.1 inner container

6.1.4.20.1.1 The inner containers should be properly (cylindrical or pear-shaped) and be made of good quality material free from any defect that could compromising its strength. The walls must be thick enough at all points.

6.1.4.20.1.2 plastic screw closures, abraded glass stoppers or other closures equally effective to be used on containers. Any part of the closure likely to contact with the contents must be resistant to such content.
They should be taken the necessary measures so that the locks can be properly closed, aiming to prevent leaks and prevent them from loosening during transport. If necessary fasteners to breathe, they must meet the provisions of item 4.1.1.8.

6.1.4.20.1.3 The inner containers must be firmly shoes in packaging

by external cushioning or absorbing materials.

6.1.4.20.1.4 Maximum capacity of inner containers: 60 L.

6.1.4.20.1.5 Maximum net mass: 75 kg.

6.1.4.20.2 outer carton

6.1.4.20.2.1 In the manufacture of the outer packaging, for each related code in Column 1, their manufacturing requirements must be met prescribed in items listed in Column 2 of Table below:

CODE (1)	APPLICABLE PROVISIONS (2)	COMMENTS (3)
6PA1	6.1.4.1	(1)
6PA2	6.1.4.14 apply	(2)
6PB1	6.1.4.2	-
6PB2	6.1.4.14 apply	-
6PC	6.1.4.9	-
6PD1	6.1.4.5	-
6PD2	-	(3)
6PG1	6.1.4.7.1 to 6.1.4.7.4	-
6PG2	6.1.4.12 apply	-
6PH1 and 6PH2	6.1.4.13	(4)

(1) The removable lid, however, may be of the type fitting and pressure.

(2) For cylindrical containers, the outer packaging when standing, must rise up container and its closure. If the crate circling one pear-shaped container and has format compatible, the outer packaging must be equipped with a protective cover type fitting and pressure.

(3) The wicker basket must be properly made with material of good quality and equipped with a protective cover to prevent damage to the container.

(4) rigid plastic packaging should be made of high density polyethylene or equivalent plastic material; the removable cover for this type of packaging may however, be of the type fitting and pressure.

6.1.5 Tests required for packaging

6.1.5.1 Execution and frequency of testing

6.1.5.1.1 Each project-type of packaging shall be tested according to the provisions of item 6.1.5 in accordance with procedures established by the competent authority.

6.1.5.1.2 Before any container is put to use, its design type should It has passed the tests. A project-type of packaging is defined by design, dimensions, material and thickness, manufacturing and packing, but may include various surface treatments. It also includes packagings which differ from the design type only by their lower design height.

6.1.5.1.3 The tests must be repeated on samples of production at intervals established by the competent authority. For these tests on paper or packaging cardboard, preparation at ambient conditions is considered equivalent to the requirements of item 6.1.5.2.3.

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

6.1.5.1.5 The competent authority may permit the selective packaging trial differ from the design type in small respects, for example, the smaller inner packagings, inner packagings of lower net mass or packaging as drums, bags and boxes with small reduction in external dimensions.

6.1.5.1.6 *(Reserved)*

***Note** : The provisions on assembling different inner packagings in*

an outer packaging and permissible variations in inner packagings are planned in item 4.1.1.5.1.

6.1.5.1.7 Articles or inner packaging of any type for solids or liquids, They can be placed and transported in an outer packaging without having been tested under the following conditions:

a) the outer packaging must have been approved when tested in according to item 6.1.5.3 with fragile inner packages (for example, glass) containing liquids, using the drop height packing group I;

b) the total gross mass of all the internal packaging should not more than half the gross mass of inner packagings used in the drop test in paragraph "a";

c) the thickness of the cushioning material between the packaging internal and between the latter and the outer face of the package should not be lower than the originally tested packaging adopted. If the test original has been done with a single inner packaging, the thickness the cushioning material between inner packagings shall not is less than the original thickness of the cushioning material between the inner package and the outer face of the packaging in the original test. When smaller inner packages are used or lower number (in comparison with those used in the drop test) to be added enough cushioning material to fill the empty spaces;

d) the outer packaging shall have passed the test

stacking (see section 6.1.5.6) when empty. Total mass identical packages shall be based on the combined mass of inner packagings used in the drop test in paragraph "a";

e) inner packagings containing liquids shall be completely involved with absorbent material in sufficient quantity to absorb all the liquid contents of the inner packagings;

f) if the outer packaging is intended to contain inner packagings to liquids and is not sealed or is intended to contain

inner packagings for solids and is not dust-proof, should be taken to prevent leakage of contents, using a sealing coat, a plastic bag or other means equally effective containment. For packages containing liquids, the absorbent material referred to in subparagraph "and" should be placed within the the liquid containment device;

g) packaging must be marked in accordance with paragraph 6.1.3, indicating that they were subjected to performance tests on the packing group I, for combination packagings. Mass Gross marked in kilograms should be the sum of the mass of outer packaging with half the mass (s) pack (s) internal (s) used (s) in the test referred to fall in line "a". Such brand should also include the letter "V", as stated in item 6.1.2.4.

6.1.5.1.8 The competent authority may at any time require proof, by testing according to this Regulation of the manufactured packaging series meet the same requirements as the design type tested.

6.1.5.1.9 If for safety reasons it is required a treatment or coating internal, it must maintain its protective properties even after the tests.

6.1.5.1.10 Since the validity of the test results is not affected and the approval of the competent authority can be performed several tests with the same sample.

6.1.5.1.11 rescue packages

6.1.5.1.11.1 rescue packages (see section 1.2.1) shall be tested and marked in accordance with the provisions applicable to packages of Packing Group II, for the transport of solids or inner packagings, except as follows:

a) the substance to be used in the assays must be water, and packages must be potted, at least up to 98% of its maximum capacity. It is permissible to use additives, such as grain bags

lead, to obtain a total mass, provided that they are placed so as not to affect test results. Alternatively, the

drop test, one can vary the height of fall in accordance with the "b" of item 6.1.5.3.4;

b) packaging must be also approved the test sealing effected at a pressure of 30 kPa (0,3bar), and the results this test shall be recorded in the report specified in item 6.1.5.7; and

c) packaging must be marked with the letter "T", as indicated in item 6.1.2.4.

6.1.5.2 Preparation of packagings for testing

6.1.5.2.1 The tests shall be made in packaging as prepared for transportation, including internal packaging, in the case of combination packagings. containers and internal or single packages, distinct from the bags must be filled at least with 95% of its capacity for solids or 98% for liquids. The bags should be packaged with maximum mass with which they can be used. When the packaging a combined internal packaging are designed for liquids and solids content, must be separated trials made for each content type. The substances or articles be transported in containers can be replaced by other substances or articles, since this would invalidate the results of the tests. For solids, when one simulativo product is used, it shall have the same physical characteristics (mass, particle size, etc.) as the substance to be transported. It is permissible to use of fillers Additional such as bags of lead shot, to obtain the necessary total mass, from they are placed so as not to affect test results.

6.1.5.2.2 In the drop test for liquids, when a product is used simulativo, it should be relatively similar density and viscosity to the substance to be transported. One can also use water in the drop test, provided the provisions of item 6.1.5.3.5.

6.1.5.2.3 Paper and cardboard packaging must be packed by at least 24 hours in an atmosphere of relative humidity and temperature controlled. There is three options for the atmosphere; is that with the preferred temperature of 23 ° C ± 2 ° C and 50% ± 2% relative humidity. The other two options are: temperature 20 ° C ± 2 ° C and 65% ± 2% relative humidity or 27 ° C ± 2 ° C and relative humidity of 65% ± 2%.

***Note** : Average values shall be within these ranges. Fluctuations low duration or limitations of measurement methods may cause individual measurements of about 5% variations in relative humidity without significant impairment of test.*

6.1.5.2.4 Additional measures should be taken to ensure that the material plastic used to make drums, jerricans and composite packaging (of plastic) intended to contain liquids meet the general and special conditions established in items 6.1.1.2, 6.1.4.8.1 and 6.1.4.8.3. This can be done, e.g. The samples are undergoing the containers or packages to a preliminary study by a long period, for example six months, during which the samples should remain full of substances that should contain and then subjecting them to the applicable tests related to items 6.1.5.3, 6.1.5.4, 6.1.5.5 and 6.1.5.6. For substances that could cause fatigue breaking or weakening drums or plastic drums, the sample, filled with the substance or another substance whose influence on fatigue plastic material is equivalent, must be subjected to an overload equivalent to total mass of identical packages which might be stacked on it during transport. The minimum height of the stack to be considered, including the test sample, It should be 3 meters.

6.1.5.3 Drop test

6.1.5.3.1 Number of samples (per design type and manufacturer) and orientation which gives

Except in the case of a fall on a surface, the center of gravity should be in a vertical impact point. When more than a possible orientation a drop test, should be adopted that have most likely to cause damage to packing.

PACKING	NUMBER OF SAMPLES	FALL ORIENTATION

		FOR TEST
Steel drums aluminum drums metal (other than steel or aluminum) steel pails aluminum canisters plywood drums cardboard drums Drums and plastic pails composite packaging shaped drum	Six (three for each which gives)	*First drop* (3 samples): the package must hit the target diagonally with the rim or, this does not exist, with a seam circular or an edge. * *Second fall* (with the other 3 samples): the packaging must hit the target with the most part weak not tested in the first fall, for example, a clasp or for some cylindrical drums, a welded longitudinal seam Drum body. **
natural wood boxes plywood boxes reconstituted wood boxes Cardboard boxes plastic boxes steel or aluminum boxes composite packaging shaped box	Five (1 for each which gives)	*First fall* : on the bottom. *Second fall* : on the face higher *Third drop* : on one side higher *Fourth loss:* on one side lower *Fifth drop* : on a corner
Bags of a sheet with side seam	Three (3 drops by bag)	*First drop* : on a face larger *Second drop* : on a face narrow *Third drop* : on one end of the bag
Bags of a sheet with no side seam, or multiwall	Three (two drops by bag)	*First drop* : on a face larger *Second fall* : on the end of the bag

* Variations are allowed in orientation, when there is more than one nozzle, quick release and longitudinal seams of the package, but all three samples should reach the target diagonally to the upper shell.

** For the second fall, three samples should reach the target in different directions, different from the first in the most vulnerable points in order to check for possible failures packing.

Page 37

6.1.5.3.2 *special sample preparation for the drop test*

The temperature of the sample with its contents shall be reduced to -18 ° C or least for the following packages:

a) Plastic drums (see section 6.1.4.8);

b) plastic pails (see section 6.1.4.8);

c) plastic boxes, except foamed plastic (see section 6.1.4.13);

d) composite packaging (plastic) (see item 6.1.4.19); and

e) combination packagings with inner packagings of plastics, other than plastic bags for solids or articles.

When the samples are prepared in this way, the conditions laid down in item 6.1.5.2.3 may be waived. The liquids used for the test shall be kept in the liquid state, if necessary with the addition of antifreeze.

6.1.5.3.3 Packaging with removable lid for liquids may only be submitted the drop test after floods and remain closed for 24 hours, at least for it can be considered a possible loosening of the gasket.

6.1.5.3.4 Target

The target must be a non-resilient and horizontal surface and shall be:

a) full and compact enough to stand still;

b) free from defects capable of influencing the test results;

c) sufficiently rigid to not deform and will not be damaged in essay; and

d) large enough to ensure that the test sample falls entirely on the surface.

6.1.5.3.5 Drop height

If the test is performed with the package containing the solid or liquid be transported, or a simulativo product with essentially the same physical characteristics, the drop height shall be:

Packing Group I	Packing Group II	Packing Group III
1.8m	1.2 m	0.8m

In the case of liquids in single packagings and inner packagings combination packagings, if the test is performed with water:

Notice: *The term water includes water / antifreeze solutions with relative density Minimum 0.95 for the tests at -18 ° C .*

a) when the substance to be transported have a relative density non-exceeding 1.2, the drop height shall be:

Packing Group I	Packing Group II	Packing Group III
1.8m	1.2 m	0.8m

b) when the substance to be transported have higher relative density 1.2, the drop height shall be calculated based on density relative (d) rounded to the first decimal place, as follows:

Packing Group I	Packing Group II	Packing Group III
dx 1.5 (m)	dx 1.0 (m)	dx 0.67 (m)

6.1.5.3.6 Approval criteria for testing

6.1.5.3.6.1 Every packaging containing liquid shall be leakproof when it has been struck a balance between internal and external pressures, except for packaging Internal combination packagings when it is not necessary that the pressures are equalized.

6.1.5.3.6.2 When a packaging for solid is subjected to a drop test and its top surface to reach the area of impact, the sample must be approved if all the Content is retained by the inner container or the inner container (e.g., a plastic bag), even if its closure, without prejudice to retain their function containment, does not remain dustproof.

6.1.5.3.6.3 The packaging or the outer packaging of a package or composite combined can not show any damage that could affect safety during transport. internal containers, inner packagings or articles shall remain

completely within the outer packaging and there can be no leakage of contents inner packaging or inner receptacle.

Notice: *Except for flexible inner packagings and flexible accessories, will be deemed approved combination packagings whose outer packaging presents fissure, since the inner package remains completely inside the package external.*

6.1.5.3.6.4 Neither the outermost layer of a bag or the outer packaging must defective able to affect safety during transport.

6.1.5.3.6.5 Provided there is no further leakage occurs, a small discharge by closure means at the time of impact is not considered failure of the packaging.

6.1.5.3.6.6 Packaging for Class 1 products, there may be no disruption that may allow leakage of loose explosive substances or articles explosives on the outer packaging.

6.1.5.4 Tightness test

This test should be performed in all standard designs packaging intended to contain liquids, except for inner packagings of combination packagings.

6.1.5.4.1 *Number of samples* : three samples per design type and manufacturer.

6.1.5.4.2 *Special preparation of samples for testing* : locks with devices vent should have their sealed holes or must be replaced by similar non breathe.

6.1.5.4.3 *Testing and pressure method to be applied* : the packagings including their closures shall be kept submerged in water for five minutes while it is applied an internal air pressure. The dipping method must not affect the results of test.

The air pressure (gauge) to be minimal must be applied:

Packing Group I	Packing Group II	Packing Group III
≥ 30 kPa (0,3bar)	≥ 20kPa (0,2bar)	≥ 20kPa (0,2bar)

They can be employed other methods at least equally effective.

6.1.5.4.4 Criteria for passing the test: there can be no leakage.

Page 40

6.1.5.5 internal pressure test (hydraulic)

6.1.5.5.1 *Packaging to be tested* The test is applicable to all projects-type of metal packaging or plastic and composite packages for liquids. This test is not required for inner packagings of combination packagings.

6.1.5.5.2 *Number of samples* : three samples per design type and manufacturer.

6.1.5.5.3 *Special preparation of samples for testing* : fasteners device vent should have their holes sealed or replaced by similar device without Breather.

6.1.5.5.4 *Testing and pressure method to be applied* : metal packaging and the composite packaging (inner containers of glass, porcelain or ceramic), including their closures, shall be subjected to the test pressure for 5 minutes. The packaging of plastic and composite packaging (inner container of plastic), including its closures shall be subjected to the test pressure for 30 minutes. This pressure is the one shall appear in the marking required in paragraph "d" of item 6.1.3.1. The manner in which the packages are supported during the test should not affect the results. The pressure test should be applied uniformly and continuously and kept constant during the specified period. The hydraulic pressure (gauge) applied, as determined by one of The following methods shall be:

a) not less than the total gauge pressure measured in the packaging (or that is, the vapor pressure of the contents plus the partial pressure of air or other inert gases, minus 100 kPa (1 bar) at 55 ° C, multiplied by a safety factor of 1.5; this total gauge pressure should be

determined based on the maximum degree of filling in accordance with the Item 4.1.1.4, the filling temperature of 15 ° C;

b) not less than 1.75 times the vapor pressure at 50 ° C, the substance to be transported minus 100 kPa (1 bar), but not below 100 kPa (1 bar);

c) not less than 1.5 times the vapor pressure at 55 ° C, the substance to be transported minus 100 kPa (1 bar), but not below 100 kPa (1 bar).

6.1.5.5.5 In addition, packages for products Packaging Group I shall be tested to a minimum pressure of 250 kPa (2,5bar) (gauge) for a period of 5 or 30 minutes, depending on the material of which the packaging is made.

6.1.5.5.6 *Criteria for passing the test* : there can be no leakage.

6.1.5.6 Stacking test

Except bags, all-type projects of other containers should be subjected to this test.

6.1.5.6.1 *Number of samples* : three samples per design type and manufacturer.

6.1.5.6.2 *Test method* : The specimen shall be subjected to a force applied in its upper face, equivalent to the total weight of identical packages may be stacked on it during transport. When the sample content is a product simulativo liquid with different relative density of the liquid being transported, the force It must be calculated with regard to the latter. The minimum height of the stack, including the sample, should be 3 m. The load application time should be 24 hours, except for drums and plastic pails and composite packaging types 6HH1 and 6HH2, intended to contain liquids, which must be subjected to the test for a period of 28 days at a temperature not lower than 40 ° C.

6.1.5.6.3 *Approval criteria in the test* : no sample may have leak. In composite or combination packagings, there can be no leakage substance contained in the inner container or the inner packaging. No sample must show any deterioration which could adversely affect the safety of transportation, or any deformation able to reduce its strength or cause instability of the stack. Plastic packaging must be cooled to reach the room temperature before evaluation.

6.1.5.7 Test Report

6.1.5.7.1 A test report shall be prepared and made available to users the package containing at least the following information:

1. Name and address of who carried out the test;

2. Name and address of the applicant (if appropriate);

3. An individual identification of the test report;

4. Date of the test report;

5. Manufacturer of the packaging;

534

Page 42

6. Description of the design type of packaging (eg, dimensions, materials, closures, thickness, etc.), including manufacturing method (E.g., blow molding) and which may contain drawing (s), or photograph (s);

7. Maximum capacity;

8. Characteristics of tested package contents, such as viscosity and relative density for liquids and particle size for solids;

9. Description and test results;

10. Position and signature of the responsible for testing.

6.1.5.7.2 The test report shall contain statements that the packaging, prepared as for transport was tested according to the applicable devices this Chapter and that the use of other methods or other components packaging may render it invalid. A copy of the test report shall be available the competent authority.

535

CHAPTER 6.2

REQUIREMENTS FOR MANUFACTURING AND CONTAINERS TEST UNDER PRESSURE, APPLICATORS AEROSOL, SMALL CONTAINING GAS CONTAINERS (CARTRIDGES GAS), OF FUEL CELLS CARTRIDGES CONTAINING GAS FLAMMABLE LIQUEFIED

***Note** : Spray applicators, small containing gas (cartridges gas) and fuel cell cartridges containing flammable gas are not subject the requirements set out in items 6.2.1 to 6.2.3.*

6.2.1 general requirements

6.2.1.1 Design and Manufacturing

6.2.1.1.1 Pressure vessels and their closing devices to be designed, manufactured, tested and equipped so that they can withstand the conditions normal transport, including with regard to fatigue.

6.2.1.1.2 Considering the scientific and technological progress, the authority jurisdiction may permit the use of pressure vessels to specifications different from those presented in this Regulation.

6.2.1.1.3 In no case shall the minimum wall thickness must be less than specified in the technical design and manufacturing standards.

6.2.1.1.4 As for pressure vessels soldiers should only be used metal appropriated for soldering.

6.2.1.1.5 cylinder pressure tests, tubes, pressure drums and lots of cylinder pressure must be conducted in accordance with the Instruction for Packaging P200 or, for a chemical under pressure, with Instruction P206. The test pressure for closed cryogenic containers should be performed according to Instruction for P203 packaging. The pressure test of storage devices metal hydride must be performed in accordance with Instruction P205 for packaging. O test pressure of a cylinder for adsorbed gas must be performed according to Instruction for P208 packaging.

6.2.1.1.6 Pressure vessels assembled in batches should be provided with a the support structure and held together as a unit. Pressure vessels must be set so as to prevent movement in relation to the structural assembly, and and any movement that could produce a dangerous stress concentration sites. Collectors should be designed so that they are protected against impact and forces typically encountered during shipping. Collectors should have at least the same test pressure cylinders in the case of toxic liquefied gases must be provided means for each of the pressure vessels to be filled independently and that the carriage does not occur during exchange of content between a pressure vessel and another.

6.2.1.1.7 The contact of dissimilar metals that results in damage by galvanic action It should be avoided.

6.2.1.1.8 Additional requirements for the manufacture of closed cryogenic containers for refrigerated liquefied gases

6.2.1.1.8.1 For each pressure vessel, should be laid down mechanical characteristics of the metal used, including impact resistance and coefficient of curvature.

6.2.1.1.8.2 The pressure receptacles shall be thermally insulated. The isolation Heating should be protected against impacts by means of a casing. If the space between the pressure vessel and the casing is emptied of air (vacuum insulation), the housing It should be designed so that it can withstand without permanent deformation at a pressure outside of at least 100 kPa (1 bar) calculated in accordance with a technical regulation recognized, or not less than 200 kPa gauge pressure critical fracture (2 Pub). If the housing is closed about to become gas-tight (eg in the case the vacuum insulation), a device to prevent the formation of pressure should be installed risk on the insulating layer. In cases where the seal tightness to gas pressure vessel or its accessories is inadequate, the device should prevent moisture into the insulation.

6.2.1.1.8.3 Closed cryogenic receptacles intended for the transport of gases refrigerated liquefied gas, having a boiling point below -182 ° C, the pressure atmospheric, can not contain materials which may react dangerously with Oxygen or oxygen enriched atmospheres when located in parts of

thermal insulation where there is a risk of contact with oxygen in the air or a liquid enriched with oxygen.

6.2.1.1.8.4 Closed cryogenic receptacles shall be designed and manufactured with Suitable lifting devices and fixation.

6.2.1.1.9 *Additional requirements for the manufacture of pressure vessels for acetylene*

For UN 1001 numbers, dissolved acetylene, and UN 3374 acetylene free solvent, the pressure receptacles shall be filled with a porous material, uniformly distributed, of a type that meets the specified requirements and testing by the competent authority that:

a) be compatible with the pressure receptacle and does not form compounds harmful or hazardous, or with acetylene or with the solvent in the case the UN 1001 number;

b) can prevent the spread of decomposition of the acetylene in the material porous.

In the case of the number UN 1001, the solvent must be compatible with the pressure vessels.

6.2.1.2 materials

6.2.1.2.1 The materials of construction of pressure vessels and their devices to lock entering in direct contact with dangerous goods can not be affected, have decreased their strength or cause dangerous effect, eg catalysing a reaction or reacting with the dangerous products that intended.

6.2.1.2.2 Pressure vessels and their closing devices to be made from materials specified in the design and manufacture of technical standards and the instructions for packaging applicable to the substance in the container when transported under pressure. The material must be resistant to rupture under tension and the formation of cracking corrosion, as indicated in the technical design and manufacturing standards.

6.2.1.3 Service Equipment

6.2.1.3.1 Valves, pipes and other accessories under pressure shall be designed and manufactured so as to withstand at least one and a half times the pressure testing of pressure vessels.

6.2.1.3.2 Service equipment shall be configured or designed order to avoid the damage that may be caused by the release of content pressure vessel under normal conditions of handling and transport. The pipes Collector leading to shut-off valves shall be sufficiently flexible to protect the valves and pipes against shear or release of content pressure vessel. The charge and discharge devices and any caps protection must be protected against accidental opening. The valves must be protected

as specified in item 4.1.6.1.8.

6.2.1.3.3 Pressure vessels that can not be moved manually or that can not be rolled shall be provided with devices (metal bases, hoops, clamps) to ensure safe handling with mechanical means and shall be placed so as not to diminish the strength or cause excessive stress on pressure vessel.

6.2.1.3.4 Each pressure vessel must be provided with relief devices pressure as specified in item (1) Instruction for P200 Packing in P205 or in items 6.2.1.3.6.4 and 6.2.1.3.6.5. The pressure relief devices shall be designed to prevent entry of foreign matter, gas leak and training dangerous excess pressure. Once installed, the pressure relief devices pressure vessels loaded with flammable gases and mounted horizontally means of collecting pipes should be arranged so that they can discharge freely into the atmosphere under normal conditions of transport, so as to avoid contact between the released gas and the pressure vessel itself.

6.2.1.3.5 Pressure vessels whose load is measured by volume must It is provided with a level indicator.

6.2.1.3.6 Additional requirements for closed cryogenic containers

6.2.1.3.6.1 Each opening for loading and unloading of a container Cryogenic closed, used for the transport of flammable refrigerated liquefied gases, It must be provided with at least two closing devices reciprocally

Page 47

independent mounted in series, the first being a stop valve and the second a cap or equivalent device.

6.2.1.3.6.2 tubular sections which can be closed at both ends, where a liquid product may be retained, there must be an automated method relief pressure to prevent an excessive increase of pressure inside the pipe.

6.2.1.3.6.3 All connections of a closed cryogenic receptacle shall be clearly marked to indicate its function (for example, vapor phase or liquid phase).

6.2.1.3.6.4 Pressure Relief Devices

6.2.1.3.6.4.1 Every closed cryogenic container must have at least one device pressure relief, which must withstand dynamic forces, including fluctuations.

6.2.1.3.6.4.2 In addition, the closed cryogenic containers may have a disc Break mounted in parallel with the device (s) (s) spring loaded in order to meet the requirements of item 6.2.1.3.6.5.

6.2.1.3.6.4.3 Connections to pressure relief devices shall have a diameter sufficient to allow excess pressure escape freely.

6.2.1.3.6.4.4 In maximum filling conditions, all entries devices pressure relief must be located in the vapor space of the cryogenic container closed, and the devices must be so arranged as to ensure the discharge of vapors without restrictions.

6.2.1.3.6.5 Capacity and calibration of pressure relief devices

Notice: *Regarding the pressure relief devices for cryogenic vessels closed, the Maximum Operating Pressure Admissible (MAWP) means the pressure effective maximum gauge at the top of a cryogenic container closed when it is in the service position, including the higher effective pressure during loading and unloading.*

6.2.1.3.6.5.1 The pressure relief devices shall open automatically at a pressure at least equal to the MAWP and be fully open at an equal pressure 110% of MAWP. After unloading, the devices must be closed with higher pressure 10% of that in which commences the download and remain closed with no pressure lower.

6.2.1.3.6.5.2 Frangible discs must be calibrated so that it break with a corresponding nominal pressure to the lesser of: the test pressure or 150 % Of MAWP.

6.2.1.3.6.5.3 In a vacuum-insulated closed cryogenic container when loss occurs vacuum, the combined capacity of all pressure relief devices must be sufficient to limit the pressure (even increased) at 120% of MAWP.

6.2.1.3.6.5.4 The required capacity of the pressure relief devices should be calculated in accordance with technical regulations established by the competent authority [1] .

6.2.1.4 Approval of pressure vessels

6.2.1.4.1 The conformity of the pressure vessels should be verified at the time manufacturing, as required by the competent authority (Inmetro), subject to the established in this Chapter. Pressure vessels should be inspected, tested and approved by a competent authority inspection. The technical documentation It must contain full details regarding the design and manufacture, as well as Full documentation on the testing.

6.2.1.4.2 Evaluation systems compliance must meet the requirements Inmetro.

6.2.1.5 Initial inspection and tests

6.2.1.5.1 The new pressure vessels, cryogenic containers which are not closed or metal hydride storage devices, must be submitted to

inspection and testing during and after manufacture in accordance with the rules of applicable design, including the following:

On an adequate sample of pressure vessels:

a) Testing of the mechanical characteristics of the material of manufacture;

b) Verification of the minimum wall thickness;

c) checking the homogeneity of the material for each manufacturing batch;

d) inspection of the external and internal conditions of the pressure receptacles;

1 *See, for example, CGA Publications S-1.2-2003 "Pressure Relief Device Standards, Part 2-Position and Portable Tanks for Compressed Gases "and S-1.1-2003" Pressure Relief Device Standards-Part 1-Cylinders is Compressed Gases ".*

e) inspection of the thread of the bottlenecks;

f) verification of compliance with the design standard;

For all pressure receptacles:

g) hydraulic pressure test. The pressure receptacles shall bear
The test pressure without expansion that occurs to a higher allowed
the design specification;

Note: *The hydraulic pressure test may be replaced by a test using a gas where such operation does not involve any risk, if approved by the competent authority.*

h) shall be carried out inspection and assessment of manufacturing defects
or pressure vessels when they are considered
unsuitable for use. In the case of welded pressure vessels,
It should be given special attention to the quality of the welds;

i) inspection of the markings for each pressure vessel;

j) in addition, pressure vessels for the transport of
products allocated to UN numbers 1001, acetylene, dissolved and 3374,
acetylene, free of solvent should be inspected to ensure
proper installation and condition of the porous material and, where applicable,
amount of solvent.

6.2.1.5.2 The inspections and tests specified, letters "a", "b", "d" and "f" of item 6.2.1.5.1 must be performed on an adequate sample of cryogenic containers closed. Moreover, welds must be inspected by radiography examinations ultrasonic or any other suitable method of non-destructive testing in a adequate sample of closed cryogenic containers, according to the design rule and manufacture applicable. The inspection of welds does not apply to housing.

Additionally, all closed cryogenic receptacles shall be subjected the inspections and tests specified initial, letters "g", "h" and "i" of item 6.2.1.4.1, and the tightness test and the test to demonstrate the proper functioning of service equipment after assembly.

6.2.1.6 Inspection and periodic tests

6.2.1.6.1 The refillable pressure other than containers Cryogenic, must undergo inspections and periodic tests by a body inspection accredited by the competent authority as follows:

a) verification of the external conditions of the pressure vessel, the equipment and the external markings;

b) check the internal conditions of the pressure vessel (for example, internal inspection, verification of minimum thickness of walls);

c) check of the threads if there is evidence of corrosion or if the fittings They are removed;

d) hydraulic pressure test and, if necessary, verification of characteristics of the material by means of appropriate tests;

Note 1: *The hydraulic pressure test may be replaced by a test using a gas where such operation does not involve any risk, if approved by the competent authority.*

Note 2: *The hydraulic pressure test of cylinders or tubes may be replaced by an equivalent method based on test acoustic emission, ultrasonic examination or a combination of both, if approved by the competent authority. The Standard ISO 16148: 2006 may be used as a reference for procedures of acoustic emission testing.*

Note 3: *The hydraulic pressure test may be replaced by examination ultrasound performed according to the ISO 10461: 2005 + A1: 2006 for gas cylinders without aluminum alloy weld and according to ISO 6406: 2005 for gas cylinders without steel weld.*

e) verification of service equipment, other accessories and device pressure relief if they are reintroduced into service.

Notice: *For periodic inspection and frequency of testing, see Instruction for*

Page 51

item 4.1.4.1.

6.2.1.6.2 For pressure vessels for the transport of goods allocated to UN 1001 acetylene numbers, dissolved, and 3374, acetylene, solvent free, They should only be examined in accordance with the letters "a", "c" and "e" of item 6.2.1.6.1. Moreover, the conditions of the porous material (for example, peel, wear tears) should be examined.

6.2.1.6.3 Pressure relief valves for closed cryogenic containers should be subjected to periodic tests and inspections.

6.2.1.7 Requirements for manufacturers

6.2.1.7.1 The manufacturer shall be technically able and have all the resources necessary to successfully manufacture pressure vessels; this concerns especially qualified personnel:

a) to supervise the entire manufacturing process;

b) for assembling of the components;

c) to carry out the relevant tests.

6.2.1.7.2 In all cases, evaluating the manufacturer's fitness must be performed by an inspection body accredited by the competent authority of the country in which give approval.

6.2.1.8 Requirements for accredited inspection bodies

6.2.1.8.1 Inspection bodies accredited by the competent authority should be independent of the manufacturer and have the necessary competence to perform inspections, required testing and approvals.

6.2.2 Requirements for pressure vessels marked "UN"

In addition to the general requirements of paragraph 6.2.1, pressure vessels with brand "UN" must meet the applicable requirements of this Chapter, including the standards, where applicable. The manufacture of new pressure vessels or equipment of service according to the specific standards listed in items 6.2.2.1 and 6.2.2.3 is not allowed after the date indicated in the right column of the tables in those items.

Note 1: *Newer versions of the standards listed can be used, provided that approved by the competent authority.*

Note 2: *Pressure containers marked "UN" and service equipment manufactured in accordance with current and applicable standards in manufacturing date can continue in use subject to the requirements for periodic inspections established in this Regulation.*

6.2.2.1 Design, manufacture, inspection and acceptance test

6.2.2.1.1 Apply the following rules to design, manufacture, inspection and testing Initial cylinders marked "UN", except in cases where the requirements of inspection concerning the system for conformity assessment and approval are in according to item 6.2.2.5:

ISO 9809-1: 1999 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 1: tempered steel cylinders with lower voltage 1,100 MPa.

Note 1: *The observation relating to the F factor in section 7.3 of this standard does not apply the cylinders marked "UN".*

Note 2: *Applicable for manufacturing until 31 December 2018.*

ISO 9809-1: 2010 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 1: tempered steel cylinders with lower voltage 1,100 MPa.

Note: *Applicable as there are no new provisions.*

ISO 9809-2: 2000 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 2: Hardened steel cylinders with voltage equal or greater than 1,100 MPa.

Note: *Applicable for manufacturing until 31 December 2018.*

ISO 9809-2: 2010 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 2: Hardened steel cylinders with voltage equal or greater than 1,100 MPa.

Note: *Applicable as there are no new provisions.*

ISO 9809-3: 2000 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 3: standard steel cylinders.

Note: *Applicable for manufacturing until 31 December 2018.*

ISO 9809-3: 2010 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 3: standard steel cylinders.

Note: *Applicable as there are no new provisions.*

ISO 7866: 1999 Gas cylinders - Refillable gas cylinders, without welding aluminum alloy - Design, manufacturing and testing.

Note: *The observation relating to the F factor in section 7.2 of this standard does not apply the cylinders marked "UN". Aluminium alloy 6351A - T6 or equivalent not It is allowed .*

ISO 4706: 2008 Gas cylinders - Refillable gas cylinders, welded steel - Test pressure 60 bar and below.

ISO 18172: 2007 Gas cylinders - Refillable gas cylinders, welded steel - Part 1: test pressure 6 MPa and below.

ISO 20703: 2006 Gas cylinders - Refillable gas cylinders, welded aluminum alloy - Design, Manufacture and Testing.

ISO 11118: 1999 Gas cylinders - Non-refillable gas cylinders, metal - Specification and test methods.

ISO 11119-1: 2002 manufacturing composite gas cylinders - Specification and test methods - Part 1: composite materials of gas cylinders surrounded by strap.

ISO 11119-2: 2002 manufacturing composite gas cylinders - Specification and test methods - Part 2: Gas cylinders of composite materials reinforced with fiber and completely surrounded by metal coatings which transmit the load.

ISO 11119-3: 2002 manufacturing composite gas cylinders - Specification and test methods - Part 3: Gas cylinders of composite materials reinforced with fully fiber surrounded by metallic or non-metallic coatings that do not transmit the charge.

Page 54

ISO 4706: 2008 Gas cylinders - Refillable gas cylinders welded, steel - Test pressure of 60 bar or less.

ISO 18172-1: 2007 Gas cylinders - Gas cylinders Refillable welded, stainless steel - Part 1: Pressure test at 6 MPa and less.

ISO 20703: 2006 Gas cylinders - Gas cylinders Refillable welded, aluminum alloy - Design, manufacturing and testing.

Note 1: *The standards listed above, the cylinders of composite materials must be*

designed for unlimited service life.

Note 2: *After the first 15 years of service, the competent authority responsible for the original approval of the cylinders of composite materials, and compliance with these standards, may approve the extension of its useful life, based the information obtained from the tests provided by the manufacturer, owner or user.*

6.2.2.1.2 Applies to the following standard design, manufacture, inspection and testing initials of the tubes marked "UN", except in cases where the inspection requirements concerning the system for conformity assessment and approval to be in accordance with the item 6.2.2.5:

ISO 11120: 1999 Gas cylinders - Refillable gas pipes, steel and without welding to compressed gas transport, water capacity between 150 and 3,000 liters - Design, manufacturing and testing.

Note 1: *The observation relating to the F factor in section 7.1 of this standard does not apply the tubes with the "UN" mark.*

Note 2: *Applicable as there are no new provisions.*

6.2.2.1.3 Apply the following rules to design, manufacture, inspection and testing initials of acetylene cylinders marked "UN", except in cases where the requirements inspection concerning the system for conformity assessment and approval are in according to item 6.2.2.5:

Page 55

For the cylinder body:

ISO 9809-1: 1999 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 1: tempered steel cylinders with voltage less than 1,100 MPa.

Note 1: *The observation relating to the F factor in section 7.3 of this standard is not apply to cylinders with the "UN" mark.*

Note 2: *Applicable until December 31 2018.*

ISO 9809-1: 2010 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 1: tempered steel cylinders with voltage less than 1,100 MPa.

Note: *Applicable as there are no new provisions.*

ISO 9809-3: 2000 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 3: standard steel cylinders.

Note: Applicable until December 31 2018.

ISO 9809-3: 2010 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 3: standard steel cylinders.

Note: Applicable as there are no new provisions.

For the porous material of the cylinder:

ISO 3807-1: 2000 Cylinders for acetylene - Basic requirements - Part 1: Cylinders without fusible plugs.

Note: Applicable as there are no new provisions.

ISO 3807-2: 2000 Cylinders for acetylene - Basic requirements - Part 2: Cylinders with fusible plugs.

Note: Applicable as there are no new provisions.

6.2.2.1.4 Applies to the following standard design, manufacture, inspection and testing Initial Cryogenic containers marked "UN", except where the inspection requirements relating to the system for conformity assessment and approval comply with paragraph 6.2.2.5:

Page 56

ISO 21029-1: 2004 Cryogenic vessels - Transportable vessels, vacuum insulated, with capacity of less than 1,000 L - Part 1: Design, fabrication, inspection and essay.

Note: Applicable as there are no new provisions.

6.2.2.1.5 Applies to the following standard design, manufacture, inspection and testing initials of the metal hydride storage devices marked "UN", except where the inspection requirements for the assessment system conformity and approval are in compliance with paragraph 6.2.2.5:

ISO 16111: 2008 Transportable gas storage devices - Hydrogen absorbed in reversible metal hydride.

Note: Applicable as there are no new provisions.

6.2.2.1.6 The Standard presented below applies to the design, manufacture and inspection and Initial testing of cylinders packages marked "UN". Each packet of the cylinder cylinders with the "UN" mark shall be a cylinder marked "UN" that meets the requirements set out in item 6.2.2. The inspection requirements related to the system conformity assessment and approval for cylinder packages marked "UN"

They must comply with the provisions of item 6.2.2.5.

ISO 10961: 2010 Gas cylinders - cylinder packages - design, manufacture, testing, inspection.

Note: Applicable as there are no new provisions.

Notice: *Changing one or more cylinders of the same design type, including even pressure test in a package of cylinders marked "UN", does not require re-certification of existing cylinder package.*

6.2.2.1.7 Apply the following rules to design, manufacture and inspection and testing Initial cylinders with the "UN" mark to adsorbed gas, except that the requirements of inspection related to the system for conformity assessment and approval must be

in accordance with the provisions of item 6.2.2.5.

ISO 11513: 2011 Gas cylinders - Refillable gas cylinders, welded steel containing materials for filling gases at sub-atmospheric pressure (Excluding acetylene) - Design, manufacture, testing, use and periodic inspection.

Note: *Applicable as there are no new provisions.*

ISO 9809-1: 2010 Gas cylinders - Refillable gas cylinders, steel and solderless - Design, manufacturing and testing - Part 1: tempered steel cylinders with voltage less than 1,100 MPa.

Note: *Applicable as there are no new provisions.*

6.2.2.1.8 Apply the following rules to design, manufacture and inspection and testing initial cylinder pressure ("Ton Containers") marked "UN", except that the inspection requirements related to the conformity assessment system and approval They must comply with the provisions of item 6.2.2.5.

ISO 21172-1: 2015 Gas cylinders - zob welded steel pressure drums with a capacity up to 3,000 liters for the transport of gases - Design and manufacture - Part 1: Capacity up to 1,000 liters.

Note 1: *Applicable as there are no new provisions.*

Note 2: *Notwithstanding the provisions of section 6.3.3.4 of this Standard, the cylinders under pressure ("Ton Containers") welded steel with convex pressure may be used to transport corrosive substances, provided that all applicable requirements laid down in this Regulation are met.*

6.2.2.2 materials

In addition to the requirements for specified materials in standards design and manufacture of pressure vessels, and all the restrictions specified in instructions for packaging applicable to gases to be transported (e.g. Instruction for P200 or P205 package), the following rules must be applied Material compatibility:

ISO 11114-1: 2012 Gas cylinders - Compatibility of cylinder materials and valve with the gas content. Part 1: Metallic materials.

ISO 11114-2: 2000 Transportable gas cylinders. cylinder materials compatibility and valve with the gas content. Part 2: Non-metallic materials.

6.2.2.3 Service Equipment

The following standards apply to devices for closing and its protection:

ISO 11117: 1998 + Cor 1: 2009 Gas cylinders - Valve protection caps and valve limiters - Design, manufacturing and testing.

Note: *Manufacture according to ISO 11117: 1998 is allowed up to 31 December 2014*

ISO 10297: 2006 Gas Cylinders - Valves for refillable gas cylinders - Specifications and test types.

Note: *Applicable as there are no new provisions.*

ISO 13340: 2001 Transportable gas cylinders - Valves for gas cylinders non-rechargeable - specifications and types of tests.

Note: *Applicable as there are no new provisions.*

For metal hydride storage devices with the "UN" mark, They are applicable to devices for closing and protection the requirements the following standards:

ISO 16111-2008 transportable gas storage devices - Hydrogen absorbed in reversible metal hydride.

Note: *Applicable as there are no new provisions.*

6.2.2.4 ***Inspection and periodic tests***

The following rules apply to the inspection and periodic testing of cylinders marked "UN" and metal hydride storage devices with the brand "UN":

ISO 6406: 2005	steel gas cylinders without welding - Inspection and periodic tests ***Note:*** *Applicable as there are no new provisions.*
ISO 10460: 2005	Gas cylinders - Gas cylinder carbon steel welded - Inspection and periodic tests **Note:** The repair of welds described in section 12.1 of this standard is not allowed. Repairs described in section 12.2 require approval of competent authority which approved the inspection body accredited according to the item 6.2.2.6. ***Note:*** *Applicable as there are no new provisions.*
ISO 10461: 2005 / A1: 2006	cylinders without welding aluminum alloy gas - Inspection and testing journals. ***Note:*** *Applicable as there are no new provisions.*
ISO 10462: 2005	Cylinders for dissolved acetylene - Periodic inspection and maintenance. ***Note:*** *Applicable as there are no new provisions.*
ISO 11513: 2011	Gas cylinders - Refillable gas cylinders, welded steel containing materials for filling gases at sub-atmospheric pressure (except acetylene) - Design, manufacture, testing, use and periodic inspection. ***Note:*** *Applicable as there are no new provisions.*
ISO 11623: 2002	Transportable gas cylinders - Inspection and periodic tests Compounds gas cylinders. ***Note:*** *Applicable as there are no new provisions.*
ISO 16111: 2008	Transportable gas storage devices - Hydrogen absorbed in reversible metal hydride. ***Note:*** *Applicable as there are no new provisions.*

Page 60

6.2.2.5 System conformity assessment and approval to manufacture, inspections and periodic testing of pressure vessels

6.2.2.5.1 settings

For purposes of this Chapter:

The *evaluation system of compliance* is a system by which the competent authority approves the design type of a pressure vessel of a manufacturer, assembler or importer, the quality system and inspection bodies.

The *approval system* is a system whereby the competent authority believes one body to perform inspections and periodic tests of receptacles pressure, including the approval of the quality of such a body system.

Evaluation systems of compliance and approval examinations and tests are regulated under the Brazilian System of Conformity Assessment - SBAC.

The *Project-type* means a pressure receptacle design as specified by a standard.

6.2.2.6 Approval system for periodic inspection and testing of containers under pressure

Reserved

6.2.2.7 Marking "UN" of refillable pressure

Notice: *The requirements for marking hydride storage devices metallic branded "UN" are arranged in item 6.2.2.9 and the requirements for packages cylinders marked "UN" are arranged in item 6.2.2.10.*

6.2.2.7.1 The refillable pressure "UN" must display marking durable, legible and readily visible on the certification, operation and manufacturing. These markings shall be stamped permanently (eg, recorded or printed) in the pressure vessel. The markings shall be placed on the edge, in top, the neck of the pressure vessel or some component permanently attached to the pressurized container (for example, welded or necklace corrosion resistant plate welded on the outer casing of a cryogenic container closed). Except for the "UN" symbol on the packaging, the minimum dimensions of the other marks must be 5 mm in the case of pressure vessels with a diameter or equal to 140 mm and 2.5 mm in the case of pressure vessels with smaller diameter

Page 61

140 mm. The minimum size of the symbol "BU" on the packaging shall be 10 mm in the case of pressure vessels with a diameter greater than or equal to 140 mm and 5 mm, where

the pressure receptacles with a diameter less than 140 mm.

6.2.2.7.2 The certification mark must contain the following information:

a) the UN symbol for packaging

This symbol should only be used to certify that a packaging a flexible bulk container for a portable tank or CGEM meets the requirements set and requirements in Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8

b) The technical standard (eg ISO 9809-1) used for design, manufacturing and testing;

c) the characters that identify the certification country, as indicated the acronym used for the movement of motor vehicles in traffic International;

d) identification of the product certification body, accredited by competent authority;

e) date of the initial inspection: year (four digits) followed by the month (two digits) separated by a slash ("/").

6.2.2.7.3 The operation of marking shall include the following:

f) the test pressure in bar, preceded by the letters "PH" and followed by letters "BAR";

g) the mass of the container under vacuum pressure, including all non-removable integral elements (eg, collar, clamp, etc.), in kilograms, then the "KG" letters. This mass shall not include the valve bodies, the capsule valve, valve protection or coatings under pressure or the porous material for acetylene. The dough should be expressed by a number with three significant figures rounded up to the digit

nearest higher. In the case of cylinders with less than 1 kg, the mass It should be expressed by a number with two significant digits rounded to the nearest higher digit. In the case of containers under pressure to the products of UN numbers 1001, acetylene dissolved, and 3374, acetylene, solvent free, shall be indicated by least one decimal after the decimal point; and in the case of receptacles pressure of less than 1 kg, two decimals shall be indicated later the decimal point;

h) the guaranteed minimum wall thickness of the pressure vessel expressed in mm, followed by "MM" letters. This mark is not required for pressure vessels with 1 L of water capacity or least for compounds cylinders, and containers for cryogenic closed;

i) in the case of pressure receptacles for compressed gases, for products of UN numbers 1001, dissolved acetylene, and 3374, acetylene, solvent free, the working pressure in bar, preceded by the letters "PW". In the case of closed cryogenic containers, the pressure Maximum permitted work, preceded by the letters "MAWP";

j) in the case of pressure receptacles for liquefied gases and gases refrigerated liquefied gas, the water capacity expressed in liters with a number three significant figures rounded to the digit nearest lower, followed by the letter "L". If the value of the capacity minimum or nominal water is an integer, the digits after the point can be deleted;

k) in the case of pressure vessels for product UN number 1001, dissolved acetylene, the total mass of the empty container, parts and accessories that are not removed during filling, the coatings, porous material, the solvent and the gas saturation expressed with three significant figures rounded to the lower-most digit next and followed by the letters "KG". It should be mentioned at least one decimal after the comma. In the case of cylinders with less than 1 kg, the mass shall be expressed with a number with two significant digits rounded to the nearest lower digit.

555

Page 63

l) in the case of pressure receptacles for UN product number 3374, acetylene, solvent free, the total mass of the empty container, the parts and accessories that are not removed during charging, the coating and porous material expressed with three digits significant, rounded to the nearest lower number and followed by "KG" letters. It should be mentioned at least one decimal after the decimal point. In the case of cylinders with less than 1 kg, the mass should be expressed by a number with two significant digits, rounded to the nearest lower number.

6.2.2.7.4 Marking manufacturing should contain the following information:

m) threaded cylinder identification (e.g., 25E). This indication does not is required for closed cryogenic receptacles;

n) required by the manufacturer accredited by the competent authority. When the

country of manufacture is not the same as certification country,
indication of the manufacturer must be preceded by the letters identifying the
country of manufacture, as acronym used for vehicles
motor in international traffic. The indications of the country and
manufacturer must be separated by a space or a bar
oblique;

o) the serial number assigned by the manufacturer;

p) in the case of containers steel pressure and composite materials,
with steel liner intended for the carriage of gases with a
risk of hydrogen embrittlement, the letter "H" showing
Steel compatibility (see ISO 11114-1: 2012).

6.2.2.7.5 The markings above should be divided into three groups:

- The manufacturing of marking signs shall be located in
top group and appear consecutively in the sequence
given in section 6.2.2.7.4;

- Indications operation marking, according to item 6.2.2.7.3,
They must appear in the intermediate group, and the prescribed test pressure
"f" must be immediately preceded by the working pressure
prescribed in item "i" when the latter is required;

556

Page 64

- The certification marking signs shall be located in
lower group and appear in the sequence given in section 6.2.2.7.2;

Example of the markings applied to a cylinder:

6.2.2.7.6 other markings applications are allowed in places other than
are the side wall, provided that it is little subject to local stresses and not
have size and depth able to create dangerous concentrations of stress. At the
where closed cryogenic containers, these markings may be placed on
Separately, in a united board to the outer shell. These markings can not conflict

with the required markings.

6.2.2.7.7 In addition to the markings mentioned above, each pressure vessel Rechargeable that meets the requirements of inspections and periodic tests according to item 6.2.2.4, shall be marked with the following:

a) the characters identifying the country who believed the body certification responsible for inspections and periodic tests as indicated by the acronym used for the movement of motor vehicles in international traffic. This indication is not compulsory if the body has been accredited by the competent authority of the country authorized the manufacture;

b) identification of the inspection body accredited by the authority competent, responsible for conducting inspections and tests journals;

c) the date of the inspection and periodic testing, the year (two digits) followed

of the month (two digits) separated by a slash ("/"). To indicate the year can be used four digits.

Marking above must appear consecutively in the order.

6.2.2.7.8 The cylinders of acetylene, with the approval of the competent authority, the date of the most recent periodic inspection and identification of the inspection body accredited by the competent authority to carry out the inspection and periodic testing They can be recorded on a ring attached to the cylinder by the valve. This ring must be configured so that it can only be removed from the valve dismounting.

6.2.2.8 Marking "UN" for receptacles Non-refillable pressure

6.2.2.8.1 Receptacles Non-refillable pressure "UN" must display marking durable, legible and readily visible on the certification and the gas container or under pressure. These markings shall be stamped permanently (for example, recorded or printed) in the pressure vessel. Except as dotted, the tags should be placed on the edge at the top, the container neck under pressure or a component permanently attached to the pressurized container (for example, the soldier paste). Except in the case of brands "UN" and "DO NOT REFILL" in packaging, the minimum size of other marks should be 5 mm in the case of pressure vessels with a diameter greater than or equal to 140 mm and 2.5 mm in case of pressure receptacles with a diameter less than 140 mm .. The minimum size of symbol "BU" on the packaging shall be 10 mm in the case of pressure vessels with diameter greater than or equal to 140 mm and 5 mm, in the case of pressure vessels with diameter less than 140 mm. The minimum size of the letters of the words "NOT RECHARGE "should be 5 mm.

6.2.2.8.2 The marks mentioned in items 6.2.2.7.2 to 6.2.2.7.4 shall be applied, except the particulars in letters "g", "h" and "m". The serial number mentioned in item "o" can be replaced by the batch number. Furthermore, the expression is compulsory "DO NOT REFILL" in letters at least 5 mm high.

6.2.2.8.3 the item 6.2.2.7.5 requirements must be met.

Notice: *Receptacles Non-refillable pressure, due to its size,* They can *have this marking replaced by a label.*

6.2.2.8.4 Other markings are allowed, provided it is used in places bit we subjected to stresses and other than the sidewall, and also not having

size and depth able to create dangerous concentrations of stress. These markings can not conflict with required markings.

6.2.2.9 Marking "UN" for hydride storage devices metallic

6.2.2.9.1 metal hydride storage devices must display marking below durable, legible and readily visible. These markings shall be permanently printed (e.g., printed or recorded) in the device metal hydride storage. The markings shall be placed on the edge, in the superior, the device neck or some component permanently attached to device. Except in the case of the brand "UN", the minimum size of other brands should be 5 mm in the case of metal hydride storage devices lower overall dimension greater than or equal to 140 mm and 2.5 mm in the case of devices metal hydride storage with the lowest total size less than 140 mm .. The minimum size of the symbol "BU" on the devices is 10 mm in the case of Devices with smaller overall dimension greater than or equal to 140 mm and 5 mm, in the case of devices with smaller overall size less than 140 mm.

6.2.2.9.2 The marking shall include the following:

a) the UN symbol for packaging:

This symbol should only be used to certify that a packaging, a container for flexible bulk, a portable tank or CGEM meets requirements and willing requirements in Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8;

b) "ISO 16111" (the technical standard used for design, manufacture and testing);

c) the characters that identify the certification country, as indicated the acronym used for the movement of motor vehicles in traffic

International;

d) the product certification body identification, accredited by competent authority;

Page 67

e) date of the initial inspection: year (four digits) followed by the month (two digits) separated by a slash ("/").

f) the test pressure in bar, preceded by the letters "PH" and followed by letters "BAR";

g) Nominal load apressão hydride storage device metal in bar, preceded by the letters "RCP" and followed by the letters "BAR";

h) indication of the manufacturer accredited by the competent authority. When the country of manufacture is not the same as certification country, indication of the manufacturer must be preceded by the letters identifying the country of manufacture, as acronym used for vehicles motor in international traffic. The indications of the country and manufacturer must be separated by a space or a bar oblique;

i) the serial number assigned by the manufacturer;

j) in the case of steel containers and composite materials with steel liner, the letter "H", showing the steel compatibility (see ISO Standard 11114-1: 2012); and

k) in the case of metal hydride storage devices having life Limited, the expiration date, denoted by "END", then by year (4 digits), followed by the month (two digits) separated by a slash ("/").

The certification marks specified in a) to e) should appear consecutively in the given sequence. The f test pressure) must be immediately preceded by the rated pressure device load required in g). At manufacturing markings specified in subparagraphs h) ak) should appear so consecutive, in the given sequence.

6.2.2.9.3 other markings applications are allowed in places other than are the side wall, provided that it is little subject to local stresses and not have size and depth able to create dangerous concentrations of stress. These markings shall not conflict with required markings.

Page 68

6.2.2.9.4 In addition to the markings as defined in section 6.2.2.9.2, each device metal hydride storage that meets the requirements of inspections and tests periodicals, according to item 6.2.2.4, shall be marked with the following:

a) the characters identifying the country who believed the body certification responsible for inspections and periodic tests as indicated by the acronym used for the movement of motor vehicles in international traffic. This indication is not compulsory if the body has been accredited by the competent authority of the country authorized the manufacture;

b) identification of the inspection body accredited by the authority competent, responsible for conducting inspections and tests journals;

c) the date of the inspection and periodic testing, the year (two digits) followed of the month (two digits) separated by a slash ("/"). To indicate the year can be used four digits.

Marking above must appear consecutively in the order.

6.2.2.10 Marking cylinder packages

6.2.2.10.1 individual cylinders in a cylinder package must be marked as provisions set out in item 6.2.2.7.

6.2.2.10.2 Package refillable cylinders marked "UN" must be clear and legibly marked with the certification marks, operation and manufacturing. these brands They should be applied permanently on a metal plate, which must be affixed the frame / structure of the bundle of cylinders permanently. Except for marking "UN" packaging, the minimum size of the marks shall be 5 mm and marked "UN" the packages must be 10 mm.

6.2.2.10.3 The following marks must be applied:

(A) certification marks specified in items 6.2.2.7.2 (a), (b), (c) (D) and (e);

(B) operating the tags specified in 6.2.2.7.3 items (f) (i), (j) and mass of the total package structure and all parts permanently affixed (cylinders, manifolds, fittings and valves).

Page 69

Packets destined for the transport of acetylene dissolved (UN No.

1001) and acetylene, solvent free (no UN 3374) must present the tare value, as specified in B. clause 4.2 of ISO 10961: 2010; and

(C) The manufacturing marks specified in (n), (o) and when applicable, point (p) of item 6.2.2.7.4.

6.2.2.10.4 The marks are placed into three groups:

(A) the first group placed first (on top), will consist by manufacturing marks and must appear consecutively in sequence provided in paragraph (c) of item 6.2.2.10.3;

(B) the second group, placed in the middle, will consist of the brands operational paragraph (b) of item 6.2.2.10.3. Operating brand specified in paragraph (f) of item 6.2.2.7.3 must be immediately preceded by the operational mark specified in paragraph (i) of the same item when the latter is required;

(C) the third group, placed below the first two, will consist the certification marks and must appear consecutively in sequence provided in paragraph (a) of item 6.2.2.10.3.

6.2.3 Requirements for pressure vessels that do not carry the marking "UN"

6.2.3.1 Pressure vessels that do not conform to the requirements of item 6.2.2 shall be designed, manufactured, inspected, tested and approved in accordance with the provisions of a technical regulation approved by the competent authority and with the general requirements of paragraph 6.2.1.

6.2.3.2 Receptacles designed pressure, manufactured, inspected, tested and approved as provisions of item 6.2.3, can not be marked with the symbol "UN" on the packaging.

6.2.3.3 The manufacture of metallic cylinders, tubes, pressure drums and packages cylinders must be performed so that the minimum breaking strength ratio (pressure rupture divided by the test pressure) is:

1.50 for refillable pressure;

2.00 for vessels under non-refillable pressure.

6.2.3.4 Markings shall be in accordance with the requirements of authority competent.

6.2.3.5 Container under redemption pressure

In order to allow safe handling and disposal of receptacles pressure transported in containers under redemption pressure, the project may include equipping otherwise unused for pressure cylinders or drums, such as quick opening devices and openings in the cylindrical part.

The instructions for handling and safe use of receptacles Rescue pressure must be clearly presented in the request documentation submitted to the competent authority and shall be an integral part of the certificate of approval. In the certificate of approval, the containers should be indicated under pressure allowed for transport within the receptacles redemption pressure. A list of materials construction of all parts subjected to contact with dangerous product should also be included.

A copy of the certificate of approval shall be made available by the manufacturer the owner of the rescue vessel under pressure.

The marking of receptacles redemption pressure as item 6.2.3, must It is determined by the competent authority taking into account the provisions of appropriate marking set out in item 6.2.2.7, as appropriate. The marking shall include water capacity and pressure testing of the rescue vessel under pressure.

6.2.4 Requirements for aerosol applicators, small containers containing gas (gas cartridges) and fuel cell cartridges containing gas liquefied

Each aerosol dispenser filled or gas cartridge or cell cartridge fuel must be subjected to a test performed in a hot water bath, accordance with paragraph 6.2.4.1, or an approved alternative water bath, according to the item

6.2.4.2.

6.2.4.1 ***bath test in hot water***

6.2.4.1.1 The water temperature and the duration of the test shall be such that the pressure equals the internal pressure that would be reached at 55 ° C (50 ° C if the liquid phase does not exceed 95% of the capacity of the aerosol dispenser, stack gas cartridge or cartridge Fuel at 50 ° C). If the contents are heat sensitive, or if the aerosol dispenser, the gas cartridge or fuel cell cartridge are made of plastic material becomes pliable at the test temperature, the water temperature should be calibrated between 20 ° C and 30 ° C, but, in addition, one for each 2,000 aerosol applicators or cartridge gas or fuel cell cartridge must be tested at higher temperature.

6.2.4.1.2 There may leak content or permanent deformation

aerosol dispenser, the gas cartridge or fuel cell cartridge. However,
aerosol applicator gas cartridge or a plastic fuel cell cartridge,
it is assumed deformation by softening, provided that there is no leakage.

6.2.4.2 alternative methods

With the approval of the competent authority, they may be employed methods alternative that provide an equivalent level of safety and provided the requirements of items 6.2.4.2.1, and when applicable, the items 6.2.4.2.2 and 6.2.4.2.3.

6.2.4.2.1 Quality system

The responsible for the aerosol dispenser filling gas cartridge or fuel cell cartridge and component manufacturers shall have a quality assessment system. This system must implement procedures ensure rejection of all aerosol applicators, the cartridge or gas cartridge fuel cell with leaks or deformations and its not release or offer to transport.

The quality system must include:

a) a description of the organizational structure and responsibilities;

b) inspections and relevant tests, control, quality assurance and the process operation instructions to be used;

c) the quality records, such as inspection reports, data testing, calibration data and certificates;

564

Page 72

d) management reviews to ensure the effective operation system quality assessment;

e) the documents control process and its review;

f) the means for control of non-compliance of applicators aerosols gas cartridge or fuel cell cartridge;

g) training programs and staff qualification procedures relevant; and

h) procedures for ensuring no damage to the final product.

The discretion of the competent authority, audits should be conducted initial and periodic. These audits shall ensure the approved system is and It remains adequate and efficient. Any changes that must be approved system notified in advance to the competent authority.

6.2.4.2.2 Aerosol applicators

6.2.4.2.2.1 Pressure testing and sealing of the aerosol applicators before filling

Each empty aerosol dispenser must be subjected to a pressure equal or greater than the expected maximum pressure in the aerosol dispenser filled at 55 ° C (50 ° C if the phase Liquid do not exceed 95% of the container capacity at 50 ° C). This pressure should be at least equal to two thirds of the design pressure of the aerosol dispenser. If any aerosol dispenser show evidence of leakage at a rate equal to or greater than $3.3x10^{-2}$ mbar.ls $^{-1}$ at the test pressure, distortion or other defect, the aerosol applicator question must be rejected.

6.2.4.2.2.2 testing of aerosol applicators after filling

Before the filling, responsible for filling should ensure that the crimping equipment is properly calibrated and gas specified propellant is used.

Each applicator filled aerosols must be weighed and tested against leak. The leak detection equipment used must be sufficiently sensitive to detect at least a casting rate of 2.0×10^{-3} mbar.ls $^{-1}$ at 20 ° C.

Any aerosol dispenser bottled showing evidence of leakage,

deformation or excessive weight shall be rejected.

6.2.4.2.3 gas cartridges and fuel cell cartridges

6.2.4.2.3.1 pressure test gas cartridges and fuel cell cartridges

Each gas cartridge or fuel cell cartridge must be subjected a test pressure equal to or greater than the maximum expected pressure in the filled container 55 ° C (50 ° C if the liquid phase does not exceed 95% of the container capacity at 50 ° C). This pressure test shall be the one specified for the gas cartridge or cartridge fuel cell and may not be less than two-thirds of the cartridge design pressure gas or fuel cell cartridge and. If any cartridge or gas cartridge fuel cells show evidence of leakage at a rate greater than or equal to $3.3x10^{-2}$ mbar.ls $^{-1}$ at the test pressure, distortion or other defect, must be rejected.

6.2.4.2.3.2 leak testing of gas cartridges and fuel cell cartridges

Before filling and closing, responsible for Filling must ensure that the latches, if any, and the locking device associated they are properly closed and the specified gas is being used.

Each gas-filled cartridge or fuel cell cartridge must be controlled to ensure that the correct mass containing gas and assayed against leak. The leak detection equipment used must be sufficiently sensitive to detect at least a casting rate of 2.0×10^{-3} mbar.ls $^{-1}$ at 20 ° C.

Any gas cartridge or fuel cell cartridge having mass of gas that does not conform with the mass limits declared or shows

evidence or leak must be rejected.

6.2.4.3 Aerosols and containers of small capacity, which is required for sterility, but that may contaminate during water bath test if the competent authority to approve, are not subject to the provisions of items 6.2.4.1 and 6.2.4.2 since:

(A) contain a non-flammable gas and:

(I) contain other substances that are constituent parts of Pharmaceutical products intended for medical, veterinary or similar purpose;

(Ii) contain other substances used in the production process pharmaceutical products; or

(Iii) are used in medical, veterinary or similar applications.

(B) an equivalent level of safety is achieved in the case of use of methods alternative for leak detection and pressure resistance established by manufacturer such as helium detection and testing in a water bath statistical sample in a proportion of at least 1 in each container 2000 manufactured in a production batch; and

(C) for pharmaceutical products as provided in paragraphs (i) to (iii) paragraph "(a)", are produced under the responsibility of the competent authority health and, if so required by such authority is in conformity with the principles of Good Manufacturing Practices established by the Organization World Health Organization (WHO) [2] ;

2 *WHO Publication: "Quality assurance of pharmaceuticals. A compendium of guidelines and related materials. Volume 2: Good manufacturing practices and inspection ".*

567

CHAPTER 6.3

REQUIREMENTS FOR MANUFACTURING AND PACKAGING TEST FOR SUBSTANCES INFECTIVE OF SUBCLASS 6.2 - CATEGORY A

6.3.1 general provisions

6.3.1.1 The requirements of this Chapter apply to packagings intended for the transport of infectious substances of Class 6.2 - Category A.

6.3.2 Requirements for packaging

6.3.2.1 The requirements for packaging arranged in the following items are based on packaging commonly used as specified in item 6.1.4. In order to take into account advances in science and technology, there is no objection to the use of packaging with different specifications of established here, provided that it equal to effectiveness, accepted by the competent authority, and to make the packaging able to withstand with approval the tests described in item 6.3.5. test methods of described in this Regulation are accepted, provided they are equivalent.

6.3.2.2 Packaging must be manufactured and tested as a program quality assurance that satisfies the competent authority, so that it is guaranteed that each packaging meets the requirements of this chapter.

Notice: *ISO 16106: "Packaging - Volumes for transport of dangerous goods - Packaging, Containers for Intermediate Bulk (IBC) and Large packages for transportation of dangerous goods - Principles for the application of ISO 9001 " establish acceptable guidelines procedures that can be adopted.*

6.3.2.3 Packaging manufacturers and distributors must provide and deliver information on procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other necessary component to ensure that the volumes prepared for transport to be able to overcome all applicable tests this Regulation.

6.3.3 Codes for designating types of packaging

6.3.3.1 The codes for designating types of packagings are set out in item 6.1.2.7.

6.3.3.2 The letters "U" or "W" may follow the packaging code. The letter "U"
It means a special packaging in accordance with the requirements of
item 6.3.5.1.6. The letter "W" means that the package, despite being of the same type indicated
the code, is manufactured with different specification set out in item 6.1.4 and
It is considered equivalent in terms established in Section 6.3.2.1.

6.3.4 Marking

Note 1: *The marking indicates that the packaging which displays corresponds to a project-type passed the tests prescribed and that meets all the requirements laid down in this chapter in relation to the manufacture, but not the use of the package.*

Note 2: *The marking is intended to help packaging manufacturers, remanufacturers, packaging users, carriers and regulatory authorities and the supervisory identify its type and indicate that performance standards have been met.*

Note 3: *The marking does not always provide full details of test levels, etc., and these can be provided, for example, by reference to a certificate assay, test reports or to a register of packaging tested successfully.*

6.3.4.1 Every packaging intended for use according to this Regulation shall bear
marking durable, legible and dimensions and location that make it easily visible.
In volumes that have gross mass exceeding 30 kg, marking, or its duplicate,
It should be applied to the top or one side. Letters, numbers and symbols should have a height
of at least 12 mm, except for packages of up to 30 L or 30
kg when the height should be at least 6 mm, and in case of packaging with
of up to 5 L and 5 kg in such registration must have suitable dimensions.

6.3.4.2 A packaging that meets the requirements of this Chapter shall be marked
with:

a) the UN symbol for packaging:

This symbol should only be used to certify that a
packaging a flexible bulk container for a portable tank or
CGEM meets the requirements set and requirements in Chapters 6.1,
6.2, 6.3, 6.5, 6.6, 6.7 or 6.8;

569

b) the code for designating the type of packaging, according to the provisions of 6.1.2 item;

c) the term " CLASS 6.2 " ;

d) the last two digits of the year of manufacture of the packaging;

e) the characters that identify the certification country, as indicated the acronym used for the movement of motor vehicles in traffic International;

f) the manufacturer's name or other identification of the packaging specified by the competent authority;

g) in the case of containers that meet the requirements stated in item 6.3.5.1.6, the letter "U" should be inserted immediately following the indication required in paragraph "b".

The marking shall be applied to the sequence established in paragraphs "a" to "G" of item 6.3.4.2. Each of the elements should be clearly separated, e.g. by a bar or space, so that they are easily identifiable, as e.g. indicated in item 6.3.4.4.

6.3.4.3 Markup sample

4G / CLASS 6.2 / 01	as in item 6.3.4.2 (a), (b), (c) and (d)	For a cash new cardboard
BR / SP-9989-ERIKSSON	as in section 6.3.4.2 (e) and (f)	

6.3.5 Tests required for packaging

6.3.5.1 *Execution and frequency of testing*

6.3.5.1.1 Each project-type of packaging shall be tested according to the provisions of item 6.3.5, in accordance with the procedures established by the competent authority.

6.3.5.1.2 Before any container is put to use, its design type should It has passed the tests. A project-type of packaging is defined by design, dimensions, material and thickness, manufacturing and packing, but may include

various surface treatments. It also includes packagings which differ from the design type only by their lower design height.

6.3.5.1.3 The tests must be repeated on samples of production at intervals established by the competent authority.

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

6.3.5.1.5 The competent authority may permit the selective packaging trial differ from the design type in small respects, for example, the smaller inner packagings, inner packagings of lower net mass or packaging as drums, bags and boxes with small reduction in external dimensions.

6.3.5.1.6 any type of primary containers can be placed and transported within a secondary package without having been tested on a package rigid external, under the following conditions:

a) The rigid outer packaging shall have been approved when tested according to the item 6.3.5.2.2 fragile primary receptacles (e.g., glass);

b) the total gross mass of the primary receptacles shall not more than half the gross mass of primary receptacles used in the drop test in paragraph "a";

c) the thickness of the cushioning material, between primary containers, and between them and the outside of the secondary packaging shall not be lower than the originally tested packaging adopted. If the test original has been done with a single primary container, the thickness of cushioning material between the primary containers, should not be less than the original thickness of the cushioning material between the face outside of the secondary packaging and the primary receptacle in the test original. When smaller primary receptacles or are used in fewer (in comparison with those used in the drop test) sufficient cushioning material should be added for fill the gaps;

d) The rigid outer packaging shall have passed the test stacking referred to in item 6.1.5.6 when empty. Total mass

identical packages shall be based on the combined mass of inner packagings used in the drop test in paragraph "a";

e) internal liquid containers must be completely involved with absorbent material in sufficient quantity to absorb all the liquid contents of the containers;

f) If the rigid outer packaging is intended to contain containers internal to liquids and is not leakproof, or is intended to contain inner receptacles for solids and is not dust-proof, should be taken to prevent leakage of contents, using a sealing coat, a plastic bag or other means

equally effective containment;

g) in addition to the marking required in paragraphs "a" to "f" of item 6.3.4.2, the packages must be marked according to item "g" of item 6.3.4.

6.3.5.1.7 The competent authority may at any time require proof, by testing according to this Regulation of the manufactured packaging series meet the same requirements as the design type tested.

6.3.5.1.8 Since the validity of the test results is not affected and the approval of the competent authority can be performed several tests with the same sample.

6.3.5.2 Preparation of packagings for testing

6.3.5.2.1 Samples of each packaging shall be prepared for carriage unless in the case of liquid or solid infectious substances, which must be replaced by water or when packaging is required to -18 ° C, by water / antifreeze. each container primer should be filled with at least 98% of its capacity.

Notice: *The term water includes water / antifreeze solutions with relative density Minimum 0.95 for the tests at -18 ° C .*

6.3.5.2.2 Tests and number of samples required

Tests required for packaging types

Note 1: In the case of manufacturing of primary containers using two or more materials, materials more susceptible to damage determines the appropriate test.

Note 2: The material of the secondary packaging is not considered when selecting the testing or preparation for the test.

Explanation for the use of the table

If the package to be tested consist of a cardboard outer box with a primary plastic container, five samples must be submitted to the test Water spray (see section 6.3.5.3.6.1) before the drop test and five samples They must be packed at -18 ° C (see item 6.3.5.3.6.2) before the drop test. If the packaging is intended to contain dry ice, another sample must submit to the test down 5 times, after preparation according to the item 6.3.5.3.6.3.

Packaging prepared as for carriage shall be subjected to tests arranged in items 6.3.5.3 and 6.3.5.4. For outer packagings, the headings of each column of the table refers to cardboard or other similar material whose performance can be affected quickly due to moisture, as well as plastics that can become

573

Page 81

brittle at low temperatures and other materials such as metal, which are not affected by moisture or temperature.

6.3.5.3 Drop test

6.3.5.3.1 Samples shall be subjected to free-fall tests over a rigid, non-resilient, solid, flat, horizontal surface from a height of nine meters, in accordance with paragraph 6.1.5.3.4.

6.3.5.3.2 If the samples are box format, the test shall consist of five falls in sequence in the following positions:

i. on the base;

ii. on the lid;

iii. on the higher side;

iv. on the smaller side;

v. on a corner.

6.3.5.3.3 When the samples present drum shape, should be three drops subjected in sequence the following positions:

saw. Diagonally on the rim of the lid, with the center of gravity on the vertical of the point of impact;

vii. Diagonally on the rim of the base;

viii. on the side.

6.3.5.3.4 Although the sample must be submitted to falls in the required orientation, it is assumed, for aerodynamic reasons, the impact does not happen in this direction.

6.5.3.3.5 Upon completion of the test sequence, there may be leakage content (s) of container (s) primer (s) that is (m) remain secure (s) the material absorbent in the secondary packaging.

6.3.5.3.6 Special preparation of samples for the drop test

6.3.5.3.6.1 Cardboard - water spray test

external cardboard packaging: The specimen shall be subjected to a water spray test that simulates exposure to rainfall of approximately 5 cm

hour for at least 1 hour. In sequence, it should be subjected to the test described in item 6.3.5.3.1.

6.3.5.3.6.2 Plastics - packaging cold

primary receptacles or outer plastic containers: The temperature sample and its content must be reduced to -18 ° C or less for a period of at least 24 hours, and 15 minutes to be removed this atmosphere, the sample should be subjected to the test referred to in item 6.3.5.3.1. Where the sample contains ice dry, the period should be reduced to 4 hours.

6.3.5.3.6.3 Packagings intended to contain dry ice - Additional drop test

In the case of packages intended to contain dry ice, an additional test to that provided for in item 6.3.5.3.1 and, when appropriate, in 6.3.5.3.6.1 or 6.3.5.3.6.2 items, It should be performed. A sample must be stored until all the dry ice is dissipated and then the sample must be submitted to fall in one of the guidelines provided in item 6.3.5.3.2, most likely resulting damage to the packaging and failure of the test.

6.3.5.4 Drilling Test

6.3.5.4.1 Packages with up to 7 kg gross mass

Samples should be placed on a hard, flat surface. An cylindrical steel rod with a mass of at least 7 kg a 38 mm diameter and end impact with a radius of up to 6 mm (see Figure 6.3.1) should be dropped vertical free fall from a height of 1 m, measured from the impact end of the bar the impact surface of the sample. A sample should be placed on its base. An second sample shall be placed perpendicular to the first. In each one cases, the steel rod must impact the primary container. After each impact, is acceptable penetration of the secondary packaging, provided there is no leakage contents of the primary container.

6.3.5.4.2 Packages with a gross mass exceeding 7 kg

Samples should fall vertically onto the end of a steel bar cylindrical. The rod should sit vertically on a hard, flat surface. This bar must have the following dimensions: diameter of 38 mm and radius the upper end edge of up to 6 mm (see Figure 6.3.1). The free bar height should be at least equal to the distance between the primary receptacle and the outer surface

the outer packaging and must be the distance of 200 mm minimum. Initially, must be dropping a sample vertically in free fall from a height of a meters, measured from the top of the steel rod. Secondly, you should drop a second sample of the same height in a perpendicular direction to that used in the first. In each case, the package must be oriented so that the steel rod can penetrate (s) the container (s) primer (s). After completion of each test, it is acceptable penetration of the secondary packaging, provided there is no leakage content (s) of container (s) primer (s).

Figure 6.3.1

6.3.5.5 Test Report

6.3.5.5.1 It must be issued a Test Report, which should be available to users, containing at least the following information:

1. Name and address of the establishment where they performed the test;

2. Name and address of applicant (where applicable);

3. Specific identification of the test report;

4. Date of the test report;

5. Manufacturer of the packaging;

576

Page 84

6. Description of the design type of packaging (eg dimensions, types materials, closures, thickness, etc.), including the method of Manufacturing (e.g., blow molding) and may also include drawing (s) and photograph (s);

7. Maximum capacity;

8. Content of the test;

9. Description of tests and results;

10. Signature, name and title of the person responsible.

6.3.5.5.2 The test report shall contain statements that the packaging prepared for transport was tested according to the requirements relevant to this chapter, further indicating that the use of other methods or Packaging components can invalidate it. A copy of the test report should be available to the competent authority.

577

CHAPTER 6.4

REQUIREMENTS FOR CONSTRUCTION, TESTING AND APPROVAL

VOLUMES AND CLASS MATERIASI 7 - RADIOACTIVE

6.4.1 For purposes of manufacturing and packaging assays and volumes for transport risk grade material 7 - radioactive, must be attended to the provisions of transport regulations established by the National Nuclear Energy Commission - CNEN.

CHAPTER 6.5

REQUIREMENTS FOR MANUFACTURING AND TEST

INTERMEDIATE BULK CONTAINERS FOR (IBCs)

6.5.1 general provisions

6.5.1.1 **Application field**

6.5.1.1.1 The requirements of this Chapter apply to IBCs intended for the carriage of certain dangerous goods. The provisions lay down general requirements for multimodal transport and stipulate some requirements applicable to land transport.

6.5.1.1.2 Exceptionally the competent authority may approve IBCs and their service equipment that does not fully conform to the requirements set forth herein, but having acceptable alternatives. Furthermore, in order to take into account the progress of science and technology, the competent authority may accept solutions alternatives where such offer safety conditions at least equivalent as regards compatibility with the properties of the substances transported, and or greater as regards the impact resistance, the load and fire.

6.5.1.1.3 *Reserved.*

6.5.1.1.4 Manufacturers and distributors of IBCs shall provide information concerning the procedures to be followed and a description of the types and dimensions of closures (including required gaskets) and any other components needed to ensure that IBCs as presented for transport are capable of being approved in the applicable performance tests presented in this Chapter.

6.5.1.1.5 Intermediates for Bulk Containers (IBCs) can not generate or accumulate static electricity enough so that a discharge can activate, by means of initiation, ignition or operation, explosive substances or articles and / or flammable products packed.

6.5.1.2 ***settings***

Body (for all categories of IBCs other than composite IBCs): the container itself including openings and their locks, but not including equipment of service;

Handling device (for flexible IBCs): means any strap, handle or eyelet IBC structure connected to the body or formed by a continuation of the body material IBC;

Service Equipment : comprises the filling and desenvase and,

according to the category of IBC, pressure relief devices, venting, safety, heating and thermal insulation and measuring instruments;

Structural equipment (for all categories of IBCs other than flexible): covers reinforcing members, fixing, handling and protection or stabilization of the body, including The base pallet, IBC in the case of compounds with an inner plastic container, IBCs cardboard and wood;

MPGM: is the sum of the mass of the IBC of its equipment structural and service and the maximum permissible net mass;

Plastic : when used in relation to the internal containers IBCs compounds, include other polymeric materials such as, for example, rubber, etc;

Woven plastics (for flexible IBCs): it is a material made with strips or monofilaments appropriate plastic material;

Protegid the (for metal IBCs): means be provided with additional protection against impact. This protection can be constituted for example by a double wall or various layers, or a chassis with a lattice frame.

6.5.1.3 Categories of IBCs

6.5.1.3.1 IBC metal : it consists of a metal body together with Structural and appropriate service equipment.

6.5.1.3.2 *IBC flexible* : it consists of a body made of film, fabric, other material Flexible, or combination of these materials, and if necessary, a liner or coating Internal along with the service equipment and handling devices appropriate.

Page 88

6.5.1.3.3 Rigid plastic IBC : consists of a hard plastic body and can be fitted with structural equipment together with appropriate service equipment.

6.5.1.3.4 *IBC compound* : it comprises a structural device, in the form of rigid outer frame surrounding a plastic inner container, together with any structural equipment or service. Are constructed so that the frame external and internal container once assembled, become an integrated unit, packaged, stored, transported and emptied as such.

6.5.1.3.5 Cardboard IBC : it consists of a cardboard body with or without caps Background and separated top with an inner lining, if necessary (but unpackaged internal), and structural and appropriate service equipment.

6.5.1.3.6 Wooden IBC : it consists of a wooden body, rigid or demountable an internal lining (but no inner packaging), and structural equipment and appropriate service.

6.5.1.4 IBCs designation code

6.5.1.4.1 The code consists of two Arabic numerals as specified in item "a" followed by one or more capital letters as specified in paragraph "b" followed, when required, by an Arabic numeral indicating the category of the IBC.

The)

KIND	FOR SOLID OR LOADED DOWNLOADED		FOR LIQUIDS
	GRAVITY	UNDER PRESSURE EXCEEDING 10 kPa (0.1 Pub)	
Hard	11	21	31
Flexible	13	-	-

b) to identify the material the following letters are used:

THE. Steel (all types and surface treatments);

B. Aluminum;

W. Natural wood *;*

581

Page 89

D. Plywood;

F. reconstituted wood;

G. Cardboard;

H. plastic material;

L. textiles;

M. Paper, multiwall;

N. Metal (other than steel or aluminum).

6.5.1.4.2 In the case of composite IBCs, the second position of the code should be occupied by two capital letters in sequence, in Latin characters. The first should indicate the material of the inner receptacle and the second the external packaging material IBC.

582

Page 90

6.5.1.4.3 The types and codes of IBCs are as follows:

MATERIAL	CATEGORY	CODE	ITEM
Metal	For solid; loaded or discharged by gravity	11A	6.5.5.1
A. Steel	For solid; loaded or discharged under pressure	21A	
	for liquid	31A	
B. Aluminium	For solid; loaded or discharged by gravity	11B	
	For solid; loaded or discharged under pressure	21B	
	for liquid	31B	
In other	For solid; loaded or discharged by gravity	11N	
	For solid; loaded or discharged under pressure	21N	
	for liquid	31N	
Flexible	Woven plastics without coating or liner	13H1	6.5.5.2
H. Plastic	Plastic, coated	13H2	
	Woven plastic, with liner	13H3	
	Woven plastic, coated and liner	13H4	
	plastic film	13H5	
L. Textile	Without coating or liner	13L1	
	lined	13L2	
	with lining	13L3	
	Coated and with liner	13L4	
M. Paper	multiwall	13M1	
	Multiwall, water resistant	13M2	

583

H. Plastic Hard	For solid; loaded or discharged by gravity; with structural equipment	11H1	6.5.5.3
	For solid; loaded or discharged by gravity; freestanding	11H2	
	For solid; loaded or discharged under pressure; with structural equipment	21H1	
	For solids, loaded or discharged under pressure; freestanding	21H2	
	For liquids; with structural equipment	31H1	
	For liquids; freestanding	31H2	
HZ. Compound with container Internal in Plastic (*)	For solid; loaded or discharged by gravity; with hard plastic inner container	11HZ1	6.5.5.4
	For solid; loaded or discharged by gravity; with flexible plastics inner receptacle	11HZ2	
	For solid; loaded or discharged under pressure; with hard plastic inner container	21HZ1	
	For solid; loaded or discharged under pressure; with flexible plastics inner receptacle	21HZ2	
	For liquids; with hard plastic inner container	31HZ1	
	For liquids; with flexible plastics inner receptacle	31HZ2	
G. Cardboard	For solid; loaded or discharged by gravity	11G	6.5.5.5

wood			6.5.5.6
C. Wood Natural	For solid; loaded or discharged by gravity; with inner liner	11C	
D. Compensated	For solid; loaded or discharged by gravity; with inner liner	11D	
F.Madeira reconsti-lished	For solid; loaded or discharged by gravity; with inner liner	11F	

(*) The letter Z should be replaced by a capital letter, according to item "b" of item 6.5.1.4.1, corresponding to the nature of the material employed in the outer casing.

584

6.5.1.4.4 The letter "W" may be in the IBC code sequence, meaning that the IBC, although of the same type indicated by the code, is manufactured to different specifications those included in item 6.5.5 and is considered equivalent in accordance with the requirements item 6.5.1.1.2.

6.5.2 markings

6.5.2.1 primary marking

6.5.2.1.1 Each IBC manufactured and intended for use prescribed in this Regulation should display markings durable, legible and easily visible. Letters, numbers and symbols must be at least 12 mm high and shall show:

a) the UN symbol for packaging:

This symbol can not be used for any purpose other than to indicate a container, a container for flexible bulk, a tank laptop or CGEM meet the requirements of Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8. In the case of metal IBCs on which the mark is stamped or embossed, will be admitted to application letters capital letters "UN" instead of the symbol;

b) the code designating the type of IBC, as provided in item 6.5.1.4;

c) a capital letter indicating the packaging of groups for which the design type has been approved:

(I) X for packing groups I, II and III (IBCs only for solid);

(Ii) Y for packing groups II and III;

(Iii) Z only for packing group III;

d) the month and year (last two digits) of manufacture;

e) the characters identifying the country authorizing the placing of the brand, indicated by the acronym used in international traffic to identify motor vehicles;

f) the name or symbol of the manufacturer and other identification of the IBC as

specified by the competent authority;

g) the load of stacking test in kg. For IBCs not designed for stacking, the figure should be placed "0";

h) The maximum permissible gross mass in kilograms.

The marking shall be applied in the sequence shown in paragraphs "a" to "h". Each of the marking elements required by paragraph 6.5.2.2 shall be separated by example by means of a bar or a space in order to ensure that all parts of the mark to be easily identified.

6.5.2.1.2 *Examples of markings for various types of IBC, as the letters "a" through "h" above:*

11A / Y / 02 99 NL / Mulder 007 5500/1500	For a metal IBC for solids discharged by gravity and made of steel / to Packing Groups II and III / manufactured in February, 1999 / authorized by the Netherlands / manufactured by Mulder according to a project-type to which the competent authority has allocated serial number 007 / load the stacking test in kg / the maximum permissible gross mass kg.
13H3 / Z / 03 01 F / Meunier 1713 0/1500	For a flexible IBC for the discharged solids, for example, gravity and made of plastic, coated / non designed to stacking and authorized to carry Group products Package III.
31H1 / Y / 04 99	For a rigid plastic IBCs for liquids, made of plastic

GB / 9099 10800/1200	structural equipment dimensioned to withstand stacking load and authorized to carry products for packing groups II and III.
31HA1 / Y / 05 01 D / Muller 1683 10800/1200	For a composite IBC for liquids with internal container hard plastic and outer casing of steel and authorized to carry products for packing groups II and III.
11C / X / 01 02 S / Aurigny 9876 3000/910	For a wooden IBC for solids with an inner lining and authorized to pack solids of packing groups I, II and III.

Page 94

6.5.2.2 additional marking

6.5.2.2.1 In addition to the markings required in 6.5.2.1, every IBC shall submit the following information, which can be placed in a corrosion resistant plate, permanently fixed in place easily accessible for inspection:

additional marking	**IBC Category**				
	Metallic	**Hard Plastic**	**Compound**	**cardboard**	**Wood**
Capacity in liters [a], 20 ° C	X	X	X		
The tare mass in kg [a]	X	X	X	X	X
Test pressure (gauge), kPa or bar [a] , if applicable		X	X		
maximum filling / discharge pressure, kPa or bar [a] , if applicable	X	X	X		
Body material and its minimum thickness, in mm	X				
Date of last leakproofness test, if applicable (month and year)	X	X	X		
Date of last inspection (month and year)	X	X	X		
Number of manufacturer's serial	X				
Maximum stacking load allowed [b]	X	X	X	X	X

a *The unit used shall be indicated.*

b See the section 6.5.2.2.2. This additional marking shall apply to all IBCs manufactured, repaired or remanufactured from December 31, 2019.

587

Page 95

6.5.2.2.2 The maximum capacity stacking applicable when the IBC is in use must be presented in the form of one of the following symbols, which should be durable and clearly visible:

Figure 6.5.1 **Figure 6.5.2**

The minimum size must be 100 mm x 100 mm. The letters and numbers indicating mass should have a height of at least 12 mm. The area within the printing marks indicated by arrows must be square. When the dimensions are not specified, all features shall be in approximate proportion to those shown. The mass indicated above the symbol shall not exceed the load imposed during the design type test (see section 6.5.6.6.4) divided by 1.8.

Notice: *The provisions of item 6.5.2.2.2 apply to all IBCs manufactured, reconditioned or remanufactured from December 31, 2019.*

6.5.2.2.3 In addition to the marking required by paragraph 6.5.2.1, flexible IBCs may display a pictogram indicating recommended lifting methods.

6.5.2.2.4 The inner receptacle of composite IBCs manufactured after *31 December 2019* must contain the marking indicated in letters "b", "c" and "d", where the date is that manufacturing of internal plastic containers, "e" and "f" of item 6.5.2.1.1, in

the sequence. In addition, the marking must be durable, legible and located in location that is readily visible when the inner container is within the frame external. The UN marking can not be applied.

588

Page 96

The date of manufacture of the inner plastic containers can also be marked on the container itself, with the other marking. In such a case, the 2 digits of the year in Primary marking and internal clock circle must be identical. An example of proper marking method is as follows:

Notice: *Other methods which have the minimum information required to durable, visible and legible form will be accepted.*

6.5.2.2.5 When the compound IBC is designed so that the outer frame is disassembled for transport when empty (e.g., when the return of the IBC original shipper for reuse purposes), each of the parts must be disassembled marked with the month and year of manufacture, the name or symbol of the manufacturer and other identification of the IBC as specified by the competent authority (see item "f" of item 6.5.2.1.1).

6.5.2.3 Marking of Conformity Identification Seal

6.5.2.3.1 Manufacturers, assemblers and IBCs importers must obtain authorization to use the Conformity Identification Seal, according to the requirements established by Inmetro. The Conformity Identification Seal indicates that IBCs correspond to the design type indicated by the marking "UN", pass the test provided for in the assessment regulations compliance.

6.5.2.3.2 The *Conformity Identification Seal,* established by Inmetro must be placed on the same side of the "UN" marking, in an easily visible place and not prevents viewing of other markings.

Notice: The Conformity Identification Seal required in section 6.5.2.3 do not apply to IBCs provided in Section 4.1.1.1.1, except when they are subjected to process reconditioning or remanufacturing in the country.

589

Page 97

6.5.2.4 Marking of remanufactured IBCs compounds (31HZ1)

The marking specified in items 6.5.2.1.1 and 6.5.2.2 should be removed from IBC original, or made permanently illegible and new markings shall be applied to an IBC remanufactured in accordance with this Regulation .

6.5.2.4.1 Example of marking for remanufactured composite IBCs

31HZ1 / Y 05 01 D / Muller 1683 10800/1200 / REFAB	IBC remanufactured made with hard plastic inner container and outer frame of steel and allowed to pack products packaging groups II and III.

6.5.3 Requirements relating to manufacturing

6.5.3.1 general requirements

6.5.3.1.1 IBCs shall be resistant to deterioration caused by the environment external or be adequately protected to face it.

6.5.3.1.2 The IBCs shall be constructed and closed so that no part of its contents can escape under normal conditions of transport, including the effects of vibration, temperature variations, humidity or pressure.

6.5.3.1.3 IBCs and their closures shall be made of compatible materials with the content, or be internally protected, so that they are not susceptible to:

a) suffer attack content, making their use dangerous;

b) cause reaction or decomposition of content, formation of compounds harmful or dangerous to the IBC.

6.5.3.1.4 Gaskets, where used, must be made of materials not subject to, attack IBC content.

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

6.5.3.1.6 IBCs, their attachments and their service and structural equipment should They are designed to withstand without loss of contents, the internal pressure and efforts arising from normal handling and transport operations. The IBCs for the stacking shall be designed for this purpose. lifting devices or fixing must be strong enough to withstand normal

Page 98

handling and transport without gross distortion or failure and shall be positioned

so it does not cause undue strain on any part of the IBC.

6.5.3.1.7 When the IBC consists of a body within a frame, it should be constructed that:

a) the body does not rub the frame so as not to suffer damage due to friction;

b) the body is retained within the interior of the frame;

c) the equipment components are set so that there may be damaged if the connections between body and frame allow expansion or relative motions.

6.5.3.1.8 If the IBC is equipped with a discharge valve at the bottom, it should be maintained in the closed position and the entire exhaust system should be protected damage. Valves fitted with locks lever should have protection accidental opening and the positions "open" and "closed" should be easily identifiable. For IBCs intended to contain liquids shall also be provided, a second means of closing the discharge opening, for example, a flange or similar device.

6.5.3.1.9 If the materials used in the manufacture of the body, caps, closures and accessories are not compatible with the contents to be transported, it must be applied treatment or appropriate internal coating, which must maintain its properties protection under normal conditions of transport. In this case, when the packaging is for the transport of flammable products, the coating composition must contain additives able to prevent the buildup of static electricity without giving effect about adverse chemical or physical properties of the packing material. devices antistatic may be employed provided they do not show adverse effect on chemical or physical properties of the packing material.

6.5.4 Testing, certification and inspection

6.5.4.1 *Quality control:* the IBCs shall be manufactured and tested in a quality control program which satisfies the competent authority, ensure that each manufactured IBC meets the provisions of this Chapter.

Note : *ISO 16016: 2006 "Packaging - Transport packages for dangerous goods - Dangerous Goods packagings, intermediate bulk containers (IBCs) and large*

packagings - Guidelines for the application of ISO 9001 "contains acceptable guidelines on procedures that can be adopted.

6.5.4.2 *Test requirements:* IBCs are subject to testing for projects-type and, where applicable, to initial and periodic tests in accordance with paragraph 6.5.4.4 **.**

6.5.4.3 *Certification* : for each design type of IBC shall be issued a certificate and every IBC shall be marked (as indicated in item 6.5.2), proving that the project-

type, with their equipment, it was approved in the required tests and had their conformity successfully evaluated by the competent authority.

6.5.4.4 Inspection and testing

***Note** : see also item 6.5.4.5 for testing and inspection of IBCs reconditioned (repaired or refurbished).*

6.5.4.4.1 All IBC metal, hard plastic and composite IBC should be inspected at the discretion of the competent authority:

a) before being put into use (including after reconditioning) and then on at intervals not exceeding five years, as:

(I) compliance with the design type including marking;

(Ii) its internal and external conditions;

(Iii) proper functioning of service equipment;

Thermal insulation, if any, need be removed only when it is necessary to properly inspect the body of the IBC;

b) at intervals not exceeding two and a half years, verifying:

(I) external conditions;

(Ii) proper functioning of service equipment;

Thermal insulation, if any, need be removed only when it is necessary to properly inspect the body of the IBC.

Each IBC shall correspond in all respects to its design type.

6.5.4.4.2 All metal IBC, rigid or composite plastics intended to contain liquids or solids that are packaged under pressure and should be emptied subjected to a tightness test at least as effective as the assay described in item 6.5.6.7.3 and meet the test level indicated in item 6.5.6.7.3:

a) before being used in the first transmission;

b) at intervals not exceeding two and a half.

For this test the IBC must have installed closure device lower. The inner receptacle of a composite IBC may be tested without the coating External, as long as the test results are not affected.

6.5.4.4.3 The IBC owner should keep a record of each inspection and test carried out at least until the date of the next inspection or test. The report shall include the results of the inspection and test and identify the body accredited by competent authority which carried out the inspection and testing (see also the requirements for the marking of item 6.5.2.2.1).

6.5.4.5 reconditioned IBCs (repaired and refurbished)

6.5.4.5.1 If an IBC becoming defective as a consequence of an impact (for example, an accident) or any other cause, it should be reconditioned so to remain in compliance with the design type. The bodies of plastic IBCs hard and the inner receptacles of composite IBCs that are impaired, They should be replaced with new ones containing the marking required.

6.5.4.5.2 In addition to all the requirements for the testing and inspection stipulated this Regulation, where an IBC is refurbished, it must be submitted to all the requirements for testing and inspection established in section 6.5.4.4 and must be issued the corresponding report.

6.5.4.5.3 As established by the competent authority, the reconditioner must obtain permission for the printing durably, in sequence to UN marking of the design type of the manufacturer, the complementation on the reconditioning in order to demonstrate:

a) the characters that identify the country where it was performed reconditioning;

b) the name or authorized symbol of the party held reconditioning;

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

6.5.4.5.3.1 Markup sample of reconditioned IBCs:

31HZ1 / Y 05 01 D / Muller 1683 10800/1200 / R	IBC compound refurbished for solids with inner container of hard plastic and external steel frame, and authorized to pack products of packaging groups II and III.
31HZ1 / Y 05 01 D / Muller 1683 10800/1200 / NR	IBC compound refurbished for liquids with inner container of hard plastic and external steel frame, and authorized to pack products of packaging groups II and III.

6.5.4.5.4 Tests and inspections required in item 6.5.4.5.2 shall comply with the requirements of periodic tests and inspections, five and two and a half years, respectively.

6.5.4.5.5 The competent authority may, at any time, which proving through tests specified in this Chapter, that IBCs meet requirements of the tests applicable to the design type.

6.5.5 Specific requirements for IBCs

6.5.5.1 Specific requirements for metal IBCs

6.5.5.1.1 These requirements apply to metal IBCs intended for the carriage solids and liquids. There are three categories of metal IBCs:

a) for solids, filled or emptied by gravity (11A, 11B and 11N);

b) for solids, filled or emptied gauge pressure greater than 10 kPa (0.1 bar) (21A, 21B, and 21N); and

c) for liquids (31A, 31B, and 31N).

6.5.5.1.2 The bodies should be made of suitable ductile metal materials, with weldability fully demonstrated. Welds should be perfectly performed and must provide full security. The performance at low temperatures should be taken into consideration when appropriate.

6.5.5.1.3 Precautions should be taken to avoid damage from action Galvanic resulting from the juxtaposition of dissimilar metals.

6.5.5.1.4 Aluminium IBCs intended for the carriage of flammable liquids do not may have moving parts such as lids, closures, etc., made of unprotected steel,

Page 102

likely to corrode and can cause dangerous reaction to chafe or repetitive shocks with aluminum.

6.5.5.1.5 Metal IBCs shall be made of metals which meet the following requirements:

a) in the case of steel, the elongation at fracture, in%, shall not be less 10,000 / Rm with an absolute minimum of 20%, where: Rm = Minimum guaranteed strength of the steel to be used tensile, N / mm^2 ;

b) in the case of aluminum, the elongation at fracture, in%, shall not be less than 10,000 / 6Rm with an absolute minimum of 8% where Rm = Minimum guaranteed strength to aluminum traction to be used, N / mm^2 .

The samples used to determine the elongation at break They should be taken transversely to the direction of rolling and must be ensured that:

$$L_0 = 5d \text{ or}$$

$$U_0 = 5{,}65\sqrt{A}$$

On what:

U_0 = specimen reference length before the test

d = Diameter

A = cross-section of the specimen

6.5.5.1.6 Minimum thickness of the walls:

(A) for a reference steel having a product $rm \times The_{0} = 000.10$, a wall thickness can not be less than:

Capacity (C) in liter	Wall thickness (T) in mm			
	Types 11A, 11B, 11N		Types 21A, 21B, 21N, 31A, 31B, 31N	
	Non-protected	Protected	Non-protected	Protected
C ≤ 1000	2.0	1.5	2.5	2.0
1000 < C ≤ 2000	T = C / 2000 + 1.5	T = C / 2000 + 1.0	T = C / 2000 + 2.0	T = C / 2000 + 1.5
2000 < C ≤ 3000	T = C / 2000 + 1.5	T = C / 2000 + 1.0	T = C / 1000 + 1.0	T = C / 2000 + 1.5

On what:

595

Page 103

The $_0$ = minimum elongation (in%) of the reference steel to be used in break under tensile stress (see section 6.5.5.1.5);

b) in the case of different metals reference steel defined in subparagraph "A", the minimum wall thickness should be determined by the following equivalence formula:

On what:

and $_1$ = required thickness equivalent of the metal wall to be used (Mm)

and $_0$ = minimum required thickness of the wall for the reference steel (in mm)

Rm $_1$ = minimum guaranteed resistance to metal voltage to be used (N / mm ^{2}) (see point (c))

A $_1$ = minimum elongation (in%) of the metal being used at break under tension (see Section 6.5.5.1.2)

However, in any case, the wall thickness can be below 1.5 mm;

c) to calculate the purposes described in paragraph "b", the force undervoltage Guaranteed metal to be used (Rm $_1$) should be the minimum value According to the standards, national or international, adopted for material. However, in the case of austenitic steel, the minimum value Specified for Rm according to the standards for material, it may

be increased by 15% when a greater value on certificate
certificate of inspection of material. When there are no standards for
material in question, the value of Rm shall be the minimum value attested
the inspection certificate of the material.

6.5.5.1.7 pressure relief requirements: IBCs for liquids shall be capable

releasing a sufficient amount of fumes in case of fire engulfment that
ensure not occur rupture of the body. This can be achieved by the use of devices
Conventional pressure relief or other manufacturing techniques. The pressure
begins the discharge process should not exceed 65 kPa (0.65 bar) and no lower
the total head pressure produced in the IBC (i.e. the sum of the vapor pressure
the filling substance plus the partial pressure of air or other inert gases,
least 100 kPa (1 bar)) at 55 ° C, determined based on the maximum degree of filling
defined in item 4.1.1.4. The required relief devices shall be installed in
the vapor space.

6.5.5.2 Specific requirements for flexible IBCs

6.5.5.2.1 These requirements apply to flexible IBCs of the following types:

13H1 woven plastics without coating or liner

13H2 woven plastics with liner

13H3 woven plastics, coated

13H4 woven plastics with liner and coating

13H5 plastic film

13L1 textile without coating or liner;

13L2 textile with liner;

13L3 textile, coated;

13L4 textile, coated and liner;

13M1 paper, multiwall;

13M2 paper, multiwall, water resistant.

Flexible IBCs are intended only for the transport of solids.

6.5.5.2.2 The body must be made of suitable materials. The strength of the
material used and the manufacturing of the IBC shall be appropriate to its capacity and its use
that is intended.

6.5.5.2.3 All materials used in flexible IBCs manufacturing types
13M1 and 13M2, after complete immersion in water for at least 24 hours, shall,
at least 85% of the tensile strength measured prior to conditioning equipment
to stabilize at a relative humidity of 67% or less.

6.5.5.2.4 Amendments must be made by stitching, heat sealing, gluing or any equivalent method. The ends should be amended and strengthened.

6.5.5.2.5 Flexible IBCs shall provide adequate resistance to aging and to degradation caused by ultraviolet radiation or the climatic conditions or the contained substances, remaining therefore in conditions appropriate to the use to which it intended.

6.5.5.2.6 When necessary to protect the flexible plastic IBCs against ultraviolet radiation, this protection should be achieved by adding carbon black smoke or Other suitable pigments or inhibitors. Such additives must be compatible with the content and remain effective throughout the life of the body. When there are job black-of smoke or other pigments or inhibitors other than those used in the manufacture of the tested design type, may be exempted new tests if the black-de- content smoke, pigment or inhibitor not adversely affect the physical properties of manufacturing equipment.

6.5.5.2.7 the additives can be incorporated body material to increase its resistance to aging or to serve other purposes, provided that it does not affect adversely the physical or chemical properties of the material.

6.5.5.2.8 materials recovered from used containers can not be used in the manufacture of IBC bodies, but admit the use of waste cuttings or the manufacturing process itself. This does not preclude the reuse of component parts, as accessories bases or pallets, provided that such components have not been somehow damaged during previous use.

6.5.5.2.9 When the IBC is full, the ratio of height and width not must be greater than 2: 1.

6.5.5.2.10 The coating must be of suitable material. The strength of the material employee and coating manufacturing shall be appropriate to the capacity and IBC the use for which it is. Joins and closures shall be dust-proof and capable of withstanding pressures and impacts that can occur during normal conditions of handling and transport.

6.5.5.3 Specific requirements for rigid plastics IBCs

6.5.5.3.1 These requirements apply to IBCs intended for the carriage of solid or liquid. Rigid plastics IBCs are of the following types:

11H1 fitted with structural equipment designed to withstand all load of stacking; for solids, filled or emptied by gravity;

11H2 freestanding, for solids, filled or emptied by gravity;

21H1 fitted with structural equipment designed to withstand all load of stacking; for solids, filled or emptied under pressure;

21H2 freestanding, for solids, filled or emptied under pressure;

31H1 fitted with structural equipment designed to withstand all load of stacking; for liquids;

31H2 freestanding, for liquids.

6.5.5.3.2 The body shall be manufactured from suitable plastic material, with known specifications and must have adequate strength to their ability and to use the it is intended. The material shall be adequately resistant to aging and degradation caused by the substance contained or, where relevant, by radiation ultraviolet. His performance at low temperatures should be taken into account, if case. The permeation of the substance can not be a risk when able normal transport.

6.5.5.3.3 When there is need for protection against ultraviolet radiation, this It must be provided by the addition of lampblack or other pigments or inhibitors appropriate. Such additives must be compatible with the contents and remain effective during the useful life of the body. In the case of use of lampblack or other pigments or inhibitors other than those used in the manufacture of the tested design type, can be exempted from further testing if the content of carbon black smoke or other pigments or inhibitors do not adversely affect the physical properties of the material of manufacture.

6.5.5.3.4 the additives can be incorporated body material to increase its resistance to aging or to serve other purposes, provided that it does not affect adversely the physical or chemical properties of the material. When IBCs are for the transport of flammable products should be used in its composition

additive or other suitable device capable of preventing the buildup of static electricity, without displaying adverse effect on the chemical or physical properties of the material IBC.

6.5.5.3.5 Except residues or regrind from the same manufacturing process, any material used can be employed in the manufacture of

rigid plastics IBCs.

6.5.5.4 Specific requirements for composite IBCs with inner containers plastic

6.5.5.4.1 These requirements apply to composite IBCs for the carriage solids and liquids of the following types:

11HZ1 composite IBCs with a rigid plastics inner receptacle; for solids, filled or emptied by gravity;

11HZ2 Composite IBCs with a flexible plastics inner receptacle; for solids, filled or emptied by gravity;

21HZ1 composite IBCs with a rigid plastics inner receptacle; for solids, filled or emptied under pressure;

21HZ2 Composite IBCs with a flexible plastics inner receptacle; for solids, filled or emptied under pressure;

31HZ1 composite IBCs with a rigid plastics inner receptacle; for liquid;

31HZ2 Composite IBCs with a flexible plastics inner receptacle; intended to liquids.

The code shall be completed by replacing the letter Z by a letter capital, according to item "b" of item 6.5.1.4.1 to indicate the nature of the material employed in the outer frame.

6.5.5.4.2 The inner container is not intended to perform a containment function without its outer casing. It is understood as inner container "hard" one who retains its general shape when empty without closures and placed without protection outer frame. All internal container that is not "rigid" should be considered "flexible".

6.5.5.4.3 The outer casing normally consists of rigid material formed to protect the inner container damage during handling and transport, but It is not intended to perform the containment function. Includes a base pallet when appropriate.

6.5.5.4.4 An IBC compound with an external frame that involves completely the inner container, must be designed so that the integrity of the inner container It can be readily assessed following the leakproofness and hydraulic pressure tests.

6.5.5.4.5 IBCs of type 31HZ2 shall be limited to a capacity of up to 1.250L.

6.5.5.4.6 The inner container should be made of suitable plastic material, with

known specifications and be of adequate strength for its capacity and use that intended. The material shall be adequately resistant to aging and degradation caused by the substance contained or, where relevant, by radiation ultraviolet. His performance at low temperatures should be taken into account, if case. The permeation of the substance can not be a risk when able normal transport.

6.5.5.4.7 When there is need for protection against ultraviolet radiation, this It must be provided by the addition of lampblack or other pigments or inhibitors appropriate. Such additives must be compatible with the contents and remain effective during the useful life of the container. When employment carbon black smoke or other pigments or inhibitors other than those used in the manufacture of the tested design type, further testing may be waived if the carbon black smoke content or other pigments or inhibitors do not adversely affect the physical properties of the material of manufacture.

6.5.5.4.8 Additives may be incorporated into the material of the inner container improve the resistance to aging or to serve other purposes, provided that it does not affect adversely the physical or chemical properties of the material. When IBCs are for the transport of flammable products should be used in its composition additive or other suitable device capable of preventing the buildup of static electricity, without displaying adverse effect on the chemical or physical properties of the material IBC.

6.5.5.4.9 Except residues or regrind from the same manufacturing process (burrs or shavings), no material can be used used in the manufacture of inner receptacles.

601

Page 109

6.5.5.4.10 The inner receptacle of IBCs type 31HZ2 shall consist of at least three folds plastic film.

6.5.5.4.11 The strength of the material and the outer casing should be appropriate to the composite IBC capacity and the use to which it is intended.

6.5.5.4.12 The outer casing shall be free of any projection / deformation might damage the inner container.

6.5.5.4.13 The outer steel or aluminum frames must be made of metal appropriated suitable thickness.

6.5.5.4.14 The natural wood external frames shall be manufactured from wood well seasoned, commercially dry and free from defects that can reduce considerable resistance from any part of the frame. The base and the top can It is manufactured reconstituted wood resistant to water, for example, wood plate hard, wood agglomerate or other suitable type.

6.5.5.4.15 The plywood external frames should be made of well seasoned wood, with sheets obtained by unrolling, cutting or sawing,

commercially dry and free from defects that can significantly reduce the frame strength. All adjacent blades must be bonded with an adhesive waterproof. Other suitable materials may be used together with the offset in the manufacture of the frame. Casings shall be firmly nailed or the set angle or angles of the top, or mounted by means of devices also suitable.

6.5.5.4.16 The walls of reconstituted wood outer casings must be made of water resistant material, such as hard wood plate, wood agglomerated, or other suitable type. The other parts of the frame can be manufactured other suitable materials.

6.5.5.4.17 In the case of external cardboard frame should be used cardboard Strong and good quality solid corrugated or double-sided (single or multiwall), appropriate to the frame of the capacity and the use to which it is intended. THE resistance of the outer surface of the water should be such that the increase in mass, as determined by the water absorption test in a period of thirty minutes by Cobb method, is not greater than 155 g / m ^{2} - see ISO 535: 1991. The cardboard must have proper bending qualities. It should be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks or

undue bending. The corrugation of the corrugated cardboard must be firmly glued to the sheets frame.

6.5.5.4.18 The ends of the outer casings may have a cardboard wooden frame or be entirely of wood. Ribs can be employed wooden battens.

6.5.5.4.19 In the manufacture of outer casings of cardboard, the joints should be taped, lapped and glued, or lapped and with staples metal. Lapped joins shall have an appropriate overlap. When the closing is effected by means of glue or tape must be used adhesive waterproof.

6.5.5.4.20 When the outer casing is made of plastic material, should be subject to the relevant provisions set out in items 6.5.5.4.6 to 6.5.5.4.9.

6.5.5.4.21 The outer casing of the type 31HZ2 IBCs should involve the container internal on all sides.

6.5.5.4.22 Any base pallet, whether part of an IBC or any removable, must be suitable for mechanical handling with the IBC filled to its mass maximum permissible gross.

6.5.5.4.23 The pallet or integral base should be designed to prevent any protrusion at the base of the IBC can be damaged in handling.

6.5.5.4.24 The outer casing shall be secured to any detachable pallet to

ensure stability in handling and transport. When using removable pallet,
its upper surface should be free from sharp protrusions that might damage the IBC.

6.5.5.4.25 reinforcing devices can be adopted, such as wooden battens,
in order to improve performance in the stack, but such devices must
being on the outside of the inner container.

6.5.5.4.26 Where IBCs are intended for stacking, the bearing surface shall
distribute the load safely. Such IBCs should be designed so that
load is not supported by the inner container.

6.5.5.5 Specific requirements for IBCs cardboard

6.5.5.5.1 These requirements apply to cardboard IBCs for the carriage of
solids, filled or emptied by gravity. The Fibreboard IBCs are of the following type:

11G.

6.5.5.5.2 The cardboard IBCs can not incorporate lifting devices
top.

6.5.5.5.3 The body must be made of sturdy cardboard and good quality, wavy
compact or double-sided (single or multiwall), appropriate to the capacity and IBC
use to which it is intended. The resistance of the outer surface of the water should be such that the
mass increase, as determined by water absorption test in a period of thirty
minutes by the Cobb method, is not greater than 155 g / m $_2$ - see ISO 535: 1991. The cardboard
must have proper bending qualities. It should be cut, creased without scoring, and
slotted so as to permit assembly without cracking, surface breaks or
undue bending. The corrugating or corrugated cardboard must be firmly glued to the sheets
coating.

6.5.5.5.4 The walls, including top and bottom, shall have a minimum resistance
Drilling 15 J, measured in accordance with ISO 3036: 1975.

6.5.5.5.5 Manufacturing joins the body of IBCs should be made with a band
adequate overlap and must be taped, glued, stitched with
metal staples or fastened by another equally effective way. When the lock is
effected by glue or tape must be employed a resistant adhesive
Water. Metal staples shall pass completely through all pieces to be
prey and must be formed or protected so that the internal coating, if
there, do not be abraded or punctured by them.

6.5.5.5.6 The inner lining should be made of suitable material. The resistance

of the material used and the manufacturing of the liner shall be appropriate to
capacity of the IBC and the use to which it is intended. Joins and closures shall be sift-proof and
able to withstand the pressures and impacts that may occur under normal conditions
handling and transportation.

6.5.5.5.7 Any base pallet, whether part of an IBC or any
removable, must be suitable for mechanical handling with the IBC filled to its mass
maximum permissible gross.

6.5.5.5.8 The pallet or integral base should be designed to prevent
any projection at the base of the IBC can be damaged in handling.

6.5.5.5.9 The body shall be secured to any detachable pallet to ensure
stability in handling and transport. When detachable pallet is used, its
top surface must be free from sharp protrusions that might damage the IBC.

6.5.5.5.10 Strengthening devices can be adopted, such as timber supports
in order to improve performance in the stack, but must be
externally to the coating.

6.5.5.5.11 Where IBCs are intended for stacking, the bearing surface shall
distribute the load safely.

6.5.5.6 Specific requirements for wooden IBCs

6.5.5.6.1 These requirements apply to wooden IBCs for the carriage
solid, filled or emptied by gravity. wooden IBCs are the following
types:

11C natural wood with inner liner

11D plywood with inner liner

11F Reconstituted wood with inner liner

6.5.5.6.2 Wooden IBCs may not incorporate lifting devices
top.

6.5.5.6.3 The resistance of the materials used and body manufacturing method
should be appropriate to the IBC capacity and the use to which it is intended.

6.5.5.6.4 Natural wood shall be well seasoned, commercially dry and free from
defects that can reduce to a considerable degree the strength of any part of the IBC.
Each part of the IBC should consist of or being equivalent to one piece. The parties are
considered equivalent to one piece when using an appropriate method
assembled by bonding through a procedure of at least equal efficacy to any
the following, for example: Lindemann joint, tongue and groove or tongue and groove,
or flat union with at least two metal staples in each union, or
used when other equally effective methods.

6.5.5.6.5 Plywood body must have at least three blades, obtained by unrolling, cutting or sawing, commercially dry and free from defects that may

reduce to a considerable degree the body's resistance. All the contiguous blades must be glued with water resistant adhesive. Other suitable materials may be used with plywood for the construction of the body.

6.5.5.6.6 The reconstituted wood bodies should be made of wood Reconstituted water resistant such as sheet of hardwood, chipboard, or other suitable type.

6.5.5.6.7 IBCs shall be firmly nailed or secured the ledge angle or edge, or assembled by equally suitable devices.

6.5.5.6.8 The inner lining should be made of suitable material. The resistance of the material used and the manufacturing of the liner shall be appropriate to capacity of the IBC and the use to which it is intended. Joins and closures shall be sift-proof and able to withstand the pressures and impacts that may occur under normal conditions handling and transportation.

6.5.5.6.9 Every pallet that forms an integral part of the IBC or any detachable pallet must be suitable for handling by mechanical means with the full IBC until his maximum permissible gross mass.

6.5.5.6.10 The pallet forming part of the IBC should be designed to prevent any projection at the base of the IBC can be damaged in handling.

6.5.5.6.11 The IBC body shall be secured to any detachable pallet to ensure stability in handling and transport. When detachable pallet is used, its top surface must be free from sharp protrusions that might damage the IBC.

6.5.5.6.12 reinforcing devices can be adopted, such as wooden battens, in order to improve performance in the stack, but must be externally to the coating.

6.5.5.6.13 Where IBCs are intended for stacking, the bearing surface shall distribute the load safely.

6.5.6 required tests for IBCs

6.5.6.1 Execution and frequency of testing

6.5.6.1.1 IBC Before each use, the corresponding design type must have been passed the relevant tests. The design type of IBC is defined by design, size, material and thickness, manufacturing mode and potting media and emptying and may include various surface treatments. It also includes IBCs

which only differ from the design type by its small external dimensions.

6.5.6.1.2 The tests shall be performed on IBCs prepared for carriage. The IBCs shall be filled as indicated in the relevant items. Substances be transported in IBCs may be replaced by others, provided that no invalidate the test results. In the case of solids, while others are used substance, it shall have the same physical characteristics (mass, grain size, etc.) as the substance to be transported. It will admit the use of additional loads such as bags of lead shot, to a total mass since placed to not affect the test results.

6.5.6.2 Testing projects-type

6.5.6.2.1 One IBC of each design type, size, wall thickness and manner of manufacturing must be subjected to the tests described in item 6.5.6.3.5, and in order indicated in items 6.5.6.4 to 6.5.6.13. These tests should be performed as required by the competent authority.

6.5.6.2.2 The competent authority may permit the selective testing of IBCs which present only minor differences as small reduction in the dimensions external in relation to tested design type.

6.5.6.2.3 If detachable pallets are used in the tests, the test report issued in accordance with paragraph 6.5.6.14 shall include a technical description of the pallets used.

6.5.6.3 Preparation of IBCs for testing

6.5.6.3.1 IBCs of paper and cardboard and composite IBCs with outer frame Cardboard must be conditioned for at least 24 hours in an atmosphere with temperature and relative humidity (rh) controlled. There are 3 possibilities of choice:

- 23 ± 2 ° C and 50% ± 2% rh (preferably air);
- 20 ± 2 ° C and 65% ± 2% rh; or
- 27 ± 2 ° C and 65% ± 2% rh.

Notice: *Average values shall fall within these ranges. small fluctuations or limitations in measurement can make that point measurements register variations in relative humidity of up to ± 5%, without significantly affecting the loyalty of assay results.*

6.5.6.3.2 Additional measures must be taken to ensure that the material plastic used in the manufacture of rigid plastics IBCs (31H1 and 31H2 types), and Composite IBCs (31HZ1 and 31HZ2 types) meets the requirements specified in items

6.5.5.3.2 to 6.5.5.3.4 and 6.5.5.4.6 to 6.5.5.4.9, respectively.

6.5.6.3.3 This confirmation can be made, for example, subjecting one IBCs sample of the preliminary test for a long period, for example six months, during which the samples shall remain filled with the substances to which intended IBCs, or substances which have at least equivalent influences, terms of molecular degradation, weakening or tearing by material fatigue plastic, and after which the samples are subjected to the applicable tests listed Table 6.5.6.3.5.

6.5.6.3.4 When the behavior of the plastics material has been established by other means, the compatibility test described above can be dispensed with.

6.5.6.3.5 Tests required for design type and realization of order

Type IBC	Vibration (F)	Lifting base	Lifting top (The)	stacked ment (B)	watertight what age	Pressure hydraulics	Rasga-	fall ment	Tomba- ment	aplomb (w)
Metallic:										
11A, 11B, 11N	-	1st (a)	2nd	3rd	-	-	4th (e)	-	-	-
21A, 21B, 21N	-	1st (a)	2nd	3rd	4th	5th	6th (e)	-	-	-
31A, 31B, 31N	1st	2nd (a)	3rd	4th	5th	6th	7th (e)	-	-	-
Flexible	-	-	X (c)	X	-	-	X	X	X	X
Rigid Plastic:										
11H1,11H2	-	1st (a)	2nd	3rd	-	-	4th	-	-	-
21H1, 21H2	-	1st (a)	2nd	3rd	4th	5th	6th	-	-	-
31H1, 31H2	1st	2nd (a)	3rd	4th	5th	6th	7th	-	-	-
Compound:										
11HZ1, 11HZ2	-	1st (a)	2nd	3rd	-	-	4th (e)	-	-	-
21HZ1, 21HZ2	-	1st (a)	2nd	3rd	4th	5th	6th (e)	-	-	-
31HZ1, 31HZ2	1st	2nd (a)	3rd	4th	5th	6th	7th (e)	-	-	-
pasteboard	-	1st	-	2nd	-	-	3rd	-	-	-

wood	-	1st	-	2nd	-	-	3rd	-	-	-

(A) When the IBCs are designed to be lifted in this way.

(B) When IBCs are designed to be stacked.

(C) When the IBCs are designed to be lifted from the top or the side.

(D) Required test indicated by "x". An IBC which has passed one test It can be used in other tests, in any order.

(E) may be used other IBC of the same design type for the drop test.

(F) may be used other IBC of the same design type for the vibration test.

6.5.6.4 lifting the base Assay

6.5.6.4.1 applicability

This test should be applied to all type of projects Fibreboard IBCs and wood and all types of IBC provided with lifting devices for base.

6.5.6.4.2 Preparation of IBCs for test

The IBC shall be filled. Is added a filler, which is distributed uniformly. The mass of the filled IBC and its load shall be 1.25 times the gross mass Maximum permissible.

6.5.6.4.3 Test Method

The IBC shall be lifted and lowered twice by a forklift, focusing the fork arms and placing this in such a way that the separation between them is equivalent to three-quarters the size of the input side (unless your points are fixed). The forks shall penetrate to three quarters of the direction of entry. The test It must be repeated in all directions in which you can apply the forklift.

6.5.6.4.4 Approval criteria

It can occur any permanent deformation which renders the IBC, including the pallet, if any, unsafe for carriage and no loss content.

6.5.6.5 Lifting test the top

6.5.6.5.1 applicability

This test should be applied to all projects-type designed IBCs to be lifted from the top **,** and the flexible IBCs designed to be lifted

Page 117

the top or side **.**

6.5.6.5.2 Preparation of IBCs for test

Metal IBCs, rigid plastics and compounds are to be filled. a load which is distributed uniformly is added. The mass of the filled IBC and its load should be twice its maximum permissible gross mass.

Flexible IBCs shall be filled with a representative material and then filled up to a value of six times its maximum permissible load, the load always evenly distributed.

6.5.6.5.3 Test methods

Metal and flexible IBCs shall be lifted as they were designed until clear of the floor and maintained in that position for a period of five minutes.

The rigid plastics and composite IBCs shall be lifted:

a) by means of each pair of lifting devices diagonally opposite, so that lifting forces are applied vertically, for a period of five minutes; and

b) by each pair of lifting devices diagonally opposite, so that lifting forces are applied towards the center, at 45 ° to the vertical, for a period of five minutes.

6.5.6.5.4 They may be used other lifting methods and test preparation of flexible IBCs that are at least equally effective.

6.5.6.5.5 Approval criteria

a) metal IBCs, rigid and composite plastics can not occur any permanent deformation that causes the IBC, including its pallet, if any, becomes unsafe for transport, nor can loss of contents;

b) flexible IBCs: can not, in IBC or its devices lifting, damage which would make unsafe for transport or handling, no loss of contents.

Page 118

6.5.6.6 Stacking test

6.5.6.6.1 applicability

This test should be applied to all types of IBCs designed to They are stacked.

6.5.6.6.2 Preparation of IBCs for test

IBCs shall be filled to its maximum permissible gross mass admissible. If the density of the product being used for the test to prevent this operation, the IBC should be filled even more, so that it gets to test it with a maximum permissible gross mass, uniformly distributed.

6.5.6.6.3 Test methods

(A) The IBC shall be placed on its base on a horizontal surface lasts and subjected to a uniformly distributed load (see section 6.5.6.6.4). The IBC shall be subjected to the test load for a minimum of:

(I) 5 minutes for metal IBCs;

(Ii) 28 days at 40 ° C for rigid plastics IBCs of types 11H2, 21H2 and 31H2 and for composite IBCs with outer plastic frame, supporting the stacking load (i.e., 11HH1 types,

11HH2, 21HH1, 21HH2, 31HH1 and 31HH2);

(Iii) 24 hours for all other types of IBCs;

(B) the load must be applied by one of the following methods:

(I) piling up on the test IBC one or more IBCs of the same type filled to its maximum permissible gross mass;

(Ii) placing appropriate weights on a flat plate or on a reproduction of the IBC's base, which must be rested on the IBC under test.

6.5.6.6.4 Load Calculation to be superimposed

The load to be applied on the IBC should be 1.8 times the equivalent weight Maximum permissible gross all similar IBCs that may be stacked on during transport.

6.5.6.6.5 Approval criteria

(A) all types of IBCs, other than flexible: can not occur any permanent deformation to do that IBCs, including its pallet base, if any, becomes unsafe for transportation, or may occur loss of content;

(B) Flexible IBCs: no deterioration may not occur in the body renders the IBC unsafe for transport and no loss of content.

6.5.6.7 Tightness test

6.5.6.7.1 applicability

Should be applied to those types of IBCs containing liquids or solids, filled or emptied under pressure, as a design test and periodic test.

6.5.6.7.2 Preparation of IBCs for test

The test must be performed before the installation of any equipment thermal insulation. The vented closures should be sealed or replaced by Similar without breath.

6.5.6.7.3 Method of testing and pressure to be applied

The test shall be conducted over a period of at least ten minutes using air at a minimum gage pressure of 20 kPa (0.2 bar). The tightness IBC air must be determined by an appropriate method, for example, differential air pressure, or by immersing the IBC in water or, in the case of metal IBCs the seams and joints with soap solution covering. In the latter case, it should be applied a correction factor to the hydrostatic pressure.

6.5.6.7.4 Approval criteria

There can be no air leakage.

6.5.6.8 hydraulic pressure test

6.5.6.8.1 applicability

It should be applied to those types of IBCs used for liquids or solid filled or emptied under pressure, as a design type test.

6.5.6.8.2 Preparation of IBCs for test

The test must be performed before the installation of any equipment

612

Page 120

thermal insulation. pressure relief devices shall be removed and their openings must be plugged or rendered inoperative.

6.5.6.8.3 Test Method

The test shall be conducted over a period not less than ten minutes, applying a hydraulic pressure not less than that indicated in 6.5.4.8.4. The IBCs not They can be mechanically restrained during the test.

6.5.6.8.4 Pressure to be applied

6.5.6.8.4.1 metal IBCs:

(A) For IBCs of types 21A, 21B and 21N, for the solid Group Packaging I, a gauge pressure of 250 kPa (2.5 bar);

(B) for IBCs of types 21A, 21B, 21N, 31A, 31B and 31N for the substances of packing groups II or III, a pressure 200 manometric kPa (2bar);

(C) In addition to IBCs of types 31A, 31B and 31N should be applied a pressure of 65 kPa (0,65bar). This test should be performed prior to the test of 200 kPa (2 bar),

6.5.6.8.4.2 rigid plastics IBCs and composite IBCs:

(A) for IBCs of types 21H1, 21H2, 21HZ1 and 21HZ2: 75 kPa (0.75 bar) (Gauge);

(B) for IBCs of types 31H1, 31H2, 31HZ1 and 31HZ2: the pressure is higher of two values, wherein the first one must be determined by the following methods:

(I) the total gauge pressure measured in the IBC (i.e. the pressure the content of the vapors over the partial pressure of air or other inert gases, minus 100 kPa (1 bar)) at 55 ° C, multiplied by a safety factor of 1.5; this gauge pressure total should be determined based on the maximum level filling, as specified in 4.1.1.4, at a temperature

15 ° C Filling;

(Ii) 1.75 times the vapor pressure of the substance to be transported,
at 50 ° C under 100 kPa (1 bar), but with a test pressure

613

Page 121

Minimum equal to 100 kPa;

(Iii) 1.5 times the vapor pressure of the substance to be transported,
55 ° C, less than 100 kPa (1 bar), but with a test pressure
Minimum equal to 100 kPa;

and the second pressure should be determined by the following method:

(Iv) twice the static pressure of the substance to be transported,
with a minimum of twice the static pressure of water.

6.5.6.8.5 *Approval criteria:*

(A) For IBCs of types 21A, 21B, 21N, 31A, 31B and 31N, where
subject to the test pressures specified in 6.5.6.8.4.1 (a) or
(B): can not occur leak;

(B) for IBCs of types 31A, 31B and 31N, when subjected to pressure
specified test 6.5.6.8.4.1 (c): may not occur deformation
permanent which renders the IBC unsafe for carriage and can
leakage occurs;

(C) for rigid plastics IBCs and composite IBCs: can not occur
permanent deformation which renders the IBC unsafe for transport,
or leakage may occur.

6.5.6.9 ***Drop test***

6.5.6.9.1 *applicability*

the should be applied to all IBCs, as a design type test.

6.5.6.9.2 Preparation of IBCs for test

a) Metal IBCs: the IBC shall be filled with at least 95% of its
maximum capacity, if for solids or 98% of its capacity
maximum, for liquids. pressure relief devices
They should be removed and their openings plugged or should be
rendered inoperative;

b) Flexible IBCs: the IBC shall be filled to its maximum permissible gross mass
admissible, which must be evenly distributed;

c) hard and composite plastics IBCs: the IBC shall be filled with the
least 95% of its maximum capacity, if for solids, or

614

Page 122

98% of its maximum capacity for liquids. The
Pressure relief devices can be removed and plugged or
rendered inoperative. Testing of IBCs should be carried out when the
Temperature of the test sample and its contents has been reduced to
-18 ° C or less. When compounds IBCs test samples
are prepared in this way, the conditions specified in item
6.5.6.3.1 may be waived. The test liquids are
remain in the liquid state, if necessary with employment
antifreeze. This condition may be waived if the materials in
question have ductility and resistance to sufficient traction when
at low temperatures;

d) IBCs cardboard and wood: the IBC should be filled with at least
95% of its maximum capacity.

6.5.6.9.3 Test Method

Leave the IBC drop in its base, on a rigid horizontal surface, not elastic, smooth and flat, in accordance with the requirements laid down in item 6.1.5.3.4 so that the impact point is the base portion considered vulnerable. The IBCs with 0.45 m^3 or less capacity shall also be subjected to the following tests fall:

a) metal IBCs: on the most vulnerable part other than the part of the
base tested in the first drop;

b) Flexible IBCs: on the most vulnerable side;

c) rigid plastics IBCs, composite, cardboard or wood: impact
full on one side, full on top on one of the corners.

It can be used the same or different IBCs IBC in each drop.

6.5.6.9.4 Drop height

For solids and liquids, if the test is performed with the solid or liquid
be carried or with another substance which essentially has the
same physical characteristics:

Packing Group I	Packing Group II	Packing Group III
1.8m	1.2 m	0.8m

615

Page 123

For liquids if the test is carried out with water, must be:

a) when the substance to be transported have a relative density

to 1.2:

Packing Group II	Packing Group III
1.2 m	0.8m

b) when the substance to be transported have a relative density exceeding 1.2, the drop height shall be calculated based on the density on (d) the substance to be transported, rounded to the first Decimal above, as follows:

Packing Group II	Packing Group III
d × 1.0 m	d × 0.67 m

6.5.6.9.5 Approval criteria:

a) metal IBCs: can no loss of contents;

b) flexible IBCs: can no loss of contents. A small pouring through, for example, locks or bores sewing points on the basis of the impact should not be considered IBC default, as long as there are no other leaks after IBC is lifted from the ground;

c) rigid plastics IBCs, composite, cardboard or wood: no loss can occur content. A small stroke through locks, due to the impact should not be considered defective IBC, as long as there is no other leakage;

d) All IBCs: can not cause damage to make the IBC unsafe for be transported to recovery or disposal, can not be loss of contents. In addition, the IBC should be able to be visibly lifted off the ground by any suitable means, for 5 minute period.

6.5.6.10 Tear Test

6.5.6.10.1 Applicability

the should be applied to all flexible IBCs, as a design type test.

6.5.6.10.2 Preparation of IBCs for test

The IBC shall be filled with at least 95% of its capacity and to its maximum permissible gross mass, uniformly distributed.

6.5.6.10.3 Test method

After the IBC is placed on the soil must be made a cutting knife 100 mm, completely penetrating the wall of one of the larger faces and forming a 45 ° angle to the principal axis of the IBC, the half-height between the surface of bottom and the top level of the content. Then, the IBC should be subjected to a load overlapping, evenly distributed, equivalent to twice the maximum gross mass admissible. The load shall be applied for at least five minutes. after that procedure in the case of an IBC intended to be lifted from the top or one of side, and after removal of the superimposed load, the IBC should be lifted from the ground and remain in such position for a period of five minutes.

6.5.6.10.4 Criteria for approval

Cutting can not increase by more than 25% of its original length.

6.5.6.11 overturning test

6.5.6.11.1 Applicability

the should be applied to all flexible IBCs, as a design type test.

6.5.6.11.2 Preparation of IBCs for test

The IBC shall be filled with at least 95% of its capacity and to maximum permissible gross mass, uniformly distributed.

6.5.6.11.3 Test method

The IBC shall be tumbled over any part of its top, in a horizontal surface, not flexible, smooth and flat.

617

Page 125

6.5.6.11.4 Height of tipping

Packing Group I	Packing Group II	Packing Group III
1.8m	1.2 m	0.8m

6.5.6.11.5 Criteria for approval

There can be loss of content. A small stroke through, example, locks or holes sewing points, due to the impact, should not be considered a failure of the IBC provided that no further leakage.

6.5.6.12 aplomb test

6.5.6.12.1 Applicability

It should be applied to all flexible IBCs designed to be lifted

the top or side, as a design type of assay.

6.5.6.12.2 Preparation of IBCs for test

The IBC shall be filled with at least 95% of its capacity and to maximum permissible gross mass, uniformly distributed.

6.5.6.12.3 Test method

The IBC, lying on its side, should be lifted at a speed minimum 0.1 m / s to a vertical position, above the ground by one of the devices lifting or two of them if there are four lifting devices.

6.5.6.12.4 Criteria for approval

There can be damage or the IBC or its lifting devices, that make them unsafe for transport or handling.

6.5.6.13 Vibration test

6.5.6.13.1 Applicability

It should apply to all IBCs intended to contain liquids, such as test project-type.

6.5.6.13.2 Preparation of IBCs for test

The sample of the IBC should be selected randomly and must be

assembled and closed as for transport. The IBC should be filled with water at least up 98% of its maximum capacity.

Method 6.5.6.13.3 and duration of the test

6.5.6.13.3.1 The IBC shall be placed in the center of the test machine platform with a vertical amplitude sinusoidal double (peak to peak displacement) of 25 mm ± 5%. if necessary, restraint must be affixed to the platform in order to prevent the sample moving horizontally off the platform without restricting vertical movement.

6.5.6.13.3.2 The test should be performed for an hour at a frequency capable of that part of the IBC base is raised briefly from the platform vibration during part of each cycle, so that a metal shim may be fully inserted intermittently by at least one point between the base of the IBC and the test platform. If necessary, to prevent the IBC enter into resonance, frequency should be adjusted. However, the frequency of testing should continue allowing the introduction of the metal shim as described above, which is essential for passing the test. The shim used in the test shall be at least 1.6 mm thick, 50 mm wide and of sufficient length so that it can be introduced between the IBC and the platform at least 100 mm to perform the test.

6.5.6.13.4 Criteria for passing the test

leaks or ruptures can not be observed. Nor can be observed ruptures or structural component failures such as breakages welds or fixing.

6.5.6.14 Test report

6.5.6.14.1 shall be issued a report from tests, which should be available of users of the IBC, containing at least the following information:

1. Name and address of the test facility;

2. Name and address of applicant (where applicable);

3. An individual identification of the test report;

4. Date of the test report;

5. IBC manufacturer;

6. Description of the IBC design type (eg dimensions, materials,

closures, thickness, etc.), including manufacturing method (e.g., molding blow) and may contain design (s) and or photograph (s), and the specifications for the Static electricity for the transport of flammable products;

7. Maximum capacity;

8. Characteristics of test contents, such as viscosity and density relative to fluid and particle size for solids;

9. Description and test results;

10. The position and signature of responsible for testing.

6.5.6.14.2 The test report shall contain statements that the IBC prepared for transport it is tested in accordance with the relevant requirements of this Chapter, further indicating that the use of other methods or components packaging may render it invalid. A copy of the test report shall be made available to competent authority.

620

CHAPTER 6.6

REQUIREMENTS FOR MANUFACTURING AND BIG PACKS OF TEST

6.6.1 general provisions

6.6.1.1 The requirements of this Chapter do not apply:

- Class 2, except articles including aerosols;
- to Division 6.2, except clinical waste of UN 3291 number;
- the packages containing Class 7 radioactive material.

6.6.1.2 The large packagings shall be manufactured and tested according to an evaluation of the program drawn up accordingly by the competent authority of so that each manufactured packaging or refabricada meets the requirements of this Chapter.

Notice: *The ISO 16106: 2006 "Packaging - Transport packages for dangerous goods - Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings - Guidelines for the application of ISO 9001 "establishes guidelines acceptable for procedures that can be adopted.*

6.6.1.3 The specific requirements for large packages contained in item 6.6.4 They are based on large packages in current use. Considering the progress science and technology, there is no objection to the use of different large packs those contained in Item 6.6.4, provided that they are equally effective, accepted by the competent authority and approved in the tests described in item 6.6.5. different tests from those described in this Regulation will also be accepted, provided that are equivalent.

6.6.1.4 Manufacturers and distributors of packaging must provide all information regarding procedures to be followed, the descriptions of the types and dimensions of closures (including required gaskets) and any other

components needed to ensure that the containers as they are
for transport, they are able to withstand the applicable performance tests
contained in this Chapter.

621

6.6.2 Code for designation of large packagings

6.6.2.1 The code used for large packagings consist of:

a) two Arabic numerals:

- 50 for rigid large packagings; or

- 51 for flexible large packagings; and

b) capital letters in Latin characters indicating the nature of the material (e.g., wood, steel, etc.). The capital letters used shall be those set forth in item 6.1.2.6.

6.6.2.2 The code of large packages can be followed by the letters "T" or "W". The letter "T" means a large packaging rescue in accordance with the requirements set out in item 6.6.5.1.9. The letter "W" signifies that the large packaging, although of the same type indicated by the code, is manufactured following a specification different from those contained in item 6.6.4 and is considered equivalent According to the requirements listed in Section 6.6.1.3.

6.6.3 Marking

6.6.3.1 Primary marking

Every large packaging manufactured and intended for use as determined by this Regulation shall bear markings which are durable, legible and located so that they are readily visible. Letters, numbers and symbols must be at least 12 mm high. The marking must include:

a) the UN symbol for packaging:

This symbol can not be used for any purpose other than to indicate a container, a container for flexible bulk a portable tank or CGEM meet the requirements of Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8. For large metal packaging the brand embossed, it is assumed the application of letters capital letters "UN" instead of the symbol above;

b) The code "50" for large rigid packaging or "51" for

large flexible packaging, followed by the type of material as the "b" of item 6.5.1.4.1;

c) A capital letter designating the (s) group (s) packaging for (s) which (is) the design type has been approved:

- X for packing groups I, II and III;

- Y for packing groups II and III;

- Z for Packing Group III only;

d) the month and year of manufacture (last two digits);

e) the characters that identify the certification country, as indicated the acronym used for the movement of motor vehicles in the international traffic;

f) the name or symbol of the manufacturer and any identifying Large packs, if specified by the competent authority;

g) the stacking test load in kg. For large packages not intended for stacking must contain the numeral "0";

h) The maximum permissible gross mass in kilograms.

The primary marking required above shall be applied in sequence presented.

The marking elements applied in accordance with the requirements of letters "a" to "h" above must be clearly separated, for example, with a slash or space, so they can be easily identified.

6.6.3.2 Examples of markup

50A / X / 05/01 / C / PQRS 2500/1000	For a large steel packaging suitable for stacking; Load stacking: 2.500 kg; MPGM: 1000 kg; authorized for products for packing groups I, II or III.
50AT / Y / 05/01 / B / PQRS 2500/1000	For a large steel packaging appropriate for rescue stacking; Load stacking: 2.500 kg; Maximum gross mass Permissible: 1000 kg; authorized to Product Groups Packaging II or III.
50H / Y04 / 02 / D / ABCD 9870/800	For a large plastics packaging not suitable for stacking; Maximum permissible gross mass: 800 kg; authorized to Product Packaging Groups II or III.

51H / Z / 06/01 / S / 1999 0/500	For a flexible large packaging not suitable for stacking; Maximum permissible gross mass: 500 kg; authorized to Product III packing groups.

6.6.3.3 The maximum capacity stacking applicable when packing great in use, should be presented in the form of one of the following symbols, must be durable and clearly visible

Figure 6.6.1 **Figure 6.6.2**

The minimum size must be 100 mm x 100 mm. The letters and numbers indicating the mass shall have height of at least 12 mm. The area within the print marks indicated by the arrows must be square when the dimensions not are specified, all features shall be in approximate proportion those shown. The mass indicated above the symbol shall not exceed the load imposed during the design type test (see item 6.6.5.3.3.4) divided by 1.8.

Notice: *The provisions set out in section 6.6.3.3 should be applied to all large packagings manufactured, reconditioned or remanufactured as from 1 January 2015.*

6.6.4 Specific requirements for large packagings

6.6.4.1 ***Specific requirements for metal large packagings***

Specific requirements for metal large packagings apply the types:

- 50A: steel;

- 50B: aluminum;

- 50N metal (other than steel or aluminum).

6.6.4.1.1 The large packaging shall be made of suitable ductile metal, with weldability fully demonstrated. Welds should be well executed and complete security provide. The low temperature performance must be considered when appropriate.

6.6.4.1.2 Measures should be taken in order to prevent damage from action Galvanic resulting from the juxtaposition of different metals.

6.6.4.2 Specific requirements for large packaging materials flexible

The specific requirements for large packs of flexible materials apply to types:

- 51H: flexible plastic;

- 51M: flexible paper.

6.6.4.2.1 The large packaging shall be manufactured from suitable materials. THE resistance of the material used and the manufacturing of flexible large packagings should be appropriate to their ability and the use to which they are intended.

6.6.4.2.2 All materials used in the manufacture of large packagings flexible type 51M shall, after complete immersion in water for at least 24 hours, 85% of the tensile strength originally measured in the conditioned material 67% or less of moisture.

6.6.4.2.3 The seams must be made by stitching, heat sealing, gluing or equivalent method. The ends of the stitched seams should be well closed.

6.6.4.2.4 Flexible large packagings shall provide adequate resistance

aging and degradation caused by ultraviolet radiation, the conditions climate or the substances contained therein, keeping thus able appropriate to the use to which they are intended.

6.6.4.2.5 When you need to protect large flexible packaging plastic against ultraviolet radiation, this protection should be achieved by adding carbon black smoke or other suitable pigments or inhibitors. These additives shall be compatible with the content and must remain effective for the life of the package. When are employees of different additives adopted in the tested design type, new Testing may be waived, provided that the changes in the content of these additives do not impair the physical properties of the material of manufacture.

6.6.4.2.6 Additives can be incorporated into a large packaging material for

improve the resistance to aging or to serve other purposes, provided that no adversely affect the physical or chemical properties of the material.

6.6.4.2.7 When the container is full, the relationship between your height and your width should be at most 2: 1.

6.6.4.3 Specific requirements for large plastic packaging

The specific requirements for large plastic packaging apply the type:

- 50H: hard plastic.

6.6.4.3.1 The large packaging shall be manufactured from suitable plastic material, with known specifications and be of adequate strength to their ability and the use to which intended. The material shall be adequately resistant to aging, degradation caused by substances contained in the package and, when necessary, to ultraviolet radiation. His performance at low temperatures must be considered, where appropriate. If the package to be impregnated with the content, this should not constitute a risk in normal conditions of transport .

6.6.4.3.2 When there is need for protection against ultraviolet radiation, this It must be provided by the addition of lampblack or other pigments or inhibitors appropriate. These additives must be compatible with the contents of the package and continue effective throughout the life of the outer packaging. If they are carbon black smoke employees, pigments or inhibitors other than those adopted in the project-type tested, new tests may be exempted, provided that the content of these additives

does not impair the physical properties of the material of manufacture.

6.6.4.3.3 Additives can be incorporated into the packing material to increase its resistance to aging or to serve other purposes, provided that this does not harm the physical or chemical properties of the material.

6.6.4.4 *Specific requirements for large packaging cardboard*

The specific requirements for large packaging cardboard apply the type:

- 50G: hard cardboard.

6.6.4.4.1 Must be used sturdy cardboard and good quality solid or double-wall corrugated (single or multiwall), appropriate to the capacity of large and use packaging that is intended. The resistance of the outer surface of the water It must be such that the increase in mass determined by water absorption test a period of thirty minutes at COOB method, is not greater than 155 g / m^2 (See Standard ISO 535: 1991). It shall have good quality in flexion; It should be cut, creased without scoring, and slotted so as to permit assembly without cracking,

disruption of surface or undue bending. Corrugated cardboard sheets should be Firmly glued to the walls.

6.6.4.4.2 The walls, including top and bottom, shall have a minimum resistance punching 15 J, measured in accordance with ISO 3036: 1975.

6.6.4.4.3 Manufacturing joins in the outer packaging of large packagings They must be made with an appropriate overlap and must be secured with tape adhesive, glue, metal clips or other equally effective way. When the joints are joined by means of glue or tape must be employed resistant adhesive the water. Metal staples shall pass completely through all pieces to be and having fixed format or protected so that it will not corrode or perforate any kind of lining.

6.6.4.4.4 Any pallet, whether part of the large packaging, whether removable, must be suitable for mechanical handling, considering that large package is loaded to its maximum permissible gross mass.

6.6.4.4.5 The pallet or integral base shall be designed so as to avoid any rebound in large packing base that can be damaged during handling.

6.6.4.4.6 The body shall be secured to any detachable pallet to ensure

627

Page 135

stability during shipping and handling. When using a pallet removable, its top surface shall be free from sharp protrusions that might damage the large packaging.

6.6.4.4.7 To increase the resistance in stacking conditions, can be reinforcing devices used, such as wood substrates since placed externally to the coating.

6.6.4.4.8 Large packs are intended for stacking, the surface support should distribute the load safely.

6.6.4.5 Specific requirements for large packagings of wood

The specific requirements for large packagings of wood apply the types:

- 50C: natural wood;

- 50D: plywood;

- 50F: reconstituted wood.

6.6.4.5.1 The resistance of the materials used and the manufacturing method should be appropriate to the capacity of the large packaging and the use to which they are intended.

6.6.4.5.2 Natural wood shall be well seasoned, be free of moisture and without defects which would substantially reduce the resistance of either party the large packaging. Each part of the large packaging shall consist of a single piece or be equivalent. Parts are considered equivalent to a

when one piece using a suitable method for bonding connection, for example, joint Lindemann, male and female joint, lap joint or fitting, or butt joint with at least two corrugated metal fasteners at each joint, or when they are using other equally effective methods.

6.6.4.5.3 Plywood for large packaging must be at least 3 sheets. It must be well cured, obtained by unwinding, cutting or sawing, be free from humidity and defects that can reduce the large packaging resistance. At sheets must be glued together with water resistant adhesive. in the manufacture A large packaging, other suitable materials may be used in conjunction with plywood.

6.6.4.5.4 The reconstituted wood used in the manufacture of the large packaging It should be resistant to water, such as fibreboard, chipboard or the other

appropriate type.

6.6.4.5.5 The large packagings shall be firmly nailed or attached to Corner amounts or top, or be assembled by equally effective means.

6.6.4.5.6 Any pallet, whether part of a large package, whether removable shall be suitable for mechanical handling with the packaging large loaded to its maximum permissible gross mass.

6.6.4.5.7 The pallet or integral base shall be designed so as to avoid any projection on the big packing base that can be damaged during handling.

6.6.4.5.8 The body shall be secured to any detachable pallet to ensure stability during shipping and handling. Where a detachable pallet is used, its top must be free from sharp protrusions that might damage the large packaging.

6.6.4.5.9 To increase the resistance in stacking conditions, can be reinforcing devices used, such as wood substrates since placed externally to the coating.

6.6.4.5.10 Where large packagings are intended for stacking, the surface support must distribute the load in a safe manner.

6.6.5 Tests required for large packaging

6.6.5.1 Execution and frequency of testing

6.6.5.1.1 The design type of each large packaging shall be tested as provided in section 6.6.5.3, in accordance with the procedures established by the authority competent.

6.6.5.1.2 Before the large packaging is put to use, the design type correspondent must have passed the relevant tests. The design type is defined by its design, dimensions, material and thickness, manufacturing mode and form of

packaging, but may include various surface treatments. It also includes large packagings which differ from the design type only by their lower height.

6.6.5.1.3 The tests shall be repeated on production samples at intervals established by the competent authority. For large packaging test cardboard, preparation at ambient conditions is considered equivalent to the requirements item 6.6.5.2.4.

6.6.5.1.4 Tests shall also be repeated after each modification which change the design, the materials or how to manufacture a package.

6.6.5.1.5 The competent authority may permit the selective testing of packagings that differ from the design type in minor aspects as, for example, lower size of inner packagings or inner packagings of lower net mass or, still, large packagings manufactured with small reductions in (s) size (s) external (s).

6.6.5.1.6 *Reserved*

Notice: *On mounting conditions of different types of inner packaging large packages and their possible variations, see item 4.1.1.5.1.*

6.6.5.1.7 At any time, the competent authority may require proof, by through tests in accordance with this Chapter, that the manufactured packaging series meet the same requirements submitted to the tested design type.

6.6.5.1.8 The same sample can be used in several trials, since results of such tests are not affected and with the approval of the Authority competent.

6.6.5.1.9 Large packs rescue

Large packs of redemption should be tested and marked in accordance with the provisions applicable to large packs of the Group Package II, for the transport of solids or inner packagings, except following:

(A) the substance used to perform the tests must be water, and great packaging rescue should be filled to not less than 98% of its capacity. It is allowed the use of additives such as lead shot bags for a total mass of required packaging, provided that such bags are placed so as not to affect the test result. Alternatively, in performing the test fall, the drop height may vary according to the provisions of item 6.6.5.3.4.4.2 (B);

(B) large packs rescue should additionally have been submitted as a success, the tightness test at 30 kPa, and this result should It is reflected in the test report required in section 6.6.5.4; and

(C) large rescue packages must be marked with the letter "T",

630

as set out in item 6.6.2.2.

6.6.5.2 Preparation for testing

6.6.5.2.1 The tests shall be made in large packs prepared for transport including the inner packages or articles to be transported. At Inner packagings shall be filled with at least 98% of its capacity, when intended for liquids, or 95%, when intended for solids. when internal packaging of large packagings are designed to contain both liquid as solids, separate testing should be performed for each type of content. At substances contained in inner packaging or articles to be transported in large packages can be replaced by other materials or articles, provided that this would invalidate the results of the tests. When other packages are used internal or articles, they must have the same physical characteristics (mass, etc) than the inner packaging or articles to be carried. It allowed the use of fillers Additional such as bags of lead shot, to obtain the necessary total mass, provided that they are placed so as not to affect test results.

6.6.5.2.2 In free fall tests for liquids, when another substance is used, the relative density and viscosity of this material should be similar to the substance to be transported. It is allowed the use of water in free fall test for net, provided that the conditions set out in item 6.6.5.3.4.4 are met.

6.6.5.2.3 Large packagings made of plastics materials and packaging containing large internal packaging plastics, except bags designed to contain solids or articles should be subjected to the free drop test when temperature of the test sample of its content is reduced to a temperature equal to or below -18 ° C. Not require such a condition that the materials in question provide sufficient ductility and tensile strength at low temperatures. Where test samples are prepared in this way, it dispenses the condition set out in item 6.6.5.2.4. The test fluid should be maintained this physical state by adding antifreeze material, if necessary.

6.6.5.2.4 Large packs of cardboard shall be conditioned for at minimum of 24 hours in an atmosphere of temperature and relative humidity (RH) controlled. There are 3 possibilities of choice:

- 23 ± 2 ° C and 50% ± 2% rh (preferably air);

- 20 ± 2 ° C and 65% ± 2% rh; or

631

- 27 ± 2 ° C and 65% ± 2% rh.

Notice: *Average values shall be within the prescribed limits. At Short-term fluctuations and limitations that are subject measurements can cause variations in relative humidity of up to ± 5% in individual measurements without affecting the reproducibility of the assay significantly* **.**

6.6.5.3 Testing Requirements

6.6.5.3.1 lifting the base Assay

6.6.5.3.1.1 Applicability

This test must be applied to all standard designs packaging large equipped with lifting the base devices.

6.6.5.3.1.2 Preparation of large packagings for test

The large packagings shall be filled up to 1.25 times maximum permissible gross mass, with evenly distributed load.

6.6.5.3.1.3 Test method

The large packagings shall be raised and lowered twice by forklift with forks centrally positioned and evenly spaced three inlet face width of the rooms (unless it has a fixed entry points). The forks shall penetrate to three quarters of the base, the inbound direction. The test It must be repeated in all directions in which the forks input is possible.

6.6.5.3.1.4 Criteria for approval

It can occur any permanent deformation which renders the packaging Large unsafe for transport and no loss can be any content.

6.6.5.3.2 Lifting test the top

6.6.5.3.2.1 Applicability

This test must be applied to any design type of large packagings which can be lifted from the top and provided with lifting means at the top.

6.6.5.3.2.2 Preparation of large packagings for test

Large packs must be charged up to twice its maximum permissible gross mass. A flexible large packaging shall be charged up to six times the value of its permissible gross mass, the load evenly

distributed.

6.6.5.3.2.3 Test method

The large packaging shall be lifted from the top, according to your project, until sure to touch the ground and must be kept in this position for five minutes.

6.6.5.3.2.4 Criteria for approval

a) large containers of metal or hard plastic: can not occur permanent deformations that make them unsafe for transport, including the pallet, if any, and not be any loss of contents;

b) flexible large packagings: these packages, as well as their lifting devices, they can not be damaged to make them unsafe for transportation, or may occur for any loss content;

6.6.5.3.3 Stacking test

6.6.5.3.3.1 Applicability

This test must be applied to all standard designs packaging Large designed to be stacked.

6.6.5.3.3.2 Preparation of large packagings for test

Large packs must be charged with a gross mass Maximum permissible.

6.6.5.3.3.3 Test method

The large packagings shall be placed on its base on a hard flat horizontal surface, and subjected to a uniformly distributed load (See section 6.6.5.3.3.4) for a minimum period of five minutes to pack Great for wood, cardboard or plastic, the minimum period of load application should be 24 hours.

6.6.5.3.3.4 Calculation of the overload test

The overhead to be applied to large packaging shall be equivalent to 1.8 times the maximum permissible gross mass joint of all large packs Similar that can be stacked on it during transport.

6.6.5.3.3.5 Criteria for approval

a) all types of large packagings other than flexible: they can not occur permanent deformations that make them unsafe for transport, including pallets, if any, and any loss arising or content;

b) flexible large packagings: the body of the large packaging can not suffer any kind of damage that makes it unsafe for transport and or cause the loss of its contents.

6.6.5.3.4 Drop test

6.6.5.3.4.1 Applicability

This test must be applied to all standard designs packaging
big ones.

6.6.5.3.4.2 Preparation of large packagings for test

The large packaging shall be prepared in accordance with paragraph 6.6.5.2.1.

6.6.5.3.4.3 Test method

Leave the large packaging is dropped on a rigid horizontal surface,
inelastic, smooth and flat, in accordance with the requirements set out in item
6.1.5.3.4, so that the impact point is part of a large packaging base
most vulnerable.

6.6.5.3.4.4 Drop height

Notice: *Packaging for substances and articles of Class 1 shall be tested in order to meet the level of performance of Packing Group II.*

6.6.5.3.4.4.1 For inner packagings containing solid or liquid substances or
Articles if the test is performed with the solid, liquid or article to be transported,
or other substance or article having essentially the same characteristics:

Packing Group I	Packing Group II	Packing Group III
1.8m	1.2 m	0.8m

6.6.5.3.4.4.2 For inner packagings containing liquids if the test is performed with
Water:

The) when the substance to be transported has a relative density of up to 1.2:

Packing Group I	Packing Group II	Packing Group III
1.8m	1.2 m	0.8m

B) when the substance to be transported has a relative density
1.2, the drop height shall be calculated based on the relative density (d)
substance to be transported, rounded to the first decimal above, as
Follow:

Packing Group I	Packing Group II	Packing Group III
1.5 x d (m)	dx 1.0 (m)	dx 0.67 (m)

6.6.5.3.4.5 Criteria for approval

6.6.5.3.4.5.1 The large packaging must not present any damage that may compromise safety during transport. There may leak content (s) of package (s) internal (s) or article (s).

6.6.5.3.4.5.2 In the case of large packagings intended for articles of Class 1, is not allowed any kind of break that allows the leakage of explosive substances or articles contained in said containers.

6.6.5.3.4.5.3 A large packaging is considered approved in the drop test when all your content remains within it, even if its closure does not continue and dustproof.

6.6.5.4 Certification and Test Report

6.6.5.4.1 For each design type of large packaging a certificate shall be issued and a mark (as per item 6.6.3) attesting that the design type, including its equipment meets the requirements of the tests.

6.6.5.4.2 It should be drawn up test report which will be available to large packaging users, containing at least the following information:

635

Page 143

1. Name and address of the establishment where they performed the test;
2. Name and address of applicant (where appropriate);
3. Specific identification of the test report;
4. Date of the test report;
5. Manufacturer of the large packaging;
6. design type Description of the large packaging (for example, dimensions, materials, closures, thickness, etc.) and / or photograph (s);
7. Maximum capacity / maximum permissible gross mass;
8. Characteristics of test contents, eg types and descriptions the inner packagings or articles used;
9. Description and test results;
10. Name, signature and position of responsible for testing.

6.6.5.4.3 The test report shall contain statements that the large packaging prepared for carriage was tested, according to the applicable provisions of Chapter, and the use of other packaging methods or components may invalidá- it. A copy of the test report shall be made available to the competent authority.

636

Page 144

CHAPTER 6.7

REQUIREMENTS FOR DESIGN, MANUFACTURE, INSPECTION TANKS AND TESTING PORTABLE AND CONTAINERS MULTIPLE ITEMS FOR GAS (MEGCs)

6.7.1 Application and general requirements

6.7.1.1 The requirements of this Chapter apply to portable tanks intended for transportation of dangerous goods, and to MEGCs intended for the carriage of gases not refrigerated Class 2, by all modes of transport. In addition to the requirements of this Chapter, unless otherwise indicated, the applicable requirements of International Convention for Safe Containers (CSC) 1972 and its changes must be met by any multimodal portable tank or CGEM that under the definition of "container" under that Convention. Should be observing the provisions of the assessment program compliance authority competent.

6.7.1.2 Taking into account scientific and technological developments, the requirements techniques in this chapter may be modified by alternative arrangements. such arrangements should offer security level at least equivalent to that provided by this chapter for compatibility with the transported substances and ability of the portable tank or the CGEM to withstand impact, loading and fire. Both alternative portable tanks as the MEGCs must be approved by competent authority.

6.7.1.3 When, in Column 12 of the Dangerous Goods List of Chapter 3.2, particular substance is not associated with an instruction for Portable Tank (T1

T23, T50 or T75), the competent authority of the country of origin can issue authorization interim transport. The authorization must specify the shipping documentation and contain at least the information normally provided in the instructions for tanks portable and the conditions under which the substance to be carried. Appropriate measures They are taken by the competent authority for inclusion in the List of Products hazardous

6.7.2 Requirements for the design, manufacture, inspection and testing portable tanks for the carriage of Class 1 substances and Classes 3 to 9

6.7.2.1 settings

For purposes of the following items, set up the following settings:

Fine grain steel means steel which has a ferritic grain size 6 or size less, when determined according to ASTM E 112-96 or as defined in EN 10028-3, Part 3;

Mild steel means a steel with a guaranteed tensile strength of at least 360 N / mm ₂ to 440 N / mm ₂ and an elongation at break minimum guaranteed in accordance with Item 6.7.2.3.3.3;

Reference steel means a steel which has a tensile strength of 370 N / mm ₂ and one elongation at break of 27%;

Housing or tank body means the part of the portable tank containing the substance transported (the tank itself), including openings and their closures, but without include service equipment or external structural elements.

Fuse element means a non reconnectable pressure relief device that is thermally activated;

Tightness test means the test that using gas subjecting the shell and its service equipment to an effective internal pressure not less than 25% of pressure MAWP (PTMA);

Service equipment means measuring instruments and devices filling, emptying, venting, safety, heating, cooling and insulation thermal;

Structural equipment means the reinforcing, fastening, protective and stabilizing external to the housing;

Design temperature range for casting should be from -40 ° C to 50 ° C for substances transported under ambient conditions. For other substances transported in conditions of high temperatures, the temperature should not project

be lower than the maximum temperature of the substance during filling, emptying or transport. More severe design temperatures shall be considered in case portable tanks subjected to severe climatic conditions.

638

Page 146

Maximum permissible gross mass (MPGM) means the sum of the tank tare mass laptop with the largest load for transport;

Test pressure means the maximum gauge pressure at the top of the housing, measured during the hydraulic pressure test at least equal to the design pressure multiplied by 1.5. The minimum test pressure for portable tanks intended for substances is indicated in the applicable instruction to the portable tank in item 4.2.5.2.6;

Design pressure means the pressure to be used in the calculations required for recognized pressure vessel regulation. The design pressure can not be less than greater of the following pressures:

a) the maximum effective gauge pressure allowed in the shell during filling or emptying; or

b) the sum of the following pressures:

(I) the absolute vapor pressure (in bar) of the substance at 65 ° C (at higher temperature during filling, emptying or transportation to substances transported above 65 ° C) least 1 bar;

(Ii) partial pressure (in bar) of air or other gases in the empty space, determined by a temperature in this space, to 65 ° C with an expansion of the liquid due to the increase in average temperature tank T_r - T_f (t_f = filling temperature, usually 15 ° C; t_r = maximum average tank temperature 50 ° C); and

(Iii) total pressure determined based on the static forces specified in clause 6.7.2.2.12, but not less than 0.35 bar; or

c) two-thirds of the minimum test pressure specified in the instruction to applicable portable tank constant in item 4.2.5.2.6;

Maximum Allowable Working Pressure (MAWP) means a pressure to not less highest of the following pressures measured at the top part of the housing when it is is in its operating position:

639

Page 147

a) the maximum effective gauge pressure allowed in the shell during filling or emptying; or

b) the maximum effective gauge pressure to which the shell has been designed. This pressure can not be less than the sum of the following pressures:

(I) the absolute vapor pressure (in bar) of the substance at 65 ° C (at higher temperature during filling, emptying or transport to substances transported above 65 ° C) less 1 bar; and

(Ii) partial pressure (bar) air or other gas in the space empty, determined by a temperature in this space, until 65 ° C with an expansion of the liquid due to increased average temperature T tank $_{r}$ - t $_{f}$ (t $_{f}$ = temperature bottling, usually 15 ° C; t $_{r}$ = mean maximum temperature Tank 50 ° C).

Portable tank means a multimodal tank used for transporting products Class 1 and Classes 3 to 9. The portable tank includes a housing provided with the service equipment and structural necessary for the transport of substances dangerous. The portable tank should be filled and emptied without removing your structural equipment; must possess stabilizing members external to the housing and It can be lifted when in full; It should be designed primarily to be jacked a vehicle or transport vessel and be equipped with platform, mountings or accessories to facilitate mechanical handling. Tank truck, tank car, non-metallic tank, gas cylinder, large container and container Intermediate Bulk (IBC) are not included in this definition.

Offshore portable tank means a portable tank specially designed for repeated use in the transport of dangerous goods having as origin or destination offshore facilities. Such offshore portable tanks are designed and manufactured in accordance with the "Guidelines for the Approval of Containers Handled in Mar Open "specified by the International Maritime Organization (IMO) in document MSC / Circ.860.

640

Page 148

6.7.2.2 General requirements for the design and manufacture

6.7.2.2.1 Carcasses must be designed and manufactured according to the

provisions of a regulation for pressure vessels accepted by authority competent. They must be made of metallic materials capable of receiving the form desired. In principle, the materials must conform to national standards or International on materials. For welded shells, it should only be used one material whose weldability has been fully demonstrated. Welds should be perfectly executed and should provide complete security. Depending on the manufacturing process or material, the housing must undergo treatment adequate heat to provide the necessary resistance of welds and affected areas by heat. In choosing the material, it must be taken into account the temperature range project the point of view of the risk of brittle breakage under tension (friability), cracking corrosion and impact resistance. When using steel fine-grained, the guaranteed value of the yield stress must not exceed 460 N / mm 2 and the guaranteed value of the upper tensile stress limit should not exceed 725 N / mm 2 according to the specification of the material. Aluminum may be used as manufacturing equipment as indicated in special provision for portable tank for a specific substance in Column 13 of the Dangerous Goods List or when approved by the competent authority. Where aluminum is allowed to be insulated to prevent significant loss of physical properties when subjected to a heat load of 110 kW / m 2 for a period not less than 30 minutes. The insulation shall remain effective at any temperature below 649 ° C and It must be coated material with a melting point of not lower than 700 ° C. The materials of portable tank must be suitable for the external environment in which they can be transported.

6.7.2.2.2 The shells of portable tanks, fittings and pipes must be made of material which is:

a) substantially immune to attack by (an) other substance (s) carried (s); or

b) properly treated or neutralized by chemical reaction; or

c) coated with corrosion-resistant material directly bonded to the housing or fixed by equivalent means.

6.7.2.2.3 Gaskets must be made of materials that can not be attacked by the substances to be carried.

6.7.2.2.4 When carcases are coated, the coating should be substantially immune to attack by the substance (s) (s) transported (s), homogeneous, non-porous, free from perforations, sufficiently elastic and compatible with the thermal expansion characteristics of the shell. The coating of any substrate, accessory and piping must be continuous and extend around the surface any flanges. When external fittings are welded to the tank,

coating should be continuous, extending over the fittings and along the Surface external flanges.

6.7.2.2.5 Joints and seams in existing coating must be made through fusion of materials or other equally effective method.

6.7.2.2.6 It should be avoided contact of different metals that may result in damage by galvanic action.

6.7.2.2.7 The materials of the portable tank, including any devices, gaskets, coatings and accessories, can not adversely affect the substances to be transported.

6.7.2.2.8 Portable tanks shall be designed and constructed with supports to Provide a secure base during transport and with lifting devices and suitable fixing.

6.7.2.2.9 Portable tanks shall be designed to withstand, without loss of contents, at least the internal pressure generated by the content and static charges, dynamic and thermal, in normal handling and transport. The project should demonstrate that the effect of fatigue caused by repeated application of these loads over the life of the portable tank, have been taken into consideration.

6.7.2.2.10 housing equipped with vacuum relief device must be designed to withstand, without permanent deformation an external pressure of at least 0.21 bar higher than the internal pressure. The vacuum relief device must be calibrated to no more than 0.21 bar negative unless the housing is designed to upper external overpressure, in which case the vacuum pressure relief device should not be higher than the vacuum pressure tank design. Carcasses used for the transport of solid substances belonging to groups only Packaging II or III which do not liquefy during transport can be designed

642

Page 150

to a lower external pressure, where approved by the authority competent. In this case, the vacuum relief device must be calibrated so which is activated at this lower pressure. Carcasses equipped with vacuum relief device shall be designed to withstand without deformation Permanent an external pressure of at least 0.4 bar above the internal pressure.

6.7.2.2.11 Vacuum-relief devices used on portable tanks for the carriage of substances that meet the criteria for flash point of Class 3 products, including substances carried in the same temperature or above its flash point, must prevent the immediate passage of flame to the Housing interior, or the portable tank shall have housing able to withstand, without leakage, possible internal explosion resulting from the passage of flame to your interior.

6.7.2.2.12 Portable tanks and their fastenings when filled with cargo

maximum allowable, must be able to absorb the static forces following
implemented separately:

a) in the direction of travel: twice the maximum gross mass
Permissible multiplied by the acceleration of gravity (g);

b) horizontally in the direction perpendicular to the direction of travel:
the maximum permissible gross mass (if the direction of travel not
is clearly determined, the forces shall be equal to twice
the MPGM) multiplied by the acceleration
gravity (g);

c) Vertically upwards: the MPGM
multiplied by the acceleration of gravity (g); and

d) Vertically downwards: twice the maximum gross mass
Permissible (total load, including the effect of gravity) multiplied
by the acceleration of gravity (g).

Notice: *For calculation purposes, $g = 9.81 m / s^2$.*

6.7.2.2.13 The safety factor to be considered under each of the forces
mentioned in item 6.7.2.2.12 shall be as follows:

a) for metals with clearly defined yield point, a
safety factor of 1.5 compared to the yield stress

guaranteed; or

b) for metals with no clearly defined yield point, a
safety factor of 1.5 in relation to mechanical stress
0.2% proof guaranteed and, for austenitic steels, mechanical stress
1% test.

6.7.2.2.14 The value of yield stress or mechanical stress test shall
to conform to national or international standards specified for materials.
When austenitic steels are used, the minimum voltage values
flow or mechanical stress test specified by the standards can be
plus up to 15% when greater values are attested in the certificate
inspection of material. When there is no standard for the metal in question, the value
adopted for the yield stress or mechanical stress test shall be
approved by the competent authority.

6.7.2.2.15 Portable tanks shall be electrically grounded when intended
the transport of substances that meet the criteria specified for flash point
of Class 3 products, including high-temperature substances transported or
temperature above its flash point. steps should be taken to avoid
dangerous electrostatic discharge.

6.7.2.2.16 When required for certain substances, the instruction on applicable portable tank as indicated in column 12 of the Goods List Dangerous and described in paragraph 4.2.5.2.6 or by a portable tank special provision for indicated in Column 13 of the Dangerous Goods List and described in Section 4.2.5.3, the portable tanks must have an additional protection which may consist of an increase in thickness of the housing or greater pressure test, given in both cases the risks inherent to the transported substances.

6.7.2.2.17 The thermal insulation directly in contact with a housing intended for transport of substances at high temperature should have an ignition temperature at least 50 ° C higher than the maximum temperature of the tank design.

6.7.2.3 Design Criteria

6.7.2.3.1 Carcasses must be designed so as to enable analysis mathematical or experimental tensions through the resistance meter efforts, or by other methods approved by the competent authority.

6.7.2.3.2 Carcasses must be designed and manufactured to withstand a pressure hydraulic test of not less than 1.5 times the design pressure. specific requirements They are established for certain substances in the relative instruction to portable tanks applicable, indicated in Column 12 of the Dangerous Goods List and described in item 4.2.5.2.6, or special provision for portable tank indicated in Column 13 of the Relationship Dangerous Goods described in item 4.2.5.3. the requirements must be adhered to minimum thickness of the substrate for such tanks, specified in items 6.7.2.4.1 to 6.7.2.4.10.

6.7.2.3.3 For metals that have a clearly defined yield point, or characterized by an assured mechanical stress testing (usually 0.2% mechanical tension test or, for austenitic steels, 1% mechanical strain test), the primary membrane σ (sigma) of housing voltage must not exceed the 0.75 Re or 0.50 Rm, whichever is lower, at the test pressure, where:

Re = yield strength in N / mm^2 , or 0.2% of the tensile stress assay or, for austenitic steels, 1% mechanical tension test

Rm = minimum tensile stress in N / mm^2 .

6.7.2.3.3.1 The Re and Rm values to be used shall be the minimum values specified according to national or international material standards. When austenitic steels, the specified minimum values for Re and Rm according with the material standards may be increased by up to 15% when such values more high are attested in the inspection certificate of the material. When there is no standard for the metal in question, the values of Re and Rm used shall be approved

by the competent authority or body designated by it believed.

6.7.2.3.3.2 Steels with a Re / Rm ratio of more than 0.85 are not eligible for manufacturing welded shells. The Re and Rm values to be used in determination of this relationship must be specified in the inspection certificate material.

6.7.2.3.3.3 Steels used in the manufacture of shells shall have an elongation at break, in%, of not less than 10,000 / Rm with an absolute minimum of 16% to steel fine grain and 20% for other steels. Aluminium and aluminum alloys used in manufacturing housings must have an elongation at break in%, not less than

10,000 / 6Rm with an absolute minimum of 12%.

6.7.2.3.3.4 For the purpose of determining the actual values of the materials should be observed that in the case of metal plates, the axis of the body-specimens for testing traction should be perpendicular (across) to the rolling direction. O permanent elongation at fracture shall be measured in body-of-test with section rectangular cross according to ISO 6892: 1998, using template 50 mm long.

6.7.2.4 Minimum thickness of housing

6.7.2.4.1 The minimum shell thickness shall be the greater thickness based on:

a) the minimum thickness determined in accordance with the requirements of items 6.7.2.4.2 to 6.7.2.4.10;

b) the minimum thickness determined in accordance with the design pressure approved, including the requirements of item 6.7.2.3; and

c) the minimum thickness specified in the relative instruction tanks Portable indicated in Column 12 of the Dangerous Goods and described in item 4.2.5.2.6 or a special provision for tanks Portable indicated in Column 13 of the Dangerous Goods and described in item 4.2.5.3.

6.7.2.4.2 The cylindrical portions, ends (caps) and covers of manholes casings with a diameter of up to 1.80 meters can not have a thickness less than 5 mm steel reference or equivalent thickness in the metal to be employed. In carcasses diameter exceeds 1.80 m, the thickness shall not be less than 6 mm steel reference or equivalent thickness in the metal to be used, except for solids in powder or granulated for packing groups II or III, when the the minimum thickness can be reduced to no less than 5 mm in reference steel or equivalent thickness in the metal to be used.

6.7.2.4.3 When there is additional protection against damage of the housing, tanks laptops with less than 2.65 bar test pressure can have a minimum thickness

reduced proportionately to the adopted protection, as approved by the authority competent. However, carcasses up to 1.80 m in diameter must be thicker not less than 3 mm, in the reference steel or of equivalent thickness in the metal to be used. Carcasses of more than 1.80 m in diameter can not have a thickness less than 4

mm in the reference steel or of equivalent thickness in the metal to be used.

6.7.2.4.4 The cylindrical portions, ends (caps) and covers of manholes any substrate can not be thinner than 3 mm, irrespective of the adopted manufacturing material.

6.7.2.4.5 The additional protection referred to in item 6.7.2.4.3 may be obtained by an outer structural complete protection, for example, a manufacturing "sandwich" with external protection (jacket) secured to the housing, manufacturing double-walled, or involving the carcass in a full frame with structural elements longitudinal and transverse.

6.7.2.4.6 The equivalent thickness of a metal other than the reference steel, which thickness is prescribed in section 6.7.2.4.3 shall be determined by the following formula:

$$and_1 = \frac{4.21\, and_0}{3\, rm_1\, shah_1}$$

on what:

and $_1$ = Equivalent thickness (in mm) required for the metal to be employee;

and $_0$ = Minimum thickness (in mm) of the reference steel specified in instruction on applicable portable tank identified in Column 12 of the Dangerous Goods List and described in item 4.2.5.2.6, or especially provision for portable tanks indicated in Column 13 of the Dangerous Goods List and described in section 4.2.5.3;

Rm $_1$ = resistance guaranteed minimum tensile (N / mm ^{2}) of the metal to be used (see section 6.7.2.3.3);

The $_1$ = Guaranteed minimum elongation at break (in%) of the metal to be used according to national or international standards.

6.7.2.4.7 When, according to the instruction on the applicable portable tank identified in Column 12 of the Dangerous Goods List and described in paragraph 4.2.5.2.6, a minimum thickness of 8 mm or 10 mm is specified, it should be noted that such thicknesses are based on the properties of the reference steel and a diameter Housing 1.80m. When using metal other than mild steel (see section 6.7.2.1) or when the housing has a diameter greater than 1.80 m, the thickness should be determined

Page 155

by the formula:

$$a_1 = \frac{4.21\, in_{10}}{8.13\, rm_1 sh_1 h_1}$$

on what:

and $_1$ = Equivalent thickness (in mm) required for the metal to be employee;

and $_0$ = Minimum thickness (in mm) of the reference steel specified in instruction on applicable portable tank identified in Column 12 of the Dangerous Goods List and described in item 4.2.5.2.6, or especially provision for portable tanks specified in column 13 of the Dangerous Goods List and described in section 4.2.5.3;

d $_1$ = housing diameter (m) but not less than 1.80 m;

Rm $_1$ = resistance guaranteed minimum tensile (N / mm2) of the metal to be used (see section 6.7.2.3.3);

A $_1$ = guaranteed minimum elongation at break (in%) of the metal to be used in accordance with national or international standards.

6.7.2.4.8 In no case shall the wall thickness be less than that specified in items 6.7.2.4.2, 6.7.2.4.3 and 6.7.2.4.4. All parts of the carcass must have a minimum thickness determined in items 6.7.2.4.2 to 6.7.2.4.4. This thickness should not include tolerance to corrosion.

6.7.2.4.9 When using mild steel (see section 6.7.2.1) shall not be required to calculate according to the formula specified in item 6.7.2.4.6.

6.7.2.4.10 There shall be no sudden change of plate thickness at the junction of ends (caps) with the cylindrical part of the housing.

6.7.2.5 Service Equipment

6.7.2.5.1 Service equipment should be placed so that it is protected against the risk of being ripped off or damaged during transport and handling. If the connection of the frame with the frame of the tank allow relative movement between parts of Together, the equipment must be set so as to allow this movement, but without the risk of damaging the parts. The external discharge fittings (pipe nipples, closing devices), the internal stop-valve and its seating must be

Page 156

protected against the risk of being torn by external forces (for example, using-

is shear sections). The devices (including flanges or threaded plugs) of filling and emptying and any protective caps must be protected Inadvertent opening.

6.7.2.5.2 All housing openings intended for filling and emptying portable tank shall be fitted with shut-off valves operated manually, installed as close to the carcass. Other openings, except those devices designed to vent or pressure relief are to be equipped with sealing valve or other suitable means of closure located as close to the carcass.

6.7.2.5.3 All portable tanks shall have a manhole or other openings of appropriate size inspection to allow inspection of its interior and provide adequate access for internal repair and maintenance. Portable tanks compartmentalised must have manhole or other inspection openings for each compartment.

6.7.2.5.4 External fittings shall be grouped as much as possible. For portable tanks with thermal insulation, top accessories should be surrounded by collector tank spills with suitable drains.

6.7.2.5.5 All connections to the portable tank must display applications as well visible indicating their respective functions.

6.7.2.5.6 All shut-off valves and other closing means must be designed and manufactured with working pressure not less than the maximum pressure allowable working housing, considering the predicted temperatures during transport. All stop-valves with threaded rod should end up turning the steering wheel clockwise. For other sealing valves, the position (open and closed) and direction of closure shall be clearly indicated. All valves seal must be designed to prevent accidental opening.

6.7.2.5.7 None of the moving parts (for example, roofs, components fasteners, etc.) must be made of non-corrodible steel protected when subject to enter contact, friction or repetitive shocks with aluminum portable tanks intended for the transport of substances that conform to the criteria specified for point glow on the Class 3 products, including substances carried to high temperature or temperature above its flash point.

649

Page 157

6.7.2.5.8 The pipes must be designed, manufactured and installed to avoid damage due to thermal expansion and contraction, mechanical shock and vibration. All pipes should be made of suitable metallic material. Whenever possible, their pipe joints shall be welded.

6.7.2.5.9 The joints of copper pipes must be joined with brazing or present a metal union of equal strength. The melting point of the material

used for welding must not be lower than 525 ° C. The joints shall not reduce Pipe resistance, which can occur when a thread does.

6.7.2.5.10 The burst pressure of all piping and accessories can not be less than the greater of: four times the maximum working pressure permissible housing or four times the pressure that the pipe can be submitted in service by the action of pump or other device (except pressure relief valves).

6.7.2.5.11 In the manufacture of valves and fittings must be used metals Ductile.

6.7.2.5.12 The heating system shall be designed or controlled so that no substance reaches a temperature at which the pressure in the tank exceeds the maximum allowable working pressure or other risks occasion (for example, a dangerous thermal decomposition).

6.7.2.5.13 The heating system shall be designed or controlled so that internal heating elements do not receive energy, unless such elements They are fully submerged. The surface temperature of the elements heating, in the case of internal heating equipment or the temperature in casting in the case of an external heating system, can not exceed 80% autoignition temperature (° C) of the substance carried.

6.7.2.5.14 If fitted with an electric heating system inside the tank, It must be equipped with a circuit breaker earth leakage to present a current off less than 100 mA.

6.7.2.5.15 The electrical distribution boxes installed in the tanks may not be any direct connection to the inside of the tank and should offer protection at least equivalent to IP56 the type according to IEC 144 and IEC 529.

6.7.2.6 lower openings

6.7.2.6.1 Certain substances can not be transported in portable tanks openings in the bottom. If the statement on portable tanks, indicated in Column 12 of the Dangerous Goods List and described in paragraph 4.2.5.2.6, prohibit openings below, there can be any opening below the level of the liquid to be transported the housing when it is filled to the maximum permissible limit. The closing Openings should be performed by welding to an inner plate and externally to carcass.

6.7.2.6.2 lower discharge ports in portable tanks carrying certain solid substances, crystallizable or highly viscous, should be equipped with at least two closing devices serially fitted and mutually independent.

The equipment design must satisfy the competent authority or body designated by it accredited and shall include:

a) an outer sealing valve installed as close to the housing as possible and constructed to prevent any opening Inadvertent, either by impact or other unintended action; and

b) an tight closure at the end of the discharge pipe, which can be blind flange screwed or screw cap.

6.7.2.6.3 Every bottom discharge outlet, except as provided in item 6.7.2.6.2, It must be equipped with three closure devices in series and mutually independent. The equipment design must satisfy the competent authority or body believed by it and must include:

a) an internal automatic closure valve seals, i.e., a sealing valve inside the housing or in a welded flange or a companion flange so that:

(I) the control devices for valve operation are designed to prevent accidental opening due to impact or other Inadvertent action;

(Ii) the valve is operated from above or below;

(Iii) whenever possible, the valve position, open or closed, You should be able to be checked at ground level;

(Iv) it must be possible to close the valve a point

affordable portable tank situated away from the valve itself, except for portable tanks with a capacity of up to 1,000 L; and

(V) the valve keep the tightness in case of damage external device valve operation control;

b) an outer sealing valve installed as close to the housing as possible; and

c) a leakproof closure at the end of the discharge pipe, which can be a blind flange nut or a screw cap.

6.7.2.6.4 In the case of coated housing, the internal stop-valve required in letter "a" item 6.7.2.6.3 may be replaced by an external valve sealing additional. The manufacturer shall meet the requirements of the competent authority or body believed by it.

6.7.2.7 safety relief device

6.7.2.7.1 All portable tanks shall be equipped with at least one pressure relief device. Every pressure relief device shall be designed, manufactured and marked according to the standard of the competent authority or body designated by it

believed.

6.7.2.8 pressure relief devices

6.7.2.8.1 Every portable tank with a capacity not less than 1,900 L and all independent compartment of a portable tank with a similar capacity should be provided with one or more devices for pressure relief spring-loaded type, and You can have also a rupture disc or a fusible element in parallel with the devices driven by spring, except where prohibited by reference to item 6.7.2.8.3 in education on applicable portable tank constant in item 4.2.4.2.6. The pressure relief devices shall have sufficient capacity to prevent rupture the housing as a consequence of over-pressurization or vacuum caused by filling, emptying or by heating the contents.

6.7.2.8.2 The pressure relief devices shall be designed to avoid foreign matter intake, fluid leakage and formation of dangerous excess pressure.

6.7.2.8.3 When required for certain substances by the instruction on tanks Portable applicable, indicated in Column 12 of the Dangerous Goods List and described in item 4.2.5.2.6, portable tanks shall be equipped with relief device

pressure approved by the competent authority. Unless a tank intended for use particular be provided with pressure relief device constructed of materials consistent with the load to be transported, the relief device may comprise a frangible disc preceding a pressure relief device actuated by spring. When a frangible disc is installed in series with the pressure relief device required, the space between the frangible disc and the pressure relief device must be installed a pressure gauge or a suitable indicator to detect disc rupture, perforation or leakage which could cause system malfunction. The disk rupture should rupture at a nominal pressure 10% higher than that triggers the relief device.

6.7.2.8.4 Every portable tank with less than 1,900 L capacity must be equipped with a pressure relief device, which may be a frangible disc that meets requirements contained in item 6.7.2.11.1. When not employed relief device of the type driven by spring pressure, the frangible disc shall be set to romper- to a nominal pressure equal to the test pressure. Furthermore, they can also be Fusible elements used in accordance with item 6.7.2.10.1.

6.7.2.8.5 When the housing is equipped to be emptied under pressure line power must be provided with a suitable pressure relief device, calibrated to operate a non-pressure greater than the maximum allowable working pressure housing, and a sealing valve installed as close to the housing as possible.

6.7.2.9 Regulation of pressure relief devices

6.7.2.9.1 pressure relief devices should only take action if the

temperature increases excessively, because in normal conditions of carriage housing can not be subject to undue pressure fluctuations (see item 6.7.2.12.2).

6.7.2.9.2 The required pressure relief device shall be set to start downloading at a nominal pressure of five sixths of the test pressure, where housings with test pressure not exceeding 4.5 bar and 110% of two-thirds of test pressure for carcasses with more than 4.5 bar test pressure. After downloading, the device must close at a pressure of up to 10% below the pressure in the which starts discharging. The device shall remain closed at any pressure more low. This requirement shall not prevent the use of vacuum-relief devices or combinations of pressure and vacuum relief devices.

6.7.2.10 fusible elements

6.7.2.10.1 Fusible elements shall operate at a temperature between 110 ° C and 149 ° C, since the pressure developed in the housing melting temperature element does not exceed the test pressure. These elements should be at the top carcase with admission to the vapor space and in no case should be protected from external heat. Portable tanks whose test pressure exceeds 2.65 bar They can not be provided with fuse elements, unless specified by the Provision Special for TP36 Tanks in Column 13 of the Dangerous Goods. elements Fuses used in portable tanks for the carriage of substances high temperature should be designed to operate at a higher temperature maximum temperature that occur during transport and must meet the authority or competent body designated by it believed.

6.7.2.11 rupture discs

6.7.2.11.1 Except as specified in item 6.7.2.8.3, rupture discs must be adjusted to break through to a nominal pressure equal to the test pressure observed along the design temperature range. It should be given special attention requirements set out in items 6.7.2.5.1 and 6.7.2.8.3, when disks are used break.

6.7.2.11.2 rupture discs must be suitable to withstand the pressures of vacuum that may be produced in the portable tank.

6.7.2.12 Capacity of pressure relief devices

6.7.2.12.1 The pressure relief device actuated by spring, required in item 6.7.2.8.1, should have a cross-sectional area of flow of at least a orifice diameter of 31.75 mm. The vacuum-relief devices when employees should have a cross-sectional area of minimum flow of 284 mm^2 .

6.7.2.12.2 The combined discharge capacity of the pressure relief system (Taking into account the decrease in flow when the portable tank comprises a disc

Break over a pressure relief device of the type spring loaded or
when it comprises a device to prevent the passage of flame), the
conditions in the portable tank to be fully engulfed in flames, should
be sufficient to limit the pressure in the housing to a value 20% above the pressure in the
which is triggered pressure relief device. devices may be used
emergency pressure relief in order to achieve the full capacity of prescribed relief.

654

Page 162

These devices may be fusible, spring loaded devices or
rupture discs or a combination of spring loaded devices and disks
break. The total required capacity of the relief devices may be determined
using the formula specified in item 6.7.2.12.2.1 or Table in Item
6.7.2.12.2.3.

6.7.2.12.2.1 To determine the total required capacity of the relief devices, which
It can be considered as the sum of capacity of each of the various devices,
It should be used the following formula:

$$Q = 4.12 \frac{FA}{LC} \sqrt{\frac{82.0\ ZT}{M}}$$

on what:

Q = minimum required rate of discharge in cubic meters of air per
second (m^3 / s) under standard conditions: 1 bar and 0 ° C (273 K);

F = is a coefficient with the following value:

F = 1; for carcasses without thermal insulation

$F = \frac{U\ 649\ (T)}{6:13}$; to thermally insulated shells

However, M should be not less than 0.25, wherein:

U = thermal conductance of the insulation, in $kW.m^{-2} . K^{-1}$ at 38 ° C

t = actual temperature of the substance during filling (in
W); when the temperature is unknown, using T = 15 ° C;

The value of F given above for insulated shells can be used,
provided that the insulation is in accordance with Item
6.7.2.12.2.4;

A = total area of the outer surface of the housing in m^2 ;

Z = gas compressibility factor in the accumulating condition
(When this factor is unknown, let Z equal 1.0);

T = absolute temperature in Kelvin (° C + 273) above the device

pressure relief in the accumulating condition;

Page 163

L = latent heat of vaporization of the liquid, in kJ / kg, in conditions accumulation;

M = molecular weight of gas that is discharged;

C = constant which is calculated by the following formulas as function of the ratio k of specific heats:

$$k = \frac{W_P}{W_v}$$

on what:

Cp = specific heat at constant pressure;

Cv = specific heat at constant volume.

When k > 1:

$$W = k\left(\frac{2}{k+1}\right)^{\frac{k+1}{k-1}}$$

When $k = 1$ or k is unknown:

$$W = \frac{1}{and} = 607.0$$

where *and* is the mathematical constant 2.7183.

C can also be obtained from the following Table:

k	W	k	W	k	W
1.00	0.607	1.26	0.660	1.52	0.704
1.02	0.611	1.28	0.664	1.54	0.707
1.04	0.615	1.30	0,667	1.56	0.710
1.06	0.620	1.32	0.671	1.58	0.713
1.08	0.624	1.34	0.674	1.60	0.716
1.10	0.628	1.36	0.678	1.62	0.719
1.12	0.633	1.38	0.681	1.64	0.722
1.14	0.637	1.40	0.685	1.66	0.725
1.16	0.641	1.42	0.688	1.68	0.728
1.18	0.645	1.44	0.691	1.70	0.731
1.20	0.649	1.46	0.695	2.00	0.770

Page 164

1.22	0.652	1.48	0.698	2.20	0.793
1.24	0.656	1.50	0.701		

6.7.2.12.2.2 As an alternative to the above formula, the casings designed for the transport liquids may have their relief devices sized according to Table constant in item 6.7.2.12.2.3. In this table, we adopted the value of the insulation factor F = 1 and should be adjusted properly when it is thermally insulated housing.

Other values used in determining this table are:

M =	86.7	T = 394 K	
L	=	334.94 kJ / kg	C = 0.607
Z	=	1	

6.7.2.12.2.3 minimum discharge ratio required, Q, in cubic meters of air per second at 1 bar and 0 ° C (273K)

THE exposed area (m squares)	**Q (Cubic meters of air per second)**	**THE exposed area (m squares)**	**Q (Cubic meters of air per second)**
2	0.230	37.5	2,539
3	0.320	40	2,677
4	0.405	42.5	2,814
Referring to Fig.	0.487	45	2,949
6	0,565	47.5	3,082
7	0.641	50	3,215
Referring to Fig.	0.715	52.5	3,346
Referring to Fig.	0.788	55	3,476
10	0.859	57.5	3,605
12	0.998	60	3,733
14	1,132	62.5	3,860
16	1,263	65	3,987

18	1,391	67.5	4,112
20	1,517	70	4,236
22.5	1,670	75	4,483
25	1,821	80	4,726

27.5	1,969	85	4,967
30	2,115	90	5,206
32.5	2,258	95	5,442
35	2,400	100	5,676

6.7.2.12.2.4 The thermal insulation systems used to allow reduction venting capacity, shall be approved by the competent authority or body believed by it. In any case, insulation systems approved for this purpose shall:

a) remain effective at all temperatures up to 649 ° C;

b) is coated with material having a melting point of 700 ° C or more.

6.7.2.13 Marking of pressure relief devices

6.7.2.13.1 Every pressure relief device shall be clearly marked and permanent, indicating the following:

a) the pressure (in bar or kPa) or temperature (in ° C) that is set to discharge;

b) the permissible tolerance in the discharge pressure in the case of spring driven devices;

c) the reference temperature corresponding to the pressure operation in case of rupture discs;

d) the allowable tolerance of temperature in the case of fusible elements;

e) the flow capacity of the pressure relief device activated by spring, the rupture discs or fusible elements in meters cubic air per second (m^3 / s);

f) the areas of cross-section of the pressure relief device

spring-loaded, the rupture discs and fusible elements in mm^2;

Where practicable, should also be shown the following information:

g) the manufacturer's name and the relevant catalog number.

6.7.2.13.2 The flow capacity marked on the pressure-relief devices triggered by spring must be determined in accordance with ISO 4126-1: 2004 and ISO 4126-7: 2004.

6.7.2.14 Connections to pressure relief devices

6.7.2.14.1 Connections to pressure relief devices shall have dimensions

sufficient to allow the necessary discharge pass unrestricted through the device of security. It can be installed either seal between valve housing and pressure relief devices, unless there are duplicate devices, because of maintenance or other device and the sealing valves are in use locked in the open position and these are joined so that at least one of the duplicate devices is always in operating condition. There can not be any obstruction in opening that leads to the vent or relief device pressure to restrict or prevent the housing flow to the device. Vents or pipes from the pressure relief device, if any, should release vapor or liquid to the atmosphere in conditions of minimum back on these devices.

6.7.2.15 Siting of pressure relief devices

6.7.2.15.1 The inputs of the pressure relief devices shall be located in top of the housing in such a position near the longitudinal and transverse center housing as possible. In potting conditions to the maximum permissible load, All pressure relief device inlets should be located in space Housing steam, and the devices must be willing to ensure free discharge of vapors. For flammable substances, the discharge the vapors to be directed away from the housing, so that not collide with same. It admitted the use of protective devices which deflect the flow of vapor, since they do not reduce the required relieving capacity.

6.7.2.15.2 steps must be taken to prevent access of people non-authorized the pressure relief devices as well as to protect these

devices in the event of overturning of the portable tank.

6.7.2.16 Measuring instruments

6.7.2.16.1 can not be used glass level indicators or gauges made of other fragile material, when there is the possibility of such instruments being in direct contact with the contents of the tank.

6.7.2.17 Supports, frames and lifting devices and fixing tanks portable

6.7.2.17.1 Portable tanks shall be designed and manufactured with structure support for safe base during transport. The forces specified in item 6.7.2.2.12 and the safety factor specified in 6.7.2.2.13 item should be considered in this aspect of the project. Platforms, frameworks, cradles and structures Similar are accepted.

6.7.2.17.2 The combined stresses caused by the media (eg cradles, frames, etc.) and the lifting accessories and attachment of portable tanks not

can cause excessive stress in any part of the carcass. All tanks
laptops should be equipped with lifting accessories and permanent fixation. such
Accessories should preferably be seated in portable tank supports but is
admitted their attachment to reinforcing plates located on the housing in support points.

6.7.2.17.3 In the design of supports and frameworks, the effects should be considered
environmental corrosion.

6.7.2.17.4 The plug openings of the lifting forks should be able to be closed.
The openings closure means should be permanent part of the structure or
They are permanently fixed to it. There is no need for such closing means,
in the case of portable tanks single compartment with less than 3,65 m
length, provided that:

a) the carcass and all its accessories are well protected
impact on lifting fork blades; and

b) the distance between the centers of the forklift pockets is of the
least half of the maximum length of the portable tank.

6.7.2.17.5 When portable tanks are not protected during transport,
according to item 4.2.1.2, the carcasses and service equipment must be protected
against damage from lateral or longitudinal impact or overturning. accessories

external must be protected to prevent the housing content escapement
result of impact or overturning of the tank on these accessories. Examples of
protection:

a) protection against side impact, which can consist of bars
longitudinal protecting the shell on both sides at the height of the row
average;

b) protection of the portable tank against overturning which may consist of
reinforcement rings or bars fixed across the frame;

c) protection against rear impact which may consist of a parachoque
or grid;

d) Housing protection from impact damage caused or
overturning by use of a standard ISO frame in accordance
with ISO 1496-3: 1995.

6.7.2.18 design approval

6.7.2.18.1 The competent authority or body designated by it believed should send to
each new portable tank design, a certificate of approval. This certificate must
attest that a portable tank has been inspected by the authority, it is suitable for the purpose
it is intended and meets the requirements of this Chapter and, where appropriate, to
provisions relating to substances in Chapter 4.2 and Relationship Products
Hazardous Chapter 3.2. When a series of portable tanks are manufactured without

design modification, the certificate is valid for the entire series. The certificate must refer
the test report of the design type, the substances or group of substances
They can be transported to the manufacture of carcass materials and coating
(Where applicable) and an approval number. The approval number shall consist of
a sign or hallmark of the country in whose territory the approval was granted, or
is the acronym for use in international traffic prescribed by the *Convention on Road Traffic* ,
Vienna 1968, and a registration number. Any alternatives, as
provisions of item 6.7.1.2 shall be indicated on the certificate. The project approval may
serve for the approval of smaller portable tanks made of the same material
type and thickness, using the same fabrication techniques and with identical supports and
equivalent openings and accessories.

6.7.2.18.2 The design type of the test report for the design approval shall include,
at least the following:

a) the results of the applicable framework test specified in Rule
ISO 1496-3: 1995;

b) the results of the initial inspection and test specified in item
6.7.2.19.3; and

c) the results of the impact test prescribed in item 6.7.2.19.1,
if applicable.

6.7.2.19 Inspection and testing

6.7.2.19.1 Portable tanks meeting the definition of CSC's container,
1972, as amended, they can not be used unless they have been approved
through the presentation of a representative design type of each design type
submitted to the Dynamic Test Impact Longitudinal prescribed in Section 41 of Part IV
of Tests and Criteria Manual.

6.7.2.19.2 The housing and each portable tank service equipment should be
inspected and tested (inspection and initial testing) before being put into service
and thereafter at intervals of five years (five-year inspection and test) with
inspection and intermediate periodic test between inspections and tests quinquennial
(Inspection and testing at intervals of 2.5 years). The inspection and testing intervals 2.5
years can be performed within a 3-month limit of the specified date. Must
be carried out tests and exceptional inspections, regardless of the date of the last
Periodic testing and inspections, where appropriate, in accordance with item 6.7.2.19.7.

6.7.2.19.3 The inspection and initial testing of the portable tank shall include a
verification of design characteristics, an internal and external examination of the portable tank and
their accessories, with due consideration of the substances to be transported, and
pressure test one. Before the portable tank is placed into service, should be
carried out a leakage test and a test of the satisfactory operation of the entire

service equipment. If the shell and service equipment have been
subjected to a pressure test, separately, after assembly, the assembly must
be subjected to a tightness test.

6.7.2.19.4 The inspections and five-year periodic tests shall include internal examination
and external and, as a rule, hydraulic pressure test. In the case of tanks that only
They are used for the transport of solid substances that are not toxic or
corrosive, which do not liquefy during transport, the hydraulic pressure test
It may be replaced by a suitable pressure test 1.5 times the pressure

Page 170

MAWP, when approved by the competent authority. The
coatings, thermal insulation etc., should be removed as
necessary for a reliable assessment of the state in which it is the portable tank.
If the shell and service equipment were submitted separately to a
pressure test, once assembled, the assembly shall be subjected to a test
tightness.

6.7.2.19.5 The inspections and periodic tests at intervals of 2.5 years shall include at
minimum internal and external examination of the portable tank and its accessories, considering
the substances to be transported, tightness testing and operation tests
satisfactory service equipment. Coatings, thermal insulation, etc.,
They should be removed only to the extent necessary for a reliable evaluation of the state
that is portable tank. As for portable tanks dedicated to the transport
a single substance, the internal examination at intervals of 2.5 years may be waived
or substituted by other test methods or inspection procedures specified
the competent authority or body designated by it believed.

6.7.2.19.6 Portable tanks may not be filled and available for
transport after the expiration date of the inspections and five-year periodic tests or
2.5 years as required in item 6.7.2.19.2. However, they can be transported by
period of up to three months after the expiration date, portable tanks that were
filled before the expiration date of the last testing and periodic inspections **.** Beyond
that, after the expiration date of the last testing and periodic inspections, the tanks
laptops can be transported under the following conditions:

a) after being emptied and before being cleaned, in order to
perform the next test and required periodic inspections before
refill; and

b) for a period of up to six months, unless the competent authority
establish otherwise, to ensure the return of dangerous goods
in order to give it proper recycling or disposal.
Reference to this exemption shall be mentioned in the document
transport.

6.7.2.19.7 It is necessary to carry out inspection and exceptional test when the tank

Portable present evidence of damaged or corroded areas, leakage, or other conditions indicating impairment that affects the integrity of the portable tank. The extension

663

Page 171

the exceptional inspection and testing depend on the level of damage or deterioration portable tank. Should be included, at least, inspection and testing of 2.5 years, as Item 6.7.2.19.5.

6.7.2.19.8 The internal and external examinations shall ensure that:

a) the housing is free of erosion, corrosion, or abrasions, dents, distortions, weld defects or any other conditions, including leak that make the portable tank unsafe for transport;

b) piping, valves, heating or cooling and gaskets are free from corrosion, defects and other conditions, leak including that make the portable tank unsafe for filling, transport or emptying;

c) the fixing device manholes covers are operational and there is no leakage in these covers or gaskets;

d) there are no bolts and missing or loose nuts on connections flanges or blind flanges are replaced or tightened;

e) all valves and emergency devices are free from corrosion, distortion and any damage or defect that prevents their normal operation. closing devices operated by remote lock and automatic shut-off valves should be driven to demonstrate proper operation;

f) coating, if present, are in accordance with the criteria indicated by the manufacturer;

g) The markings required by portable tank are legible and in accordance with the applicable requirements; and

h) The framework, supports and lifting devices of the portable tank are in satisfactory condition.

6.7.2.19.9 The inspections and tests provided for in paragraphs 6.7.2.19.1, 6.7.2.19.3, 6.7.2.19.4, 6.7.2.19.5 and 6.7.2.19.7 shall be performed or witnessed by accredited expert the competent authority or body designated by it believed. When the pressure test part of the inspection and test, the test pressure must be indicated on the label where contains the data of the portable tank. While under pressure, the portable tank must be inspected for leakage in the shell, piping or equipment.

664

Page 172

6.7.2.19.10 When welding operations are made, cutting or burning housing, such operations must be approved by the competent authority or body for she believed, considering the pressure vessel code used in casting manufacturing. After completion of the work must be carried out test pressure the original test pressure.

6.7.2.19.11 When evidence of any unsafe condition, the portable tank It can not be reused until the defects have been corrected, and the tank has been approved in another test.

6.7.2.20 Marking

6.7.2.20.1 Every portable tank shall be provided with corrosion resistant metal plate fixed to it permanently, in a conspicuous place readily accessible for inspection. When, by the portable tank configuration, you can not attach the plate to the housing permanently, the carcass must be marked with at least the information required the pressure vessel code. They must be marked on the plate by stamping or similar method at least the following data specified:

(The) Owner Information

(I) the owner's registration number.

(B) Manufacturing Information

(I) manufacturing country;

(Ii) year of manufacture;

(Iii) manufacturer's mark or name;

(Iv) manufacturer's serial number.

(w) Approval Information

(I) the UN symbol for packaging

This symbol can not be used for any purpose other than to indicate a container, a container for flexible bulk, a portable tank or CGEM meet the requirements of Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8;

(Ii) the country of approval;

665

Page 173

(Iii) Authorized body for approval of the project;

(Iv) project approval number;

(V) the letters "AA" if the project has been approved with arrangements

alternative (see section 6.7.1.2);

(Vi) pressure vessel of the regulation with which the shell is designed;

(D) pressures

(I) Maximum Permissible pressure Working in bar or kPa (pressure gauge);

(Ii) the test pressure, in bar or kPa (gauge pressure);

(Iii) the date of the initial pressure test (month and year);

(Iv) the witness's identification mark or director of the test Initial pressure;

(V) external pressure design (see section 6.7.2.2.10), in bar or kPa (manometric pressure);

(Vi) Maximum Allowable Working Pressure for system Heating / Cooling in bar or kPa (gauge pressure) when applicable.

Notice: *The unit used shall be indicated.*

(and) temperatures

(I) Band design temperature, indicating the unit used (in ° C).

(F) materials

(I) housing materials and reference of material standards;

(Ii) thickness equivalent in reference steel, indicating the unit used (in mm);

(Iii) coating material (when applicable).

(G) Capacity

(I) Tank water capacity at 20 ° C, indicating the unit used (In liters). This shall be accompanied by the letter "S" when the housing is divided by antimovimentos plates into sections

Page 174

capacity of up to 7,500 liters;

(Ii) water capacity of each compartment at 20 ° C, indicating the unit used (in liters) (when applicable, for tanks with multiple magazines). This shall be accompanied by the letter "S" when the housing is divided by antimovimentos plates into sections capacity of up to 7,500 liters.

(H) Inspections and periodic tests

(I) type of most recent periodic test (2.5 years, 5 years or

exceptional);

(Ii) date of the most recent periodic test (month and year);

(Iii) most recent periodic test of the test pressure, indicating the unit used (in bar or kPa manomética) (if applicable);

(Iv) the identification mark or believed held

He witnessed the most recent test.

Page 175

Figure 6.7.2.20.1: Example of identification plate

Owner registration number
INFORMATION OF MANUFACTURE
Country of manufacture
Year of manufacture
Manufacturer
Number of manufacturer's serial
ADOPTION INFORMATION
Country of approval
authorized body for approval
from the project
project approval number "AA" (if applicable)
Housing project Regulation
(Regulation of the pressure vessel)
PRESSURES
MAWP bar or kPa
Pressure test bar or kPa
Date of test (Mm / yyyy) brand
initial rush witness
External Pressure test bar or kPa

MAWP for system in bar or kPa
heating / cooling (if applicable)
TEMPERATURES
design temperature range ° C to ° C
MATERIALS
Housing materials and reference of material standards
Equivalent thickness for steel reference mm
coating material (when applicable)
CAPACITY
Tank water capacity at 20 ° C l "S" if applicable
Water capacity compartment l "S" if applicable
___ At 20 ° C (when applicable, tanks with multiple compartments)

INSPECTIONS AND TESTS PERIODIC

Kind of test	Date test	Brand witness test pressure 3	gives and	Kind in test	Date test	Witness Mark and test pressure 3
	(Mm / yyyy)	bar or kPa			(Mm / yyyy)	bar or kPa

3 Test pressure if applicable

Page 176

6.7.2.20.2 The following information shall be marked in a durable way, the very portable tank or solid metal plate and securely attached to the tank:

Operator name

Maximum permissible gross mass (MPGM) _____ kg

Mass of the empty (tare) _____kg

Instruction for Portable Tank, according to item 4.2.5.2.6

Notice: *The identification of the substances transported, see Part 5 this Regulation.*

6.7.3 Requirements for the design, manufacture, inspection and testing portable tanks for the carriage of non-refrigerated liquefied gases.

Notice: *The following requirements also apply to portable tanks intended for transport of chemicals under pressure (UN numbers 3500, 3501, 3502, 3503, 3504 and 3505).*

6.7.3.1 settings

For purposes of the following:

Reference steel means a steel which has a tensile strength of 370 N / mm 2 and one elongation at break of 27%;

Mild steel means a steel with a guaranteed tensile strength of at least 360 N / mm 2 to 440 N / mm 2 and an elongation at break in accordance guaranteed minimum with paragraph 6.7.3.3.3.3;

Housing or tank body means the part of the portable tank containing liquefied gas non-refrigerated intended to be carried (tank proper), including openings and their closures, but does not include service equipment or elements external structural;

Filling density means the average mass of liquefied gas not-cooled Housing capacity liter (kg / l). The filling density is given in Instruction On T50 Portable Tanks, contained in section 4.2.5.2.6;

Tightness test means the test that using gas subjecting the shell and its service equipment to an effective internal pressure not less than 25% of pressure MAWP (PTMA);

669

Page 177

Service equipment means measuring instruments and devices filling and emptying, venting, safety and thermal insulation;

Structural equipment means the reinforcing, fastening, protective and external stabilization to the housing;

Design temperature range for casting should be from -40 ° C to 50 ° C for gases Liquefied non-refrigerated transported at ambient conditions. Should be considered more severe design temperatures for portable tanks subjected to severe weather conditions;

Maximum Permissible Gross Mass (MPGM) means the sum of the tank tare mass laptop with the heaviest load authorized for transport;

Test pressure means the maximum gauge pressure at the top of the housing, as during the pressure test;

Design pressure means the pressure to be used in the calculations required for recognized pressure vessel regulation. The design pressure can not be less than greater of the following pressures:

The) the maximum effective gauge pressure allowed in the shell during filling and emptying; or

B) the sum of:

(I) the maximum effective gauge pressure to which the shell was designed, as defined in paragraph "b" of pressure setting the MAWP (PTMA); and

(Ii) the total pressure determined based on the static forces specified in Section 6.7.3.2.9, but not less than 0.35 bar;

Pressure Maximum Allowable Working (PTMA) means not less than the pressure more the following high pressures, measured at the top of the housing in operating position, but in no case less than 7 bar:

a) the maximum effective gauge pressure allowed in the shell during filling or emptying; or

b) the maximum effective gauge pressure to which the shell was designed, to be:

(I) for a non-refrigerated liquefied gas listed in the Instruction

Page 178

On Portable Tanks T50, constant in section 4.2.5.2.6, the PTMA (in bar) specified in the Instruction Relative Tanks T50 portable for that gas;

(Ii) for other non-refrigerated liquefied gases, not less than the sum the following pressures:

- The absolute pressure of the steam (bar) of the non-liquefied gas Chilled to the design reference temperature minus 1 bar; and

- The partial pressure (bar) air or other gas contained in empty space, given the design reference temperature and expanding the liquid phase due to increased volume average temperature $t_r - t_f$ (t_f = Temperature Potting, usually 15 ° C, t_r = mean maximum temperature Tank 50 ° C);

(Iii) for chemicals under pressure, the PTMA (in bar) presented the Instruction for Portable Tank T50 for the portion liquefied propellant gas listed in Instruction T50 item 4.2.5.2.6;

Design reference temperature means the temperature at which it determines vapor pressure of the content for purposes of calculating the maximum working pressure Permissible (PTMA). The design reference temperature shall be lower than the temperature Critical non-refrigerated liquefied gas is to be transported, to ensure the liquefied gas remains all the time. This value, for each type of tank laptop, the following must be specified:

a) casing with 1.5 m diameter: 65 ° C;

b) housing with a diameter greater than 1.5 m:

i) without insulation or sun protection: 60 ° C;

ii) with sun protection (see section 6.7.3.2.12): 55 ° C; and

iii) with thermal insulation (see section 6.7.3.2.12): 50 ° C;

Portable tank means a multimodal tank with more than 450 L capacity, used the transport of non-refrigerated liquefied gases of Class 2. This includes a tank housing provided with the service equipment and structural necessary to transport gas. Must be able to be filled and emptied without removing your

671

Page 179

structural equipment. Must possess stabilizing members external to the housing and capable of being lifted when in full; It should be designed primarily to be lifted to a vehicle or transport vessel and be equipped with platform, mountings or accessories to facilitate mechanical handling. Tanker trucks, tank wagons, non-metallic tanks, intermediate bulk containers (IBCs) gas cylinders and large receptacles are not included in the definition of portable tanks.

6.7.3.2 General requirements for the design and manufacture

6.7.3.2.1 Carcasses must be designed and manufactured according to the provisions of a regulation for pressure vessels accepted by the competent authority. They shall consist of steel able to receive the desired shape. In principle, materials shall conform to national or international standards on materials. In welded shells, should only be used a material whose weldability has been fully demonstrated. The welds must be executed perfectly and should provide complete safety. If the manufacturing process or the material requires, the housing must be submitted to an appropriate heat treatment to ensure the necessary strength the welds and the heat affected zones. In choosing the material, it must be taken into regard to the range of design temperatures, with references to the risk of brittle breakage under tension (friability), the stress cracking by corrosion and resistance to impact. When fine-grained steel is used, the guaranteed value of the voltage flow must not exceed 460 N / mm $_2$ and the guaranteed value of the upper limit of tensile stress may not exceed 725 N / mm $_2$ according to the specification material. Portable tank materials must be suitable for the external environment that can be transported.

6.7.3.2.2 Carcasses, fittings and pipes of portable tanks shall be made of material which is:

a) substantially immune to attack (s) Gas (es) liquid (s) non-refrigerated (s) to be transported; or

b) properly inactivated or neutralized by chemical reaction.

6.7.3.2.3 Gaskets shall be made of materials compatible with the (s) gas (es) liquid (s) non-refrigerated (s) to be transported.

6.7.3.2.4 It should be avoided contact of different metals that may result in damage by galvanic action.

672

Page 180

6.7.3.2.5 The materials of the portable tank, including any devices, gaskets and accessories, can not adversely affect the non-refrigerated liquefied gases intended for carriage in the portable tank.

6.7.3.2.6 Portable tanks shall be designed and constructed with supports to Provide a secure base during transport and with lifting devices and suitable fixing.

6.7.3.2.7 Portable tanks shall be designed to withstand, without loss of contents, at least the internal pressure generated by the content and static charges, dynamic and thermal, in normal handling and transport. The project should demonstrate that the effect of fatigue caused by repeated application of these loads over the life of the portable tank, have been taken into consideration.

6.7.3.2.8 Shells shall be designed to withstand without deformation permanent external gauge pressure at least 0.4 bar above the pressure internal. If the housing needs to be subjected to significant vacuum before Potting or during dissections, it must be designed to withstand pressure external gauge of at least 0.9 bar above the internal pressure, and must be tested that pressure.

6.7.3.2.9 Portable tanks and their fastenings when filled with the maximum load admissible must be able to absorb the static forces applied following separately:

a) in the direction of travel: twice the maximum gross mass Permissible multiplied by the acceleration of gravity (g) 1 ;

b) horizontally in the direction perpendicular to the direction of travel: the maximum permissible gross mass (if the direction of travel not is clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration gravity (g) 1 ;

c) Vertically upwards: the MPGM multiplied by the acceleration of gravity (g) 1 ; and

d) Vertically downwards: twice the maximum gross mass Permissible (total load, including the effect of gravity) multiplied by acceleration of gravity (g) 1 .

673

Page 181

(1) *For purposes of calculating g = 9.81m / s 2*

6.7.3.2.10 The safety factors to be observed for each of the forces indicated in item 6.7.3.2.9 shall be as follows:

a) for steels with clearly defined yield point, a coefficient Security 1.5 in relation to the guaranteed yield strength; or

b) for steels with no clearly defined yield point, a coefficient Security 1.5 in relation to mechanical stress assay 0.2% ensured, and for austenitic steels, 1% tensile stress test.

6.7.3.2.11 The value of yield stress or mechanical stress test should to conform to national or international material standards. when they are austenitic steels, the minimum flow and voltage stress values mechanical testing specified by material standards may be increased in up to 15% when these greater values are attested in the inspection certificate material. When there is no standard for the steel in question, the value adopted for the yield stress or mechanical stress test must be approved by competent authority.

6.7.3.2.12 When carcases for the transport of liquefied gases non-Refrigerated are provided with thermal insulation, the thermal insulation systems must meet the following requirements:

a) consist of a shielding covering at least the upper third and at most the upper half of the substrate surface and separated therefrom by a layer of air of about 40 mm thickness; or

b) consist of a complete cladding, made of insulating materials of adequate thickness, protected to prevent entry moisture and damage under normal conditions of transportation, and in order to providing thermal conductance to 0.67 (KMW^{-1};

c) if the protective covering is so closed that it becomes impermeable to gas, It must be installed a device to prevent the formation of pressure dangerous in the insulating layer, in case of inadequate seal housing or any of its equipment;

d) thermal insulation can not prevent access to accessories and

emptying devices.

6.7.3.2.13 Portable tanks intended for the carriage of liquefied gases - flammable refrigerated must be capable of being electrically grounded.

6.7.3.3 Design Criteria

6.7.3.3.1 Carcasses must have circular cross section.

6.7.3.3.2 Carcasses must be designed and manufactured to withstand a pressure

Hydraulic test of not less than 1.3 times the design pressure. The housing project should take into account the minimum values of the maximum allowable working pressure (PTMA) provided Instruction Relating to Portable Tanks T50 constant in item 4.2.5.2.6, for each non-refrigerated liquefied gas intended for transport. Attention should be paid to minimum thickness requirements for these carcasses, specified in clause 6.7.3.4.

6.7.3.3.3 For steels that have clearly defined yield point, or characterized by test are guaranteed mechanical tension (usually 0.2% strain Mechanical test or, for austenitic steels, 1% of the tensile stress test), the the primary membrane stress Σ (sigma) in the shell shall not exceed 0.75 Re or 0.50 Rm, whichever is less, at the test pressure, where:

Re = yield strength in N / mm ^{2} , or 0.2% of the tensile stress test, or

for austenitic steels, 1% of the mechanical stress test;

Rm = minimum tensile stress in N / mm ^{2} .

6.7.3.3.3.1 The Re and Rm values to be used shall be the minimum values specified according to national or international material standards. When austenitic steels, the specified minimum values for Re and Rm according with the standards of materials can be added up to 15%, such as more values high are attested in the inspection certificate of the material. When there is no standard for the steel in question, the values of Re and Rm used shall be approved by competent authority or body designated by it believed.

6.7.3.3.3.2 Steels, whose ratio value Re / Rm exceeding 0.85 are not admissible for the manufacture of welded shells. The Re and Rm values to be used in determination of this relationship must be specified in the inspection certificate material.

6.7.3.3.3.3 Steels used in the manufacture of shells shall have an elongation at

break, in%, of not less than 10,000 / Rm with an absolute minimum of 16% to steel fine grain and 20% for other steels.

6.7.3.3.3.4 For the purpose of determining the actual values of the materials should be observed that in the case of metal plates, the axis of the body-specimens for testing traction should be perpendicular (across) to the rolling direction. O permanent elongation at break, measured in bodies of the test piece with section rectangular cross according to ISO 6892: 1998, using template 50 mm long.

6.7.3.4 Minimum thickness of housing

6.7.3.4.1 The minimum shell thickness shall be the greater thickness based on:

a) the minimum thickness determined in accordance with the requirements of

item 6.7.3.4; and

b) the minimum thickness determined in accordance with Regulation recognized pressure vessel, including the requirements of paragraph 6.7.3.3.

6.7.3.4.2 The cylindrical portions, ends (caps) and covers of manholes casings with a diameter of up to 1.80 meters can not have a thickness less than 5 mm steel reference or of equivalent thickness in the steel to be used. Carcasses over 1.80 m in diameter must have thickness not less than 6 mm in the reference steel or equivalent thickness in the steel to be used.

6.7.3.4.3 The cylindrical portions, ends (caps) and covers of manholes any substrate can not have thickness less than 4 mm, regardless of adopted manufacturing material.

6.7.3.4.4 The equivalent thickness of a steel other than the reference steel, which thickness is prescribed in section 6.7.3.4.2 shall be determined by the following formula:

$$and_1 = \frac{4.21\ and_0}{3\ rm_1\ sha_1}$$

on what:

and ₁ = equivalent thickness (in mm) required for the steel to be employee;

and ₀ = minimum thickness (in mm) of the reference steel specified in item 6.7.3.4.2;

Rm ₁ = resistance guaranteed minimum tensile (N / mm ₂) of the steel to be used (see section 6.7.3.3.3);

The ₁ = guaranteed minimum elongation at break (in%) of the steel to be used according to national or international standards.

6.7.3.4.5 In any case, the wall thickness should be less than the specified in items 6.7.3.4.1 to 6.7.3.4.3. All parts of the shell shall have a thickness minimum given in items 6.7.3.4.1 to 6.7.3.4.3. This thickness does not include a corrosion allowance.

6.7.3.4.6 When using mild steel (see section 6.7.3.1), it is not necessary to calculate according to the formula given in section 6.7.3.4.4.

6.7.3.4.7 There can be no sudden change of plate thickness at the junction of ends (caps) with the cylindrical part of the housing.

6.7.3.5 Service Equipment

6.7.3.5.1 Service equipment should be placed so that it is protected

against the risk of being ripped off or damaged during transport and handling. If the connection of the frame with the frame of the tank allow relative movement between parts of Together, the equipment must be set so as to allow this movement, but without the risk of damaging the parts. External emptying accessories (nozzles pipes, closing devices), the internal stop-valve and its seating must be protected against the risk of being torn by external forces (e.g. using shear sections). The filling and emptying devices (Including flanges or threaded plugs) and any protective caps shall be capable be protected against inadvertent opening.

6.7.3.5.2 All portable tank housing holes with a diameter greater than 1.5 mm, except for the pressure-relief devices, inspection openings or closed bleed holes, shall have at least three sealing devices mutually independent in series, the first being an internal sealing valve a relief valve flow or equivalent device, the second, a valve external sealing, and the third, a blind flange or equivalent device.

6.7.3.5.2.1 When a portable tank is equipped with flow-limiting valve, this

677

Page 185

It must be mounted so that its headquarters be within the housing or a flange welded or, if placed externally, its installation should be designed so that, in case of impact, its effectiveness is maintained. The flow restrictor valve should be selected and mounted so that they automatically close when it reaches its flow specified by the manufacturer. located fittings and accessories on entry or Output such valves should have higher flow capacity that specified for the valves.

6.7.3.5.3 In the case of filling and emptying openings, the first device closing should be an inner seal and the second valve, a valve Sealing placed in accessible position on each tube filling and emptying.

6.7.3.5.4 In the case of filling and emptying openings situated in the bottom of portable tanks for the carriage of non-refrigerated liquefied gases and flammable, or toxic, the internal sealing valve is a device snap closure security, which closes automatically in the event of Unintentional movement of the portable tank during filling and emptying, or there is fire engulfment. Except for portable tanks with a capacity of up to 1,000 L, it should also be possible to operate this device by remote control.

6.7.3.5.5 Besides emptying and filling holes and pressure equalization gas, carcasses may have openings for installation of meters, thermometers and manometers. The connections of these instruments should be made by nozzles or receptacles soldiers, not for bolted connections in the housing.

6.7.3.5.6 All portable tanks shall have a manhole or other openings of appropriate size inspection to allow inspection of its interior and provide

adequate access for internal repair and maintenance.

6.7.3.5.7 External fittings shall be grouped as far as possible.

6.7.3.5.8 All portable tank connections must display clearly visible mark indicating their respective functions.

6.7.3.5.9 All shut-off valves and other closing means must be designed and manufactured with working pressure not less than the working pressure maximum permissible (PTMA) of the shell taking into account the expected temperatures during transport. All stop-valves with threaded rod should close turning the wheel clockwise. For other sealing valves, the position, open and closed, and the direction of closure shall be clearly indicated. All

sealing valves must be designed to prevent unintentional opening.

6.7.3.5.10 Piping shall be designed, manufactured and installed to avoid damage due to thermal expansion and contraction, mechanical shock and vibration. All pipes should be of suitable metallic material. Whenever possible, Welded pipe joints should be used.

6.7.3.5.11 Joints in copper pipes should be made with brazing or have a metal union of equal strength. The melting point of the materials used for soldering can be not less than 525 ° C. The joints can not reduce resistance tubing, as may happen in the case of threaded joints.

6.7.3.5.12 The burst pressure of all piping and accessories can not be less than four times the maximum allowable working pressure (PTMA) housing or four times the pressure to which the pipeline can be subjected in service by the action of pump or other device (except pressure relief valves), whichever the highest value.

6.7.3.5.13 In the manufacture of valves and fittings must be used metals Ductile.

6.7.3.6 lower openings

6.7.3.6.1 Certain non-refrigerated liquefied gases may not be transported in portable tanks with openings at the bottom. When this is prohibited in the Relative Instruction Portable tank T50, constant in item 4.2.5.2.6, there can be no openings in the housing below the liquid level, when it is filled to the limit of the maximum load admissible.

6.7.3.7 pressure relief devices

6.7.3.7.1 Portable tanks shall be equipped with one or more devices pressure relief triggered by spring. The devices must be opened automatically a pressure at least equal to the maximum allowable working pressure (PTMA) and be completely open at a pressure equal to 110% of the maximum working pressure admissible. After emptying, the devices are close to non-inferior pressure

10% of that which begins emptying and remain closed to any lower pressure. The pressure relief devices shall be of a type that resists the dynamic loads, including those caused by movements of the liquid. They are not admitted rupture discs, except in series with a relief device activated by spring.

679

Page 187

6.7.3.7.2 The pressure relief devices shall be designed to prevent entry of foreign matter, leakage of gas and the formation of dangerous excess pressure.

6.7.3.7.3 Portable tanks intended for the carriage of certain liquefied gases non-refrigerated identified in the Statement Relating to Portable Tanks T50 constant in item 4.2.5.2.6 shall be equipped with a pressure relief device approved by competent authority. Unless a dedicated tank the specific use is provided approved pressure relief device constructed of materials compatible with the load, the relief device shall comprise a frangible disc preceding a pressure relief device actuated by spring. In the space between the rupture disk and relief device must be installed a pressure gauge or indicator detector appropriate. This arrangement allows the burst detection, perforation or leak in the drive which may affect the functioning of the pressure relief device. The disk break, in this case, must be broken by the nominal pressure 10% higher than the starting pressure discharge of the relief device.

6.7.3.7.4 In the case of multipurpose portable tank, the relief device pressure must be open to the pressure indicated in Section 6.7.3.7.1 for the gas present highest maximum allowable pressure of the gases transported in the portable tank is allowed.

6.7.3.8 Capacity of relief devices

6.7.3.8.1 The combined discharge capacity of the relief devices should be enough, in full involvement in fire conditions, limit pressure (Including accumulation) inside the housing to 120% of the maximum working pressure admissible. triggered by spring relief devices should be used to achieve total capacity of prescribed relief. In the case of multipurpose tank, the capacity combined discharge of pressure relief devices to be adopted should be the gas that requires the highest capacity gas discharge between the carriage in the tank Portable is allowed.

680

Page 188

6.7.3.8.1.1 To determine the total required capacity of the relief devices, which They should be considered as being the sum of the individual capacities of each them to be used the following formula [4] :

$$Q = 4.12 \frac{FA}{LC} \sqrt{\frac{82.0\ ZT}{M}}$$

on what:

Q = minimum required rate of discharge in cubic meters of air per second (m^3 / s) under standard conditions 1 bar and 0 ° C (273 K);

F = is a coefficient with the following value:

for carcasses without thermal insulation F = 1;

for insulated shells, $F = \frac{U\ 649\ (T)}{6:13}$

but in no case less than 0,25 where:

U = thermal conductance of the insulation in $KmkW^{-2}$ at 38 ° C,

t = actual temperature of the liquefied gas during non-refrigerated filler (° C);

when the temperature is unknown, using T = 15 ° C;

The value of F given above for insulated shells may be used, provided that the insulation is in accordance with Item 6.7.3.8.1.2;

A = total area of the outer surface of the housing in m^2 ;

4 *This formula applies only to non-refrigerated liquefied gases with critical temperatures well above the temperature on accumulation conditions. In the case of gases with critical temperatures near or lower than the temperature on accumulation conditions, calculating the discharge capacity of the devices of pressure relief should take into account other thermodynamic properties of the gas (see, for example, CGA S-1.2-2003 "Pressure Relief Device Standards-Part 2-Cargo and Portable Tanks for Compressed Gases").*

681

Page 189

Z = the gas compressibility factor in the accumulating condition
(When this factor is unknown, let Z equal 1.0);

T = absolute temperature in Kelvin (° C + 273) above devices
of pressure relief in the accumulating condition;

L = latent heat of vaporization of the liquid, in kJ / kg, under conditions
accumulation;

M = molecular weight of gas that is discharged;

C = constant is calculated by one of the formulas
following the coefficient k as a function of specific heats.

$$k = \frac{W_P}{W_v}$$

on what:

C_p = specific heat at constant pressure; and

C_v = specific heat at constant volume.

When k > 1:

$$W = k\left(\frac{2}{k+1}\right)^{\frac{k+1}{k-1}}$$

When $k = 1$ or k is unknown:

$$W = \frac{1}{and} = 607.0$$

It is ***and*** the mathematical constant 2.7183.

Page 190

C - it can also be obtained from the following Table:

k	W	k	W	k	W
1.00	0.607	1.26	0.660	1:52	0.704
1.02	0.611	1.28	0.664	1.54	0.707

1.04	0.615	1.30	0,667	1.56	0.710
1.06	0.620	1.32	0.671	1.58	0.713
1.08	0.624	1.34	0.674	1.60	0.716
1.10	0.628	1.36	0.678	1.62	0.719
1.12	0.633	1.38	0.681	1.64	0.722
1.14	0.637	1.40	0.685	1.66	0.725
1.16	0.641	1.42	0.688	1.68	0.728
1.18	0.645	1.44	0.691	1.70	0.731
1.20	0.649	1.46	0.695	2.00	0.770
1.22	0.652	1.48	0.698	2.20	0.793
1.24	0.656	1.50	0.701		

6.7.3.8.1.2 The thermal insulation systems used to allow reduction venting capacity, shall be approved by the competent authority or body believed by it. In any case, insulation systems approved for this purpose shall:

a) remain effective at all temperatures up to 649 ° C; and

b) be coated with material with a melting point of 700 ° C or more.

6.7.3.9 Marking of relief devices

6.7.3.9.1 All pressure relief device must have a clear brand and permanent, indicating the following:

a) the pressure (kPa or bar) that it is set to discharge;

b) the allowable tolerance at the discharge pressure for devices driven spring;

c) the reference temperature corresponding to the pressure run for frangible discs;

d) the device flow capacity in cubic meters of air per second (m^3 / s).

e) the cross-sectional flow areas of the relief device pressure spring-loaded and frangible disc in mm^2.

Where practicable, should also be shown the following information:

f) the manufacturer's name and the relevant catalog number.

6.7.3.9.2 The flow capacity marked on the pressure-relief devices must be determined in accordance with ISO 4126-1: 2004 and ISO 4126-7: 2004

6.7.3.10 Connections to pressure relief devices

6.7.3.10.1 Connections to pressure relief devices shall have dimensions sufficient to allow the necessary discharge pass unrestricted through the device of security. It can be installed either seal between valve housing and pressure relief devices, unless there are duplicate devices, because of maintenance or other device and the sealing valves are in use locked in the open position or the stop-valves are interconnected so that at least one of the duplicate devices is always in use and able to meet the requirements of paragraph 6.7.3.8. There can be no obstruction in the opening that leads the vent or pressure relief device that restricts or impedes the flow of housing for the device. Vents from the relief device pressure, if any, should release the vapors or liquid to the atmosphere Minimum pressure conditions on the relief devices.

6.7.3.11 Siting of pressure relief devices

6.7.3.11.1 The inputs of the pressure relief devices shall be located in top of the shell so closely to the longitudinal and transverse center of the housing as possible. In maximum filling conditions, all entries devices pressure relief must be located in the housing of the vapor space, and devices must be so arranged as to ensure free discharge of vapors. For flammable non-refrigerated liquefied gases, the exhaust fumes should be directed away from the housing, so that not collide with it. It is permissible to use Protection devices for diverting the flow of vapors from not reduce required relief capacity.

6.7.3.11.2 steps must be taken to prevent access by persons not

authorized the pressure relief devices and to protect them in case of overturning of the portable tank.

6.7.3.12 Measuring instruments

6.7.3.12.1 Except in the case of the portable tank to be filled by weight, it must be equipped with one or more measuring devices. They can not be used glass level indicators or other fragile material made of meters, such as instruments come into direct contact with the contents of the tank.

6.7.3.13 Supports, frames and lifting devices and fixing tanks portable

6.7.3.13.1 Portable tanks shall be designed and manufactured with structure support for safe base during transport. The forces specified in item 6.7.3.2.9 and the safety factor specified in 6.7.3.2.10 item should also be considered in this aspect of the project. Platforms, frameworks, cradles and structures Similar to be considered acceptable.

6.7.3.13.2 The combined stresses caused by holders (cradles, frameworks, etc.) and

by lifting accessories and attachment of portable tanks may not cause tensions excessive in any part of the housing. All portable tanks shall be equipped with lifting accessories and permanent fixation. They should in preferably be seated in portable tank supports but will admit his fixing the reinforcing plates located in the housing in bearings.

6.7.3.13.3 In the design of supports and frameworks, must be taken into account effects of environmental corrosion.

6.7.3.13.4 The plug openings of the lifting forks should be able to be closed. The openings closure means should be permanent part of the structure or permanently fixed to it. Portable tanks single compartment with less 3,65 m in length, need not dispose of the closing means, as long as what:

a) the carcass and all its accessories are well protected impact by the forklift blades; and

b) the distance between the centers of the forklift pockets is of the least half of the maximum length of the portable tank.

6.7.3.13.5 When, during transport, portable tanks are not protected accordance with paragraph 4.2.2.3, the carcasses and service equipment must be protected against damage from lateral or longitudinal impact or overturning. accessories external must be protected to prevent the housing content escapement result of impact or overturning of the tank on its fittings. Examples of protection include:

a) protection against side impact, which can consist of bars longitudinal protecting the shell on both sides at the height of the row average;

b) protection of the portable tank against overturning which may consist of reinforcement rings or bars fixed across the frame;

c) protection against rear impact which may consist of a fender or grid;

d) Housing protection from impact damage caused or overturning by use of an ISO frame in accordance with the ISO 1496-3: 1995.

6.7.3.14 design approval

6.7.3.14.1 The competent authority or body designated by it believed should send to each new portable tank design, a certificate of approval. This certificate must attest that a portable tank has been inspected by the authority, it is appropriate to order that

is intended and meets the requirements of this Chapter and, if applicable, the provisions on the gases found in the Relative Instruction Portable tanks T50, constant in item 4.2.5.2.6. When a series of portable tanks are manufactured without modification design, the certificate will be valid for the entire series. The certificate shall refer to the report of the tests of the design type, the gases may be transported to the material manufacturing of housing and the approval number. The approval number shall consist in a sign or mark characteristic of the country granting approval, or the acronym for use in international traffic prescribed by the *Convention on Road Traffic* , Vienna 1968, and in a record number. Any alternative arrangements according to item 6.7.1.2, should It is indicated on the license. A design approval may serve for the approval of smaller portable tanks made of materials of the same type and thickness, using same fabrication techniques and with identical supports, locks and accessories equivalents.

6.7.3.14.2 The design type of the test report for the design approval shall include, at least the following:

a) the results of the applicable framework test specified in Rule ISO 1496-3: 1995;

b) the results of the initial inspection and test specified in item 6.7.3.15.3; and

c) the results of the impact test prescribed in item 6.7.3.15.1, when applicable.

6.7.3.15 Inspection and testing

6.7.3.15.1 Portable tanks meeting the definition of CSC's container, 1972, as amended, they can not be used unless they have been approved through the presentation of a representative design type of each project submitted to Longitudinal Impact Dynamic test prescribed in Section 41 of Part IV of the Manual Tests and Criteria.

6.7.3.15.2 The housing and the components of the portable tank of the entire equipment They must be inspected and tested before being put into service first time (initial inspection and test) and thereafter at intervals not exceeding five years (inspection and periodic test, five-year), with an inspection and testing periodic inspections and intermediate between the five-year test (inspection and testing 2.5-year interval). Inspection and testing 2.5-year interval may be carried out within three months of the specified date. testing should be performed and exceptional inspections, regardless of the date of the last tests and inspections periodically when necessary in accordance with item 6.7.3.15.7.

6.7.3.15.3 The inspection and initial testing of the portable tank shall include a verification of design characteristics, an internal and external examination of the portable tank and accessories, with due consideration of the non-refrigerated liquefied gases

They are transported, and a pressure test in accordance with paragraph 6.7.3.3.2. The test pressure can be performed as a hydraulic test or by using another liquid or gas with the agreement of the competent authority or body designated by it believed. Before the portable tank is placed into service, one must be done leakage test and a satisfactory operation test all the equipment service. If the shell and its service equipment has been tested at pressure, separately, after assembly, the assembly must be subjected to a test

687

Page 195

tightness. All housing welds subjected to maximum efforts should be inspected in the initial test, using radiographic test, ultrasonic or other nondestructive method appropriate. This does not apply to the finish.

6.7.3.15.4 The inspections and five-year periodic tests shall include internal examination and external and, as a rule, hydraulic pressure test. Jackets, thermal, etc., should be removed only to the extent necessary for a reliable assessment of the state in which it is the portable tank. If the housing and its service equipment have been pressure tested separately, together It must be subjected to a tightness test after assembly.

6.7.3.15.5 The inspections and periodic tests at intervals of 2.5 years shall include, at least internal and external examination of the portable tank and its accessories, taking into account the non-refrigerated liquefied gases to be transported, test sealing operation and testing of the service equipment. Jackets, thermal, etc., should be removed only to the extent necessary for a reliable assessment of the state in which it is the portable tank. for tanks portable for the carriage of a single non-refrigerated liquefied gas, the examination Internal the 2.5 year interval can be dispensed with or replaced by other methods test or inspection procedures approved by the competent authority or body believed by it.

6.7.3.15.6 Portable tanks may not be filled and available for transport after the expiration date of the inspections and five-year periodic tests or 2.5 years as required in item 6.7.3.15.2. However, portable tanks filled before the expiration date of the last testing and periodic inspections can be transported for a period not to exceed three months after the expiration date. Beyond In addition, a portable tank may be transported after the expiration date of the last inspection and periodic test:

a) after it emptied, but before cleaning, to run next inspection or the next test required prior to refilling; and

b) unless otherwise approved by the competent authority, a period not to exceed six months after the expiration date last inspection or last periodic test, to allow the return of hazardous products for proper recycling or disposal. O

transport document shall contain reference to such exemption.

688

Page 196

6.7.3.15.7 It is necessary to carry out inspection and exceptional test when the tank Portable present evidence of damaged or corroded areas, leakage, or other conditions indicating impairment that can affect the integrity of the portable tank. THE extent of the exceptional inspection and the test depends on the level of damage or deterioration of the portable tank. At a minimum, should include inspection and testing 2.5 years, in accordance with item 6.7.3.15.5.

6.7.3.15.8 The internal and external examinations shall ensure that:

a) the carcass is inspected to detect erosion, corrosion, abrasion, dents, distortions, weld defects or any other conditions, including leakage, that might render the portable tank unsafe for transport;

b) pipe, valves and gaskets are inspected to check for corroded areas, defects, and other conditions, including leakage, which can render the portable tank unsafe for filling, emptying or transport;

c) the fixing device manholes covers are operational and there is no leakage in these covers or gaskets.

d) screws and missing or loose nuts on any flanged connection or blind flanges are replaced or tightened;

e) all valves and emergency devices are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and valves automatic sealing should be triggered to demonstrate operation proper;

f) required markings on the portable tank are legible and in accordance with the applicable requirements; and

g) The framework, supports and lifting devices of the portable tank are in satisfactory condition.

6.7.3.15.9 Inspections and tests prescribed in paragraphs 6.7.3.15.1, 6.7.3.15.3, 6.7.3.15.4, 6.7.3.15.5 and 6.7.3.15.7 shall be performed or witnessed by an expert accredited by the competent authority or body designated by it believed. If the test pressure part of the inspection and test, the test pressure must be as indicated in

689

plate with the data of the portable tank. While under pressure, the portable tank must be inspected for leakage in the shell, piping or equipment.

6.7.3.15.10 When welding operations are made, cutting or burning housing, such operations must be approved by the competent authority or body believed by it, taking into account the pressure vessel code used in casting manufacturing. After completion of the work must be carried out test pressure to the original test pressure.

6.7.3.15.11 When evidence of any unsafe condition, the portable tank It can not be returned to service until the defects have been corrected, and the tank approved in another test.

6.7.3.16 Marking

6.7.3.16.1 Every portable tank shall be provided with corrosion resistant metal plate fixed to it permanently, in a conspicuous place readily accessible for inspection. When, by the portable tank configuration, you can not attach the plate to the housing permanently, the carcass must be marked with at least the information required the pressure vessel code. At least the date specified below They should be marked on the plate by stamping or a similar method.

(The) Owner information:

(I) the owner's registration number.

(B) manufacturing information:

(I) manufacturing country;

(Ii) year of manufacture;

(Iii) manufacturer's mark or name;

(Iv) manufacturer's serial number.

(w) approval information:

(I) the UN symbol for packaging

This symbol can not be used for any purpose other than to indicate a container, a container for flexible bulk a portable tank or CGEM meet the requirements of Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8;

(Ii) the country of approval;

(Iii) Authorized body for approval of the project;

(Iv) project approval number;

(V) the letters "AA" if the project has been approved with arrangements alternative (see section 6.7.1.2);

(Vi) pressure vessel of the regulation with which the shell is designed;

(D) pressures

(I) Pressure Maximum Allowable Working in bar or kPa (pressure gauge);

(Ii) the test pressure, in bar or kPa (gauge pressure);

(Iii) the date of the initial pressure test (month and year);

(Iv) the witness's identification mark or director of the test Initial pressure;

(V) Project External pressure (see item 6.7.3.2.8), in bar or kPa (manometric pressure).

Notice: *The unit used shall be indicated.*

(and) temperatures

(I) Band design temperature, indicating the unit used (in ° C);

(Ii) reference design temperature, indicating the unit used (in C).

(F) materials

(I) housing materials and reference of material standards;

(Ii) thickness equivalent in reference steel, indicating the unit used (in mm).

(G) capacity

691

Page 199

(I) Tank water capacity at 20 ° C, indicating the unit used (In liters).

(H) inspections and periodic tests

(I) type of most recent periodic test (2.5 years, 5 years or exceptional);

(Ii) date of the most recent periodic test (month and year);

(Iii) most recent periodic test of the test pressure, indicating the unit used (in bar or kPa manomética) (if applicable);

(Iv) the identification mark or believed held

He witnessed the most recent test.

Figure 6.7.3.16.1: Example of identification plate

Owner registration number
INFORMATION OF MANUFACTURE
Country of manufacture
Year of manufacture
Manufacturer
Number of manufacturer's serial
ADOPTION INFORMATION
Country of approval
authorized body for approval
from the project
project approval number "AA" (if applicable)
Housing project Regulation
(Regulation of the pressure vessel)
PRESSURES
MAWP bar or kPa
Pressure test bar or kPa
Date of test (Mm / yyyy) brand
initial rush witness
External Pressure test bar or kPa
TEMPERATURES
design temperature range ºC the ºC
Reference design temperature ºC
MATERIALS
Housing materials and reference of
material standards
Equivalent thickness for steel mm
reference
CAPACITY
Tank water capacity at 20 ° C liters
INSPECTIONS AND TESTS PERIODIC

Kind in	Date test	Brand witness	gives and in	Kind	Date test	Witness Mark and test pressure [4]

692

Page 200

test		test pressure [4]	test		
	(Mm / yyyy)	bar or kPa		(Mm / yyyy)	bar or kPa

6.7.3.16.2 The following information shall be marked in a durable way, the very portable tank or solid metal plate and securely attached to the tank:

Operator name

Name (s) (s) of gas (es) liquid (s) non-refrigerated (s) allowed to be transported

Maximum permissible load mass for each non-refrigerated liquefied gas whose transportation is permitido_____ kg

MPGM kg

Unladen mass (tare) kg

Instruction for Portable tank in accordance with paragraph 4.2.5.2.6

Notice: *For the identification of non-refrigerated liquefied gases transported, see, Also, Part 5.*

6.7.4 Requirements for the design, manufacture, inspection and testing portable tanks for the carriage of refrigerated liquefied gases

6.7.4.1 settings

For purposes of the following:

Reference steel means a steel which has a tensile strength of 370 N / mm 2 and one elongation at break of 27%;

Shirt means covering or outer insulation protection, which can be part of the system thermal insulation;

Housing or tank body means the part of the portable tank containing liquefied gas refrigerated intended for transport (tank proper), including openings and their fasteners, but not including the service equipment nor the structural equipment external;

Tightness test means the test that using gas subjecting the shell and its service equipment to an effective internal pressure not less than 90% of pressure

4 Test pressure if applicable

Page 201

MAWP - PTMA;

Service equipment means measuring instruments and devices filling, emptying, venting, safety, pressurizing, cooling and thermal insulation;

Structural equipment means the reinforcing, fastening, protective and stabilizing external to the housing;

Maximum permissible gross mass (MPGM) means the sum of the mass of the portable tank (Tare) with the greatest load for transport;

Test pressure means the maximum gauge pressure at the top of the housing, measured during the pressure test;

Maximum Allowable Working Pressure (PTMA) means the effective gauge pressure Maximum permissible at the top of the filled portable tank shell, in operating position, including a higher effective pressure during filling and emptying;

Tank means a portable tank whose production normally consists of:

a) a jacket and one or more inner carcass in the space between (S) casing (s) and the jacket does not contain air (vacuum insulation) may embedding a thermal insulation system; or

b) a jacket and an inner shell with an intermediate layer

solid thermally insulating material (e.g., compact foam);

Portable tank means a thermally insulated multimodal tank capacity greater than 450 L, equipped with the service equipment and structural necessary to transport of refrigerated liquefied gases. The portable tank should be able to be filled and emptied without the removal of its structural equipment. You must have elements external stabilizer to the tank and can be lifted when in full; must be designed primarily to be lifted to a vehicle or transport vessel and It is equipped with platform, fittings or accessories to facilitate the movement mechanical. Tanker trucks, rail tank cars, non-metallic tanks, containers Intermediate Bulk (IBCs), gas cylinders and large receptacles are not included the definition for portable tanks;

Minimum temperature design means the temperature adopted in the design and manufacture the housing and can not be greater than the lowest temperature (coolest) (temperature service) of the contents during normal filling and emptying

694

Page 202

transport;

Waiting time means the time between the establishment of the initial condition filling until the instant when the content of the pressure is achieved by exchange of heat, the lower set pressure (marker start) in the device or devices pressure relief.

6.7.4.2 General requirements for the design and manufacture

6.7.4.2.1 Carcasses must be designed and manufactured according to a regulation for pressure vessels accepted by the competent authority. Carcasses and shirts should be made of suitable metallic materials for molding desired. Shirts must be made of steel. They can be used non-material metal in the manufacture of accessories and brackets located between the housing and the shirt, as long as their properties, the minimum temperature project, if proven satisfactory. In principle, the materials must conform to national standards or International on materials. For housings and welded shirts, should only be used materials whose weldability has been fully demonstrated. welds They must be fully implemented and should provide complete safety. When the manufacturing process or the materials require, the carcass shall be subjected to a appropriate heat treatment to provide the necessary resistance of welds and areas affected by heat. In choosing the material, must be taken into account the temperature minimal design with respect to risk of brittle rupture under tension (friability) for hydrogen cracking by stress corrosion and impact resistance. When used fine-grained steel, the guaranteed value of the yield stress can not be more than 460 N / mm ^{2} and the guaranteed value of the upper tensile stress limit can not exceed 725 N / mm ^{2} according to the material specification. The material tank laptop must be suitable for the external environment in which they can be transported.

6.7.4.2.2 Any part of the portable tank, including fittings, gaskets and pipe that may come into contact with the refrigerated liquefied gas transported shall be compatible with said cooled liquefied gas.

6.7.4.2.3 It should be avoided contact of different metals that may result in damage by galvanic action.

6.7.4.2.4 The thermal insulation system shall include full coverage (s) frame (s) with effective insulating materials. The external thermal insulation should be protected by a jacket to prevent moisture and other damage under conditions

normal transport.

6.7.4.2.5 When the shirt is closed so that it is gas-tight, must be installed a device to prevent the formation of dangerous pressure within thermal insulation.

6.7.4.2.6 Portable tanks for the transport of liquefied gases cooled with boiling point below -182 ° C at pressure conditions atmospheric, may not include materials which may react dangerously with oxygen or with oxygen rich atmospheres when located in parts of isolation heat, if there is a risk of contact with oxygen or enriched fluid oxygen.

6.7.4.2.7 The thermal insulation material may not deteriorate improperly in service.

6.7.4.2.8 For each refrigerated liquefied gas intended for transport in tank laptop, should be given a waiting time reference.

6.7.4.2.8.1 The reference holding time shall be determined by method recognized by the competent authority, based on the following:

a) The effectiveness of the insulation system, determined according to the item 6.7.4.2.8.2;

b) the lowest pressure to which the device (s) (s), pressure limitation is (are) calibrated (s);

c) the initial conditions of filling;

d) an assumed ambient temperature of 30 ° C;

e) the specific physical properties of the refrigerated liquefied gas for the transport.

6.7.4.2.8.2 The effectiveness of the insulation system (heat exchange in watts) must be determined by the type of the portable tank test, according to a procedure approved by the competent authority. This test shall consist of:

a) A constant pressure test (for example at atmospheric pressure), measuring the loss of refrigerated liquefied gas in a range of

time; or

b) an assay in a closed system by measuring the pressure increase in the Housing for a period of time.

696

Page 204

In implementing the constant pressure test, shall be considered variations in atmospheric pressure. The execution of any of the tests must be made corrections to take account of any variations of temperature in relation to reference ambient temperature of 30 ° C.

Notice: *To determine the actual holding time before each journey, refer to the item 4.2.3.7.*

6.7.4.2.9 The shirt of a double-walled tank, isolated vacuum, should have a project external pressure of at least 100 kPa (1 bar) gauge, calculated According to recognized technical regulation, or a critical collapse pressure calculated for at least 200 kPa (2 bar) gauge. Internal and external reinforcements They may be included in the calculation of the capacity to resist external pressure shirt.

6.7.4.2.10 Portable tanks shall be designed and constructed with supports to Provide a secure base during transport and with lifting devices and suitable fixing.

6.7.4.2.11 Portable tanks shall be designed to withstand, without loss of Content at least the internal pressure generated by the content and static charges, dynamic and thermal, in normal handling and transport. The project should demonstrate that the effect of fatigue caused by repeated application of these loads over the life of the portable tank, have been taken into consideration.

6.7.4.2.12 Portable tanks and their fastenings when filled with the maximum load admissible, must be capable of absorbing the following separately applied static forces:

a) in the direction of travel: twice the maximum gross mass Permissible multiplied by the acceleration of gravity (g);

b) horizontally in the direction perpendicular to the direction of travel: the maximum permissible gross mass (if the direction of travel not is clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration gravity (g);

c) Vertically upwards: the MPGM multiplied by the acceleration of gravity (g);

d) Vertically downwards: twice the maximum gross mass Permissible (total load, including the effect of gravity) multiplied

697

Page 205

by the acceleration of gravity (g).

Note: *For calculation purposes, g = 9.81m / s 2*

6.7.4.2.13 The safety factor to be considered for each of the forces mentioned in item 6.7.4.2.12 shall be:

a) for materials with a clearly defined yield point, a safety factor of 1.5 compared to the yield stress guaranteed; or

b) for materials with no clearly defined yield point, a safety factor of 1.5 in relation to mechanical stress guaranteed assay 0.2% and for austenitic steels, mechanical stress 1% test.

6.7.4.2.14 The value of yield stress or mechanical stress test should to conform to national or international material standards. when they are austenitic steels, the specified minimum values according to the Material patterns can be increased by 15% if such higher values are attested in the inspection certificate of the material. When there is no standard for material in question, or when non-metallic materials are used, the values of flow or mechanical stress test voltage must be approved by competent authority.

6.7.4.2.15 Portable tanks intended for the carriage of refrigerated liquefied gases flammable should be able to be electrically grounded.

6.7.4.3 Design Criteria

6.7.4.3.1 Carcasses must have circular cross section.

6.7.4.3.2 Carcasses must be designed and manufactured to withstand a pressure testing at least equal to 1.3 times the maximum allowable working pressure. For carcasses with vacuum insulation, the test pressure can not be less than 1.3 times the sum of the maximum allowable working pressure and 100 kPa (1 bar). In any case, test pressure should be less than the gauge pressure of 300 kPa (3 bar). Must be given attention to the minimum shell thickness requirements, specified in items 6.7.4.4.2 to 6.7.4.4.7.

6.7.4.3.3 For metals with clearly defined flow limits, or characterized by test guaranteed mechanical strain (generally 0.2% strain

Page 206

mechanical testing and for austenitic steels, 1.0% of tensile stress test), the primary voltage σ membrane (sigma) in the housing due to the test pressure, not

may exceed the lower of the following values: 0.75 Re or 0.50 Rm, as follows:

re = yield stress in N / mm ^{2} , or 0.2% of the tensile stress test, or

for austenitic steels, 1% mechanical tension test;

Rm = minimum tensile stress in N / mm ^{2} .

6.7.4.3.3.1 The Re and Rm values to be used shall be the minimum values specified according to national or international material standards. When austenitic steels, the specified minimum values for Re and Rm according with the standards of materials can be increased by up to 15%, such as more values high are attested in the inspection certificate of the material. When there is no standard for the material in question, the values of Re and Rm used shall be approved by the competent authority or body designated by it believed.

6.7.4.3.3.2 Steels with a Re / Rm ratio of more than 0.85 are not eligible for manufacturing welded shells. The Re and Rm values to be used in determining this ratio shall be as specified in the inspection certificate material.

6.7.4.3.3.3 Steels used in the manufacture of shells shall have an elongation at break, in%, of not less than 10,000 / Rm with an absolute minimum of 16% to steel fine grain and 20% for other steels. Aluminum and aluminum alloys employees in the manufacture of carcasses must have an elongation at break in%, not less than 10,000 / (6Rm) with an absolute minimum of 12%.

6.7.4.3.3.4 For the purpose of determining the actual values of the materials should be observed that in the case of metal plates, the axis of the body-specimens for testing traction should be perpendicular (across) to the rolling direction. O permanent elongation at fracture shall be measured in body-of-test with section rectangular cross according to ISO 6892: 1998, using template 50 mm long.

6.7.4.4 Minimum thickness housing

6.7.4.4.1 The minimum shell thickness shall be the greater thickness based on:

a) the minimum thickness determined in accordance with the requirements of items 6.7.4.4.2 to 6.7.4.4.7; and

b) the minimum thickness determined in accordance with Regulation recognized pressure vessel, including the requirements of paragraph 6.7.4.3.

6.7.4.4.2 Carcases up to 1.80 m in diameter must have a minimum thickness of 5

mm when the reference steel used, or equivalent thickness when used other metal. Carcasses of more than 1.80 m in diameter must have a minimum thickness of 6 mm when the reference steel used or of equivalent thickness if used other metal.

6.7.4.4.3 Carcasses of vacuum insulated tanks with a diameter of up to 1.80 m no may have a thickness less than 3 mm when used the reference steel or equivalent thickness if used other metal. Carcasses with a diameter greater than 1.80 m must have a minimum thickness of 4 mm, when used the reference steel or equivalent thickness if used other metal.

6.7.4.4.4 For vacuum insulated tanks, the aggregate thickness of the jacket and housing must correspond to the minimum thickness specified in item 6.7.4.4.2, and the very casting thickness should not be less than the minimum thickness prescribed in item 6.7.4.4.3.

6.7.4.4.5 Regardless of the manufacturing material should have no housing thickness less than 3 mm.

6.7.4.4.6 The equivalent thickness of a metal other than the reference steel, which thickness is prescribed in items 6.7.4.4.2 and 6.7.4.4.3 must be determined by the following formula:

$$and_1 = \frac{4.21\ X\ and_0}{3\ rm_1\ sha_1}$$

on what:

and ₁ = equivalent thickness (in mm) required for the metal to be employee;

700

and ₀ = minimum thickness (in mm) of the reference steel specified in items 6.7.4.4.2 and 6.7.4.4.3;

Rm ₁ = resistance guaranteed minimum tensile (N / mm ₂) of the metal to be employee (see Section 6.7.4.3.3);

A ₁ = guaranteed minimum elongation at break (in%) of the metal to be employee, according to national or international standards.

6.7.4.4.7 In any case, the wall thickness should be less than that specified in items 6.7.4.4.1 to 6.7.4.4.5. All parts of the shell shall have a thickness minimum determined as the items 6.7.4.4.1 to 6.7.4.4.6. This thickness does not include a tolerance to corrosion.

6.7.4.4.8 There can be no abrupt change in plate thickness at the junction of ends (caps) with the cylindrical part of the housing.

6.7.4.5 Service Equipment

6.7.4.5.1 Service equipment should be placed so that it is protected the risk of being ripped off or damaged during transport and handling. If the connection between the frame and the tank or liner and the housing, to allow relative movement, equipment must be fixed in order to allow such a move, but without risk of damage The pieces. External drain fittings (pipe nipples, devices closing), the sealing valve and its seat, must be protected from the risk of being torn by external forces (for example, using shear sections). The filling and emptying (including flanges or threaded plugs) and any protective caps shall be secured against accidental opening.

6.7.4.5.2 Every opening filling and emptying of portable tanks used the transport of flammable refrigerated liquefied gases shall be equipped with at minimum of three independent closing devices in series, the first being a Sealing valve located as close as possible to the jacket; the second, a valve seal, and the third, a blind flange or equivalent device. The device closest to the jacket seal should be snap closure, which closes automatically in the case of involuntary movement of the portable tank during filling or emptying or fire engulfment. It should be possible to operate this device, also remotely.

6.7.4.5.3 Every opening filling and emptying of portable tanks used

the transport of non-flammable refrigerated liquefied gases shall be equipped with at least two independent shutoff devices in series, the first being a Sealing valve located as close as possible to the jacket; the second, a valve seal or equivalent device.

6.7.4.5.4 Sections of pipe which can be closed at both ends and which may be of liquid retention, must have a means of relief Automatic pressure to prevent pressure build-up in the pipeline.

6.7.4.5.5 vacuum insulated tanks do not require inspection openings.

6.7.4.5.6 External fittings shall be grouped as far as possible.

6.7.4.5.7 All portable tank connections should be clearly marked with the directions of their respective functions.

6.7.4.5.8 All shut-off valves and other closing means must be designed and manufactured for non-pressure less than the maximum working pressure permissible housing, taking into account the temperature expected during transport. All stop-valves with threaded rod should close by turning the handwheel clockwise. For other sealing valves, the position, open or closed, and direction of closure shall be clearly indicated. All shut-off valves

They must be designed to prevent accidental opening.

6.7.4.5.9 When pressurization units are adopted, the connections to liquid and vapor of these units must be provided with a valve located as next to the shirt as possible to avoid loss of content if the unit pressurization is damaged.

6.7.4.5.10 Piping shall be designed, manufactured and installed to avoid damage due to thermal expansion and contraction, mechanical shock and vibration. All pipes should be made of suitable material. To avoid leakage due to fire, they should be employed only steel pipes and welded joints between the jacket and the connection to the first closing any outlet. O Lock connection method with that connection must satisfy the authority or competent body designated by it believed. All other pipe joints must be welded when necessary.

6.7.4.5.11 Joints in copper pipes must be joined with brazing or have a metal union of equal strength. The melting point of the materials used for

soldering can be not less than 525 ° C. The joints can not reduce resistance pipe, as can occur with the thread unions.

6.7.4.5.12 The valves manufacturing materials and accessories are present satisfactory properties at the minimum operating temperature of the portable tank.

6.7.4.5.13 The burst pressure of all piping and accessories can not be less than the greater of: four times the maximum working pressure Permissible housing or four times the pressure that can be subjected in service, per share pump or other device (except pressure relief valves).

6.7.4.6 pressure relief devices

6.7.4.6.1 The entire housing must be equipped with at least two relief devices independent pressure, triggered by spring. Devices must be open automatically at a pressure at least equal to the maximum working pressure admissible and be fully open a pressure equal to 110% of the pressure MAWP. After emptying, the devices are close to pressure not less than 10% of that which starts the emptying and remain any closed lower pressure. The pressure relief devices shall be of a type resist dynamic loads, including moving the liquid.

6.7.4.6.2 Carcasses designed to hydrogen and refrigerated liquefied gases not flammable may also have rupture discs in parallel with devices driven by spring, as specified in items 6.7.4.7.2 and 6.7.4.7.3.

6.7.4.6.3 The pressure relief devices shall be designed to prevent entry of foreign matter, leakage of gas and the formation of dangerous excess pressure.

6.7.4.6.4 The pressure relief devices shall be approved by the authority or competent body designated by it believed.

6.7.4.7 Capacity and calibration of pressure relief devices

6.7.4.7.1 In case of loss of vacuum in vacuum-insulated tank or loss of 20% of insulation in insulated tank with solid materials, the combined capacity of all installed pressure relief devices shall be sufficient to limit the pressure (Including accumulation) to 120% of the maximum allowable working pressure.

6.7.4.7.2 For non-flammable refrigerated liquefied gases (except oxygen) and hydrogen, this capacity may be obtained employing rupture discs parallel with the safety relief devices required. These discs should romper-

to a nominal pressure equal to the test pressure housing.

6.7.4.7.3 In the circumstances specified in items 6.7.4.7.1 and 6.7.4.7.2 together with complete fire engulfment the combined capacity of all devices relief at pressure should be sufficient to limit the pressure in the housing pressure test.

6.7.4.7.4 The required capacity of the relief devices shall be calculated in according to technical regulation approved by the competent authority.

Note: *As an example, see CGA S-1.2-2003 "Pressure Relief Device Standards-Part 2 Cargo and Portable Tanks for Compressed Gases.*

6.7.4.8 Marking of pressure relief devices

6.7.4.8.1 Every pressure relief device shall be clearly marked and permanent, indicating the following:

a) the pressure (in bar or kPa) at which it is set to discharge;

b) the allowable tolerance at the discharge pressure for devices driven spring;

c) the reference temperature corresponding to the rated pressure for frangible discs;

d) the rated flow capacity of the device, in cubic meters of air per second (m^3 / s);

e) the cross-sectional flow areas of the relief device pressure spring-loaded and frangible disc in mm^2.

Where feasible, shall also contain the following information:

f) the manufacturer's name and the relevant catalog number.

6.7.4.8.2 The rated flow capacity marked in relief devices pressure must be determined in accordance with ISO 4126-1: 2004 and ISO 4126-7: 2004.

6.7.4.9 Connections to pressure relief devices

6.7.4.9.1 Connections to pressure relief devices shall have dimensions sufficient to allow the necessary discharge pass unrestricted through the device of security. It can be installed either seal between valve housing and

pressure relief devices, unless there are duplicate devices, because of maintenance or other device and the sealing valves are in use locked in the open position or the stop-valves are interconnected so that the requirements of paragraph 6.7.4.7 are always met. There can not be obstruction in the opening that leads to the vent or pressure relief device restrict or prevent the housing flow to the device. Pipe to remove vapor or net of pressure relief devices, when used, should download the liquid or vapor released into the atmosphere with minimum pressure on the relief device.

6.7.4.10 Siting of pressure relief devices

6.7.4.10.1 The inputs of the pressure relief devices shall be located in top of the housing in such a position near the longitudinal and transverse center housing as possible. In maximum filling conditions, all entries pressure relief devices must be located in the housing vapor space, and that the devices should be arranged to ensure free discharge of vapors. For refrigerated liquefied gases, the exhaust fumes should be directed contrary to the position of the tank, so that not collide therewith. It is permissible to use protective devices for diverting the flow of vapors from the relief required capacity is not reduced.

6.7.4.10.2 steps must be taken to prevent access by persons not authorized the pressure relief devices and to protect them in case of overturning of the portable tank.

6.7.4.11 Measuring instruments

6.7.4.11.1 Except in the case of the portable tank to be filled by weight, it must be equipped with one or more measuring devices. They can not be used glass level indicators or other fragile material made of meters, such as instruments come into direct contact with the contents of the tank.

6.7.4.11.2 The shirts of vacuum insulated portable tanks shall be provided with Connection to vacuum gauge.

6.7.4.12 Supports, frames and lifting devices and fixing tanks portable

6.7.4.12.1 Portable tanks shall be designed and manufactured with structure

Page 213

support for safe base during transport. The forces specified in item 6.7.4.2.12 and the safety factor specified in 6.7.4.2.13 item should be considered in this aspect of the project. platforms are acceptable frameworks, cradles and Similar structures.

6.7.4.12.2 The combined stresses caused by holders (cradles, frameworks, etc.) and by lifting accessories and attachment of portable tanks may not cause tensions Excessive anywhere in the tank. All portable tanks shall be equipped with lifting accessories and permanent fixation. They should preferably be setting the portable tank supports but may be secured to plate reinforcement placed in the tank on support points.

6.7.4.12.3 In the design of supports and frameworks, must be taken into account effects of environmental corrosion.

6.7.4.12.4 The plug openings of the lifting forks should be able to be closed. The means of closing these openings must be a permanent part of the structure or permanently fixed to it. Portable tanks single compartment with less 3,65 m in length, need not dispose of the closing means, as long as what:

a) the tank and all its accessories are well protected impact by the forklift blades;

b) the distance between the centers of the forklift pockets is of the least half of the maximum length of the portable tank.

6.7.4.12.5 When portable tanks are not protected during transport accordance with paragraph 4.2.3.3, the carcasses and service equipment must be protected against damage from lateral or longitudinal impact or overturning. accessories external must be protected to prevent the housing content escapement result of impact or overturning of the tank on its fittings. examples of protection:

a) protection against side impact, which can consist of bars longitudinal protecting the shell on both sides at the height of the row average;

b) protection of the portable tank against overturning which may consist of reinforcement rings or bars fixed across the frame;

Page 214

c) protection against rear impact which may consist of a fender or grid;

d) Housing protection from impact damage caused or overturning by use of a standard ISO frame in accordance with ISO 1496-3: 1995;

e) portable tank protection from impact or overturning by a vacuum insulated jacket.

6.7.4.13 design approval

6.7.4.13.1 The competent authority or body designated by it believed should send to each new portable tank design, a certificate of approval. This certificate must attest that the portable tank has been inspected by the authority, is suitable for the purpose that intended and meets the requirements of this Chapter. When a series of portable tanks for manufactured without design modification, the certificate is valid for the entire series. The certificate It should refer to the report of the tests of the design type, the refrigerated liquefied gases which can be transported to the carcass materials and manufacturing shirt and approval number. The approval number shall consist of a sign or mark characteristic of the country in whose territory the approval was granted, ie the acronym for use in international traffic prescribed by the *Convention on Road Traffic* , Vienna 1968 and a record number. Any alternatives, according to item 6.7.1.2, should It is indicated on the certificate. A design approval may serve for the approval of smaller portable tanks made of materials of the same type and thickness, using the same fabrication techniques and with identical supports, and opening and equivalent accessories.

6.7.4.13.2 The test report of the design type for approval shall include at least the next:

a) the results of the applicable framework test specified in Rule ISO 1496-3: 1995;

b) the results of the inspection and the initial tests described in item 6.7.4.14.3; and

c) the results of the impact test prescribed in item 6.7.4.14.1, when applicable.

6.7.4.14 Inspection and testing

6.7.4.14.1 Portable tanks meeting the definition of CSC's container, 1972, as amended, they can not be used unless they have been approved through the presentation of a representative design type of each project submitted to Impact Dynamic test Longitudinal prescribed in Section 41 of Part IV of the Manual Tests and Criteria.

6.7.4.14.2 The tank and each portable tank equipment should be inspected and tested before being put into service (inspection and acceptance test) and thereafter at intervals not exceeding five years (inspection and periodic tests five-year), with intermediate inspection and periodic testing (inspection and tests intervals of 2.5 years) between each execution of inspection and five-year trials. THE inspection and testing 2.5-year interval may be performed within three months of specified date. testing and exceptional inspections should be carried out, regardless of the date of the last periodic tests and inspections when necessary, in accordance with item 6.7.4.14.7.

6.7.4.14.3 The inspection and initial testing of the portable tank shall include a verification of design characteristics, an internal and external examination of the carcass portable tank and its fittings with due regard to liquefied gases chilled to be transported, and a pressure test referring to the test pressure according to item 6.7.4.3.2. The pressure test can be carried out as a hydraulic pressure test or by using another liquid or gas with the agreement of competent authority or body designated by it believed. Before the portable tank is placed in service, a tightness test, and a test should be performed satisfactory operation of all service equipment. If the shell and its fittings have been pressure tested separately, after assembly, the assembly must be subjected to a tightness test. All welds subject to efforts maximum must be inspected in the initial test, through X-ray, ultrasound, or Another method suitable non-destructive. This does not apply to the shirt.

6.7.4.14.4 The inspections and periodic tests (at intervals of 2.5 to 5 years) should include external examination of the portable tank and its accessories, taking into account gases refrigerated liquefied to be transported a tightness test, a verifying the operability of all service equipment and, when applicable, reading vacuum. In the case of non-vacuum insulated tanks, the jacket and insulation shall be removed during both periodic inspections (at intervals of 2.5 to 5 years), but

only to the extent necessary for safe evaluation.

6.7.4.14.5 *Deleted.*

6.7.4.14.6 Portable tanks may not be filled and available for transport after the expiration date of the inspections and five-year periodic tests or 2.5 years as required in item 6.7.4.14.2. However, portable tanks filled before the expiration date of the last testing and periodic inspections can be transported for a period of up to three months after the expiration date of the last inspection and periodic test. In addition, a portable tank may be transported after expiration date of the last inspection and periodic test:

a) after emptying but before cleaning, for execution of the next inspection or the next test required before the new potting; and

b) unless otherwise approved by the competent authority for a period of up to six months after the expiration date of the last inspection or last periodic test, to allow the return of products dangerous for proper recycling or disposal. The document transport should contain reference to such exemption.

6.7.4.14.7 It is necessary to carry out inspection and exceptional test when the tank Portable present evidence of damaged or corroded areas, leakage, or other conditions indicating impairment that can affect the integrity of the portable tank. THE extent of inspection and exceptional tests depends on the damage level or deterioration of the portable tank. At a minimum, it should include inspection and testing 2.5 years, in accordance with item 6.7.4.14.4.

6.7.4.14.8 The internal examination during the inspection and acceptance test must ensure Housing scan for holes, or abrasions, dents, distortions, defects welding, and any other conditions that might render the portable tank unsafe for transport.

6.7.4.14.9 The external examination shall ensure that:

a) the external piping, valves, pressurizing systems or cooling, where applicable, and gaskets are inspected for the corroded areas, defects, leakage, or other conditions can render the portable tank unsafe for filling, emptying or transport;

b) there is no leakage in any manholes cover or gaskets;

c) missing or loose bolts and nuts on any flanged connection or blind flanges are replaced or tightened;

d) all valves and emergency devices are free from corrosion, distortion and any damage or defect that could prevent their normal operation. closing devices operated remotely and automatic shut-off valves must be actuated to demonstrate proper operation;

e) required markings on the portable tank are legible and in accordance with the applicable requirements; and

f) The framework, supports and lifting devices of the portable tank are in satisfactory condition.

6.7.4.14.10 The inspections and tests prescribed in paragraphs 6.7.4.14.1, 6.7.4.14.3, 6.7.4.14.4, 6.7.4.14.5 and 6.7.4.14.7 shall be performed or witnessed by an expert accredited by the competent authority or body designated by it believed. If the test

pressure part of the inspection and test, the test pressure must be as indicated in plate with the data of the portable tank. While under pressure, the portable tank must be inspected for leakage in the shell, piping or equipment.

6.7.4.14.11 When welding operations are made, cutting or burning carcass of a portable tank, such operations must be approved by the authority or competent body designated by it believed, taking into account the vessels Regulation pressure used in housing production. one must be carried out pressure test, the original test pressure after the completion of the work.

6.7.4.14.12 When evidence of any unsafe condition, the portable tank It can not be returned to service until the defects have been corrected, and tank, approved in another test.

6.7.4.15 Marking

6.7.4.15.1 Every portable tank shall be provided with a plate for marking purposes. This card must be metal, corrosion resistant fixed to it permanently in visible and easily accessible for inspection location. When, by the portable tank configuration, you can not secure the card to the housing permanently, the carcass must be marked

with at least the information required by the pressure vessel code. At the least the following specified data should be marked on the plate by stamping or similar method:

(The) Owner Information

(I) the owner's registration number.

(B) manufacturing information

(I) manufacturing country;

(Ii) year of manufacture;

(Iii) manufacturer's mark or name;

(Iv) manufacturer's serial number.

(w) approval information

(I) the UN symbol for packaging:

This symbol can not be used for any purpose other than to indicate a container, a container for flexible bulk, a tank laptop or CGEM meet the requirements of Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8;

(Ii) the country of approval;

(Iii) Authorized body for approval of the project;

(Iv) project approval number;

(V) the letters "AA" if the project has been approved with arrangements alternative (see section 6.7.1.2);

(Vi) pressure vessel of the regulation with which the shell was designed.

(D) pressures

(I) Pressure Maximum Allowable Working in bar or kPa (pressure gauge);

(Ii) the test pressure, in bar or kPa (gauge pressure);

(Iii) the date of the initial pressure test (month and year);

(Iv) the witness's identification mark or director of the test Initial pressure.

Note: *The unit used shall be indicated.*

(and) temperatures

(I) minimum temperature project, indicating the unit used (in ° C).

(F) materials

(I) housing materials and reference of material standards;

(Ii) thickness equivalent in reference steel, indicating the unit used (in mm).

(G) capacity

(I) Tank water capacity at 20 ° C, indicating the unit used (In liters).

(H) isolation

(I) "Thermally insulated" or "vacuum insulated" (as appropriate);

(Ii) effectiveness of the insulation system (heat inflow) n indicating the unit used (in watts).

(I) waiting times - for each refrigerated liquefied gas permitted for transport in portable tank

(I) full name of the refrigerated liquefied gas;

(Ii) waiting time reference indicating the unit used (in days or hours);

(Iii) Initial pressure in bar or kPa (gauge pressure), indicating the unit used;

(Iv) the degree of filling (in kg), indicating the unit used;

(H) inspections and periodic tests

(I) type of most recent periodic test (2.5 years, 5 years or exceptional);

(Ii) date of the most recent periodic test (month and year);

712

Page 220

(Iii) the identification mark or believed held

He witnessed the most recent test.

Figure 6.7.4.15.1: Example of identification plate

Owner registration number
INFORMATION OF MANUFACTURE
Country of manufacture
Year of manufacture
Manufacturer
Number of manufacturer's serial
ADOPTION INFORMATION
Country of approval
authorized body for approval
from the project
project approval number "AA" (if applicable)
Housing project Regulation
(Regulation of the pressure vessel)
PRESSURES
MAWP bar or kPa
Pressure test bar or kPa
Date of test (Mm / yyyy) brand
initial rush witness
TEMPERATURES
Minimum temperature design ºC
MATERIALS
Housing materials and reference of
material standards
Equivalent thickness for steel mm
reference
CAPACITY
Tank water capacity at 20 ° C liters
ISOLATION
"Thermally insulated" or "vacuum Isolated" (as appropriate)
Influx of heat watts
WAITING TIME

liquefied gases chilled allowed	Waiting time of reference	initial pressure	filling degree
	days or hours	bar or kPa	kg

INSPECTIONS AND TESTS PERIODIC

Kind of test	Date test	Brand witness	gives in test	Kind	Date test	witness mark

(Mm / yyyy) bar or kPa (Mm / yyyy) bar or kPa

6.7.4.15.2 The following information shall be marked in durable form in itself portable tank or solid metal plate and securely attached to the tank:

names of owner and operator

refrigerated liquefied gas being transported name (and average temperature Minimum volume)

MPGM kg

Unladen mass (tare) _____ kg

Actual holding time for gas being transported _____ days (or hours)

Instruction for Portable Tank, according to item 4.2.5.2.6

Notice: *For the identification of the refrigerated liquefied gas transported, see, Also, Part 5.*

6.7.5 Requirements for the design, manufacture, inspection and testing Multiple container elements for gas (MEGCs) for the carriage of non-refrigerated gases

6.7.5.1 *settings*

For purposes of the following

Collector means a set of pipes and valves that connect the openings filling and emptying of the elements;

Elements mean cylinders, tubes or group of cylinders;

Tightness test means a test using gas subjecting the elements and service equipment of the CGEM to an effective internal pressure of not less than 20% of the test pressure;

Service equipment means measuring instruments and devices filling, emptying, venting and safety;

Structural equipment means the reinforcing, fastening, protective and stabilizing the external elements;

Maximum permissible gross mass (MPGM) means the sum of the mass of the CGEM (tare) with the greatest load for transport.

6.7.5.2 General requirements for the design and manufacture

6.7.5.2.1 The CGEMs should be able to be filled and emptied without removing structural equipment. Must have external stabilizing members to elements to provide structural integrity for handling and transport. MEGCs They must be designed and constructed with supports to provide a secure base during transportation and lifting devices and adequate fixation, including lifting the CGEM even when loaded with its maximum permissible gross mass. The CGEM should be designed to be loaded into a vehicle or vessel and must be equipped with shims, brackets or accessories to facilitate mechanical handling.

6.7.5.2.2 MEGCs shall be designed, constructed and equipped so that support all the conditions that may be subject during normal handling and transport. The design should take into account the loading effects dynamic and fatigue **.**

6.7.5.2.3 CGEMs elements must be made without welding steel and be constructed and tested in accordance with Chapter 6.2. All elements of the CGEM must be of the same design type.

6.7.5.2.4 The elements of MEGCs, fittings and pipes must be:

a) compatible with the substances to be transported (for gases, see ISO 11114-1: 2012 and ISO 11114-2: 2000); or

b) properly treated or neutralized by chemical reaction.

6.7.5.2.5 Contact between dissimilar metals which may result in damage action Galvanic should be avoided.

6.7.5.2.6 The materials of the CGEM, including any devices, gaskets and accessories may not adversely affect the substances to be carried in them.

6.7.5.2.7 The MEGCs must be designed to withstand without loss of contents, the least the internal pressure generated by the content and the static, dynamic loads and thermal, under normal conditions of handling and transport. The project must demonstrate that the effects of fatigue, caused by repeated application of these loads through life the CGEM, were taken into consideration.

6.7.5.2.8 The MEGCs and their fastenings when filled with the maximum load permitted, must be able to absorb the static forces applied following separately:

a) in the direction of travel: twice the maximum gross mass Permissible multiplied by the acceleration of gravity (g);

b) horizontally in the direction perpendicular to the direction of travel: the maximum permissible gross mass (if the direction of travel not

is clearly determined, the forces shall be equal to twice the MPGM) multiplied by the acceleration gravity (g);

c) Vertically upwards: the MPGM multiplied by the acceleration of gravity (g); and

d) Vertically downwards: twice the maximum gross mass Permissible (total load, including the effect of gravity) multiplied by the acceleration of gravity (g).

Notice: *For calculation purposes, $g = 9.81 m / s^2$.*

6.7.5.2.9 Under the forces defined in section 6.7.5.2.8, the stress at the most severely tensioned elements may not exceed the values given in standards relevant in item 6.2.2.1 or, if the elements have not been designed, constructed and tested according to those standards, in the technical code or standard recognized and approved by the competent authority of the country in which will be used (see section 6.2.3.1).

6.7.5.2.10 The safety factor to be considered for the frame and fixings, Under each of the forces mentioned in item 6.7.2.2.12 shall be as follows:

a) for metals with clearly defined yield point, a safety factor of 1.5 compared to the yield stress guaranteed; or

b) for metals with no clearly defined yield point, a safety factor of 1.5 in relation to mechanical stress 0.2% proof guaranteed and, for austenitic steels, mechanical stress 1% test.

6.7.5.2.11 MEGCs intended for the transport of flammable gases should be able to be electrically grounded.

6.7.5.2.12 The elements must be fixed in order to prevent movements Undesirable in relation to the structure and concentration of harmful localized tension.

6.7.5.3 Service Equipment

6.7.5.3.1 Service equipment shall be configured or designed to prevent damage that could result in release of the pressure vessel content during normal conditions of handling and transport. If the connection with the frame elements allow relative movement between parts of the whole, the equipment should be fixed so as to allow this movement, but without damaging the parts. Collectors, external discharge fittings (pipe sockets, shut devices) and sealing valves must be protected against the risk of being torn by external forces. Pipes collector leading to shut-off valves should be sufficiently flexible to protect the valves and pipes against

shearing or releasing the pressure receptacle contents. the devices (Including flanges or threaded plugs) filling and emptying and any protective covers must be protected against inadvertent opening.

6.7.5.3.2 Each element intended for the transport gas Subclass 2.3 It must be provided with a valve. The manifold for liquefied gases of Division 2.3 It should be designed so that the elements can be filled separately and kept isolated by a valve capable of being sealed. For gas transport Division 2.1, the elements must be divided into groups of up to 3000 liters each, isolated by a valve.

6.7.5.3.3 For filling and emptying openings of the CGEM, two valves in series must be placed in accessible position on each filling tube and emptying. One of the valves may be unidirectional. filling devices, and emptying can be fixed to the collector. For pipe sections that can be closed at both ends and where a liquid product can be trapped, one pressure relief valve should be installed to prevent excessive increase in pressure. The main isolation valves of a CGEMs should be clearly marked for indicate the direction of closing. Each of the sealing valves, or other means of lock, and you project must be constructed to withstand a pressure equal to or greater than 1.5 times the CGEMs the test pressure. All shut-off valves with threaded rod should close by turning the wheel clockwise. In case of other stop-valves the position (open and closed) and direction of closure They must be clearly indicated. All stop-valves shall be designed to prevent accidental opening. ductile metals in the manufacture must be used valves and accessories.

6.7.5.3.4 The pipes must be designed, manufactured and installed to avoid damage due to expansion and contraction, mechanical shock and vibration. joints the pipes must be joined with brazing or present a metal union equal resistance. The melting point of the materials used for the solder can not be less than 525 ° C. The operating pressure of the service equipment and manifold not It can be less than two-thirds of the test pressure elements.

6.7.5.4 pressure relief devices

6.7.5.4.1 CGEMs elements used for carbon dioxide transport, No UN 1013, and nitrous oxide, UN No. 1070, should be divided into to groups 3000 liters each isolated by a valve. Each group shall be provided with one or more pressure relief devices. If required by the competent authority of country of use, MEGCs for other gases should also be provided with pressure relief device, as specified by such authority.

6.7.5.4.2 When pressure relief devices are used, each element or a group of elements CGEMs that can be isolated, must be provided with one or Many of these devices. pressure relief devices shall be of a type that resist dynamic forces, including liquid movement, and should be designed to prevent the entry of foreign substances, the gas leak and development of any dangerous excess pressure.

6.7.5.4.3 MEGCs used for the transport of certain non-refrigerated gases, identified Instruction for T50 Packaging in item 4.2.5.2.6 may have a device pressure relief as required by the competent authority of the country of use. THE unless a specific use CGEMs intended to be provided with relief device Pressure constructed of materials compatible with the cargo being transported, the device relief should comprise a frangible disc preceding a relief device pressure spring loaded. The space between the rupture disk and a relief device pressure spring-loaded can be equipped with a pressure gauge or indicator appropriate. This arrangement allows the disc rupture detection, perforation or leakage that may cause system malfunction. The frangible disc shall rupture at a nominal pressure 10% higher than that triggers the relief device activated by spring.

6.7.5.4.4 In the case of multi-purpose MEGCs used for the transport of gases liquefied at low pressure, pressure relief devices must open pressure indicated in item 6.7.3.7.1 for the gas that present the highest maximum working pressure permissible between the gas transported in the CGEM is allowed.

6.7.5.5 Capacity of pressure relief devices

6.7.5.5.1 The combined discharge capacity of pressure relief devices when installed must be sufficient to conditions in complete engagement CGEM fire, limit the pressure (including accumulation) inside the elements of 120% established pressure in the pressure relief device. The formula presented in CGA S-1.2-2003 "Pressure Relief Device Standards - Part 2 - Cargo and Portable Tanks for Compresse gases "should be used to determine the minimum total capacity of discharge into the pressure relief device system. CGA S-1.1-2003 "Pressure Relief Device Standards - Part 1 - Cylinders for Compresse Gases "can be used to determine the relief capacity of individual elements. Relief Device actuated by spring pressure may be used to achieve full capacity relieving the low pressure liquefied gases. In the case of MEGCs multiple uses, combined discharge capacity of pressure relief devices to be adopted is that the gas which requires the largest capacity among all exhaust gases allowed to transport the CGEM.

6.7.5.5.2 To determine the total required capacity of the relief device

pressure at the elements for the transport of liquefied gases must be
taken into account the thermodynamic properties of the gas (see, for example, CGA
S-1.2-2003 "Pressure Relief Device Standards - Part 2 - Cargo and Portable Tanks for
Compresse gas "for low pressure liquefied gases and CGA S-1.1-2003" Pressure
Relief Device Standards - Part 1 - Cylinders for Compresse gases "for liquefied gases
high pressure).

6.7.5.6 Marking of pressure relief devices

6.7.5.6.1 pressure relief devices shall be clearly marked and
permanent, indicating the following:

a) the manufacturer's name and the relevant catalog number;

b) the pressure and / or temperature set for operation;

c) the date of the last test;

d) the areas of cross-section of the pressure relief device
spring-loaded and frangible disc in mm 2

6.7.5.6.2 The flow capacity marked on the pressure-relief devices
driven spring for low pressure liquefied gases shall be determined
according to ISO 4126-1: 2004 and ISO 4126-7: 2004.

6.7.5.7 Connections to pressure relief devices

6.7.5.7.1 Connections to pressure relief devices shall have a diameter
sufficient to allow excess pressure escape freely. It can not be
any sealing valve installed between the member and the relief device
pressure, unless there are duplicate devices, for maintenance or other reason
reasons, and that the sealing valve device in use are locked in position
these are interconnected or open so that at least one of the devices
Duplicate always in operating conditions and able to meet the requirements
established in Section 6.7.5.5. There can be some obstruction that leads to the opening
vent or pressure relief device, or from them, which restricts
or impede the flow element to the device. The opening through the pipe and
accessories must have at least the same flow area as the inside of the device
pressure relief in which it is connected. The size (section) Nominal Pipe
release should be at least as wide as that of the output of the relief device
pressure. Vents or pipes from the pressure relief device,
when present, must release the vapors or liquid to the atmosphere in conditions
minimum back on these devices.

6.7.5.8 Siting of pressure relief devices

6.7.5.8.1 Each pressure relief device shall, in filling conditions
maximum maintain communication with the vapor space of the elements for the transport of

liquefied gases. Once installed, the devices must be located in such a way in order to ensure that the exhaust steam is released from the bottom up and without restrictions to prevent any contact between the gas and the liquid released and the CGEM, their elements or personnel. In the case of flammable gases, pyrophoric or oxidizing, steam exhaust should be released in a different direction of the corresponding element and so We can not also get in touch with the other elements. device protective heat resistant to divert the gas flow are permitted provided that no cause a drop in the ability of excess pressure relief device.

6.7.5.8.2 steps should be taken to prevent access by persons not authorized the pressure relief devices as well as to protect these devices in the event of overturning the CGEM.

6.7.5.9 Measuring instruments

6.7.5.9.1 When a CGEMs is intended to be filled by weight, it must be equipped with one or more measuring devices. They can not be used glass level indicators or other fragile material made of meters.

6.7.5.10 *Supports, frames and lifting devices and fixing MEGCs*

The 6.7.5.10.1 MEGCs shall be designed and manufactured to support structure ensure secure base during transport. The forces specified in item 6.7.5.2.8 and the safety factor specified in 6.7.5.2.10 item should be considered in this design aspect. platforms are acceptable, frameworks, cradles or other similar structures.

6.7.5.10.2 The combined stresses caused by supporters of elements (cradles, frames etc.) and the lifting accessories and fixing MEGCs may not cause excessive stress in any element. All MEGCs must be equipped with lifting accessories and permanent fixation. In any case the brackets or accessories must be welded to the elements.

6.7.5.10.3 In the design of supports and frameworks, must be taken into account effects of environmental corrosion.

6.7.5.10.4 When MEGCs are not protected during transport, according with paragraph 4.2.4.3, the elements and service equipment must be protected damage resulting from lateral or longitudinal impact or overturning. accessories external must be protected to prevent the housing content in the exhaust result of impact or overturning of the CGEM on accessories. Attention Special should be paid to protect the collectors. Examples of protection:

a) protection against side impact, which can consist of bars longitudinal;

b) protection against tipping, which can consist of reinforcing rings or bars fixed across the frame;

c) protection against rear impact which may consist of a fender or grid;

d) protection of the elements and service equipment against damage

721

Page 229

caused by impacts or overturning using a ISO frame in accordance with ISO 1496-3: 1995.

6.7.5.11 Project approval

6.7.5.11.1 The competent authority or body designated by it believed should send to each new CGEM project, a certificate of approval. This certificate shall state the CGEM was inspected by the authority, it is suitable for the purpose it is intended and meets the requirements of this Chapter, the provisions apply to Chapter 4.1 and gases Instruction for packing P200. When a series of MEGCs are manufactured without design modification, the certificate is valid for the entire series. The certificate must refer the test report of the design type, the manufacturing materials collectors, the standards to which the elements are made and the number of approval. The number of approval shall consist of a sign or hallmark of the country in whose territory the approval was granted, ie the distinguishing sign for use in international traffic prescribed by *Convention on Road Traffic* , Vienna 1968, and a registration number. Any different alternatives, according to item 6.7.1.2, shall be indicated in the certificate. THE design approval may serve for the approval of smaller MEGCs manufactured with materials of the same type and thickness, using the same fabrication techniques, identical supports, equivalent opening and accessories.

6.7.5.11.2 The test report of the design type for approval shall include at least the next:

a) the results of the applicable framework test specified in Rule ISO 1496-3: 1995;

b) the results of the inspection and the initial tests described in item 6.7.5.12.3;

c) the results of the impact test prescribed in item 6.7.5.12.1; and

d) certification documents verifying that the cylinders and pipe meet the applicable standards.

6.7.5.12 Inspection and testing

The 6.7.5.12.1 MEGCs which meet the definition of CSC's container, 1972, your changes may not be used unless they have been approved by the presentation of a representative design type of each design type subjected to Longitudinal Impact Dynamic test prescribed in Section 41 of Part IV of the Manual

722

Page 230

Tests and Criteria.

6.7.5.12.2 The elements and items of equipment of each CGEM should be inspected and tested (inspection and initial testing) before being put into service. Thereafter, MEGCs shall be inspected at intervals of up to five years (Quinquennial inspection and test). testing and exceptional inspections should be carried out, regardless of the date of the last testing and periodic inspections when necessary, in accordance with item 6.7.5.12.5.

6.7.5.12.3 The inspection and initial testing of a CGEM shall include a check design features, an external examination of the CGEM and their accessories, with due consideration of the gas to be transported and held pressure test According to test pressures of Instruction for P200 packaging. The test pressure collectors can be performed as a hydraulic pressure test or using another liquid or gas with the agreement of the competent authority or body believed by it. Before the CGEM be put into service shall be carried out a leakage test and a test of the satisfactory operation of the entire service equipment. If the elements and its accessories have been subjected to A pressure test separately, after assembly, the assembly must be subjected a tightness test.

6.7.5.12.4 Inspection and five-year tests shall include an external examination of structure, the elements and service equipment according to item 6.7.5.12.6. The elements and the piping shall be tested at specified intervals in Packaging instruction P200 and in accordance with the requirements of the item 6.2.1.6. When the elements and equipment have been subjected to a test pressure separately, after assembly, the assembly must be subjected to a test tightness.

6.7.5.12.5 It is necessary to perform exceptional inspection and testing when the CGEM present evidence of damaged or corroded areas, leakage, or other conditions indicating deficiency that could affect the integrity of the CGEM. The extent of inspection and exceptional test depends on the level of damage or deterioration of the CGEM. At a minimum, it should include the tests required in item 6.7.5.12.6.

6.7.5.12.6 The inspections shall ensure that:

a) the elements are inspected to detect erosion, corrosion, abrasions, dents, distortions, weld defects or any other

Page 231

conditions, including leakage, that might render unsafe CGEM to transport;

b) pipe, valves and gaskets are inspected to check for corroded areas, defects, and other conditions, including leakage, which can become unsafe CGEM for filling, emptying or transport;

c) missing or loose bolts and nuts on any flanged connection or blind flanges are replaced or tightened;

d) all valves and emergency devices are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and valves automatic sealing should be triggered to demonstrate operation proper;

e) tags required in CGEMs are legible and in accordance with the applicable requirements; and

f) The framework, supports and lifting devices are in CGEM satisfactory condition.

6.7.5.12.7 The inspections and tests provided for in paragraphs 6.7.5.12.1, 6.7.5.12.3, 6.7.5.12.4 and 6.7.5.12.5 shall be performed or witnessed by the competent authority or body believed by it. If the pressure test is a part of the inspection and testing, test pressure must be indicated on plate with CGEMs data. while under pressure, CGEM should be inspected for leaks in the elements, in piping or equipment.

6.7.5.12.8 When evidence of any unsafe condition, the CGEM can not be returned to service until the defects have been corrected, and it has been approved in another test.

6.7.5.13 Marking

6.7.5.13.1 All CGEM shall be fitted with sturdy metal plate fixed to the corrosion it permanently, in a conspicuous place readily accessible for inspection. The plate Metal can not be affixed to the elements. The elements shall be marked in accordance with Chapter 6.2. At least the following specified data must be marked in plate by stamping or a similar method.

Page 232

(The) Owner Information

(I) the owner's registration number.

(B) manufacturing information

(I) manufacturing country;

(Ii) year of manufacture;

(Iii) manufacturer's mark or name;

(Iv) manufacturer's serial number.

(w) approval information

(I) the UN symbol for packaging:

This symbol can not be used for any purpose other than to indicate a container, a container for flexible bulk, a tank laptop or CGEM meet the requirements of Chapters 6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8;

(Ii) the country of approval;

(Iii) Authorized body for approval of the project;

(Iv) project approval number;

(V) the letters "AA" if the project has been approved with arrangements alternative (see section 6.7.1.2).

(D) pressures

(I) test pressure in bar or kPa (gauge pressure);

(Ii) the date of the initial pressure test (month and year);

(Iii) the witness's identification mark or director of the test Initial pressure.

Note: *The unit used shall be indicated.*

(and) temperatures

Page 233

(I) Band design temperature, indicating the unit used (in ° C).

(F) elements / capacity

(I) number of elements;

(Ii) Total water capacity, indicating the unit used (in liters).

(G) inspections and periodic tests

(I) type of most recent periodic test (5 years or exceptional);

(Ii) date of the most recent periodic test (month and year);

(Iii) the identification mark or believed held He witnessed the most recent test.

Figure 6.7.5.13.1: Example of identification plate

Owner registration number
INFORMATION OF MANUFACTURE

Country of manufacture
Year of manufacture
Manufacturer
Number of manufacturer's serial
ADOPTION INFORMATION
Country of approval
authorized body for approval
from the project
project approval number "AA" (if applicable)
Housing project Regulation
(Regulation of the pressure vessel)
PRESSURES
Pressure test Pub
Date of test (Mm / yyyy) brand
initial rush witness
TEMPERATURES
design temperature range ºC the ºC
ELEMENTS / CAPACITY
Number of components
Total capacity in water liters
INSPECTIONS AND TESTS PERIODIC

Kind of test	Date test (Mm / yyyy)	Brand witness	gives	Kind of test	Date of test (Mm / yyyy)	Brand witness	gives

Page 234

6.7.5.13.2 The following information shall be marked in a durable way, plate firm metal and securely attached to the CGEM:

Operator name

maximum permissible load mass _____kg

Working pressure at 15 ° C _____ gauge pressure

MPGM kg

Unladen mass (tare) _____ kg

CHAPTER 6.8

REQUIREMENTS FOR DESIGN, MANUFACTURE, INSPECTION AND TESTING BULK CONTAINERS

6.8.1 settings

For purposes of this Chapter

Closed bulk container means a container for fully enclosed with bulk a rigid roof, sidewalls and rigid bottom (including funds funnel-type). The term includes bulk containers with ceiling opening, as well as side walls, upper and bottom which can be closed during transportation. Bulk containers closed can be equipped with openings which allow the exchange of gases and vapors with the external air and to avoid, in normal conditions of carriage the release of solid content as well as the penetration of rain and splash water.

Flexible bulk container means a flexible container with a capacity of up to 15 m^3 and includes fixed coatings and handling devices, and equipment service.

Covered container for bulk means a bulk container with open top (without ceiling), with background and rigid side walls (including bottom funnel-type) and coverage not rigid.

6.8.2 Application and general requirements

6.8.2.1 Bulk containers, their service and structural equipment should

They are designed and manufactured to withstand without loss of contents, the internal pressure content and tensions in handling and transport.

6.8.2.2 If the bulk container is equipped with discharge valve, this must It is maintained in the closed position and the entire exhaust system should be protected damage. Valves fitted with locks lever should have protection accidental opening and the positions "open" and "closed" should be easily identifiable.

6.8.2.3 ***Codes for designating types of containers for bulk***

The following table indicates the codes to be used for appointment of types of bulk containers:

Types of bulk containers	Code
Covered container for bulk	BK1
Closed container for bulk	BK2
flexible bulk container	BK3

6.8.2.4 In order to take account of the progress of science and technology, competent authority may agree to alternative arrangements where such offer safety conditions at least equivalent to those required by this Chapter.

6.8.3 Requirements for design, manufacturing, inspection and test containers general cargo containers used as bulk BK1 and BK2.

6.8.3.1 ***design requirements and manufacturing***

6.8.3.1.1 The expression met the general requirements for the design and manufacture arranged in the following items if the bulk container meets the requirements of the standard ISO 1496-4: 1991 "Series 1 Freight containers - Specification and testing - Part 4: Non pressurized containers for dry bulk "and is dustproof.

6.8.3.1.2 General cargo containers designed and tested in accordance with Rule ISO 1496-1: 1990 "Series 1 Freight containers - Specification and testing - Part 1: General cargo containers for general purposes "shall have operational equipment designed, including its connection to the freight container, to strengthen the side walls and increase resistance to longitudinal stresses, as required to meet the requirements of the ISO 1496-4 test: 1991.

6.8.3.1.3 Bulk containers should be dustproof. If used coating to make the dustproof container, it must be of a suitable material. THE strength of the materials used, as well as the manufacture of the coating must be suitable for container capacity for bulk and to the use for which it is.

Gaskets and coating closures shall withstand pressures and impacts that may occur during normal handling and transportation. For bulk containers ventilated jacket can not prevent or hinder the operation of the device ventilation.

729

Page 237

6.8.3.1.4 The operating equipment of the bulk container designed to be emptied by tilting must be able to withstand the total mass loading inclined position.

6.8.3.1.5 All ceiling or ceiling section, and the entire side wall that are mobile should be fitted with closing devices or locks fitted with mechanisms security able to show the closed position to any observer situated at the level from soil.

6.8.3.2 Service Equipment

6.8.3.2.1 filling and emptying should be constructed and placed so that they are protected against the risk of being uprooted or damaged during transport and handling. filling and emptying must be protected against inadvertent opening. The positions "open" and "Closed" and the direction of closure shall be clearly indicated.

6.8.3.2.2 The joints of the openings must be placed so as to avoid damage due to the operation, filling or emptying of the bulk container.

6.8.3.2.3 In cases where ventilation is required, bulk containers shall It is equipped with means that allow exchange of air, either by natural convection, by example by opening either by active elements, for example fans. ventilation It should be designed to never allow negative pressure in the container. elements Container ventilation Bulk for the carriage of substances flammable or substances emitting flammable gases or vapors shall be designed so as not to become sources of ignition.

6.8.3.3 Inspection and testing

6.8.3.3.1 General cargo containers used, maintained and qualified as bulk containers, according to the requirements of this chapter should be tested and approved in accordance with the International Convention on the Safety Containers (CSC) 1972, as amended.

6.8.3.3.2 General cargo containers used and qualified as containers bulk cargo should be inspected periodically in accordance with the Convention International for Safe Containers (CSC) 1972, as amended.

6.8.3.4 Marking

6.8.3.4.1 General cargo containers used as bulk containers should

730

Page 238

It is marked with a Safety Approval Plate in accordance with the Convention International for Safe Containers (CSC) 1972, as amended.

6.8.4 Requirements for the design, manufacture and approval of containers to BK1 and BK2 bulk distinct from general cargo containers

6.8.4.1 Containers for bulk materials subject to the requirements of this chapter They include buckets, bulk to containers in open sea containers or boxes for bulk, swap (*swap bodies*), containers Rail format, containers with the running system and vehicle cargo compartment.

6.8.4.2 These bulk containers shall be designed and manufactured strong enough way to withstand the shocks and loadings normally encountered during transport, including, as applicable, transhipment between the various modes of transport.

6.8.4.3 Vehicles must be accepted by the competent authority responsible for land transport of the materials to be transported in containers fulfilling all the requirements to be established by such authority.

6.8.4.4 These bulk containers shall be approved by the authority competent and approval shall include the code for designating types of containers Bulk, according to item 6.8.2.3, as well as the requirements for inspection and testing, as appropriate.

6.8.4.5 When it is necessary to use coating in order to retain dangerous products, it must meet the requirements set out in item 6.8.3.1.3.

6.8.4.6 The following information should be presented in the fiscal document for transport: "Container bulk BK (x) approved by the competent authority of ...". where "x" should be replaced by the numbers 1 or 2, as appropriate.

6.8.5 Requirements for the design, manufacture, inspection and testing flexible containers for bulk BK3

6.8.5.1 Design and manufacturing requirements

6.8.5.1.1 flexible bulk containers should be dust proof.

6.8.5.1.2 Flexible bulk containers shall be completely closed for prevent loss of contents.

Page 239

6.8.5.1.3 flexible bulk containers should be sealed (the test

water).

6.8.5.1.4 The parts of flexible containers for bulk materials that are in contact direct with dangerous goods:

(A) may not be affected or significantly weakened by dangerous products;

(B) may not cause a harmful effect such as, for example, catalyze a reaction or reacting with the dangerous goods; and

(C) may not allow seepage of dangerous products able to generate a risk under normal conditions of transport.

6.8.5.2 service equipment and handling devices

6.8.5.2.1 filling and emptying should be constructed so that they are protected against the risk of damage during transportation and handling. filling and emptying should be protected against opening Inadvertent.

6.8.5.2.2 In the case of the flexible bulk container is provided with slings, these They must withstand pressures and dynamic forces which can appear in normal conditions handling and transportation.

6.8.5.2.3 handling devices must be sturdy enough to withstand repeated use.

6.8.5.3 Inspection and testing

6.8.5.3.1 Before any flexible container for bulk is put into use, its design type must have passed the tests prescribed in this Chapter.

6.8.5.3.2 The tests must be repeated whenever there are modifications design type that alter the design, material or manufacturing process of a container Flexible bulk.

6.8.5.3.3 The tests shall be performed on flexible bulk containers ready for transport. Containers should be filled to the maximum mass with which can be used and the content should be evenly distributed. At substances to be transported in the flexible bulk container may be replaced by others, since this would invalidate the results of the tests. When

used another substance, it shall have the same physical characteristics (mass, particle size, etc.) as the substance to be transported. It is permissible to use of fillers Additional such as bags of lead shot, to obtain the total mass of container, since placed so as not to affect test results.

6.8.5.3.4 Flexible bulk containers shall be manufactured and tested According to an evaluation program of the regulated accordingly by the authority

competent (Inmetro's), such that each flexible bulk container manufactured meets the requirements of this Chapter.

6.8.5.3.5 Drop test

6.8.5.3.5.1 Applicability

It should be applied to all flexible bulk containers, such as test project-type.

6.8.5.3.5.2 Preparation for testing

The flexible container for bulk must be filled to its gross mass Maximum permissible.

6.8.5.3.5.3 The flexible container for bulk should undergo the drop test in target which must be a non-resilient and horizontal surface and shall be further:

a) full and compact enough to stand still;

b) free from defects capable of influencing the test results;

c) sufficiently rigid to not deform and will not be damaged in essay; and

d) large enough to ensure that the sample container tested fall entirely on the surface.

After the fall, the flexible bulk container must be placed back in position vertical for observation.

6.8.5.3.5.4 The drop height shall be:

For packing group III: 0.8 m.

6.8.5.3.5.5 Criteria for approval

(A) can not loss of contents. A small stroke by, for example, Locks or holes sewing points on the basis of the impact can not

be a malfunction of the container, as long as there is no other leakage after the container is put back upright;

(B) can not cause damage that make the flexible bulk container unsafe for be transported to recovery or disposal.

6.8.5.3.6 *Lifting test the top*

6.8.5.3.6.1 Applicability

It should be applied to all flexible bulk containers, such as test project-type.

6.8.5.3.6.2 Preparation for the test

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

6.8.5.3.6.3 A flexible bulk container shall be lifted as they were designed until clear of the floor and maintained in that position for a period of five minutes.

6.8.5.3.6.4 approval criteria in the test: there can be no damage to the flexible container bulk, or their lifting devices, which makes it unsafe for transport or handling can be no loss of contents.

6.8.5.3.7 overturning test

6.8.5.3.7.1 Applicability

It should be applied to all flexible bulk containers, such as test project-type.

6.8.5.3.7.2 Preparation for testing

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

6.8.5.3.7.3 The flexible container for bulk should undergo the drop test by any part of its top by lifting the side farthest from the impact edge on target it should be a non-resilient and horizontal surface and must be still:

a) full and compact enough to stand still;

b) free from defects capable of influencing the test results;

c) sufficiently rigid to not deform and will not be damaged in essay; and

d) large enough to ensure that the sample container tested fall entirely on the surface.

6.8.5.3.7.4 For all flexible bulk containers, the tipping point is the specified as follows:

Packing Group III: 0.8 m.

6.8.5.3.7.5 Criteria for passing the test: can no loss of contents. a small stroke by, for example, locks or bores points sewing, due to the impact can not be considered as a defect of the flexible container, as long as there is no other subsequent leak.

6.8.5.3.8 aplomb test

6.8.5.3.8.1 Applicability

It should be applied to all flexible containers designed for bulk to be lifted from the top or side, as a design type test.

6.8.5.3.8.2 Preparation for testing

The flexible bulk container must be filled with at least 95%

its capacity and to the maximum permissible gross mass.

6.8.5.3.8.3 The flexible bulk container, lying on its side, should be hoisted at a minimum speed of 0.1 m / s to a vertical position above the ground, not more than half of its lifting device.

6.8.5.3.8.4 Criteria for passing the test: there can be no damage to the container or Flexible or their lifting devices, which make them unsafe for transport or handling.

6.8.5.3.9 Tear Test

6.8.5.3.9.1 Applicability

It should be applied to all flexible bulk container, as test

design type.

6.8.5.3.9.2 Preparation for testing

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

735

Page 243

admissible.

6.8.5.3.9.3 After the flexible bulk container has been placed in the soil, it must be done a cut of 300 mm, completely penetrating all container covers the wall one of the larger faces. The cut must be made at an angle of 45 degrees to the axis main flexible bulk container, the half height between the bottom surface and the level Upper content. Then, the container must be subjected to a load overlapping, evenly distributed, equivalent to twice the maximum gross mass admissible. The load shall be applied for at least fifteen minutes. after that procedure in the case of a flexible bulk container designed to be lifted by top or side, and after removal of the superimposed load, the container must be lifted from the ground and stay in this position for a period of fifteen minutes.

6.8.5.3.9.4 approval criteria in the test: the court can not increase more than 25% of their original length.

6.8.5.3.10 Stacking test

6.8.5.3.10.1 Applicability

It should be applied to all flexible bulk container, as test

design type.

6.8.5.3.10.2 Preparation for testing

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

admissible.

6.8.5.3.10.3 The flexible bulk container must be subjected to an applied force

its upper face, equivalent to four times the design load capacity, for 24 hours.

6.8.5.3.10.4 Criterion for passing the test: there can be no loss of content during test or after removal of the applied load.

6.8.5.4 Test report

6.8.5.4.1 must be issued a report from tests, which should be available users of the flexible bulk container, containing at least the following information:

1. Name and address of the test facility;
2. Name and address of applicant (where applicable);

3. An individual identification of the test report;
4. Date of the test report;
5. Manufacturer of the flexible bulk container;
6. design type Description of the flexible bulk container (eg, dimensions, materials, closures, thickness, etc.), or photograph (s);
7. Maximum capacity / maximum permissible gross mass;
8. Characteristics of test contents, such as particle size for solids;
9. Description and test results;
10. The position and signature of responsible for testing.

6.8.5.4.2 The test report shall contain statements that the flexible container for bulk prepared as for transport, was tested according to the devices apply this Chapter and that the use of other methods or other components may render it invalid. A copy of the test report shall be available the competent authority.

6.8.5.5 Marking

6.8.5.5.1 All flexible container for bulk manufactured and intended for use prescribed this Regulation shall bear durable markings, legible and easily visible. Letters, numerals and symbols shall be at least 24 mm high and shall show:

a) the UN symbol for packaging:

This symbol can not be used for any purpose other than to indicate a container, a container for flexible bulk a portable tank or CGEM meet the requirements of Chapters

6.1, 6.2, 6.3, 6.5, 6.6, 6.7 or 6.8;

b) the code BK3;

c) a capital letter indicating the packaging groups for
which the design type has been approved:

Z only for packing group III;

737

Page 245

d) the month and year (last two digits) of manufacture;

e) the characters identifying the country authorizing the placing of
mark, indicated by the acronym used in international traffic for
identify motor vehicles;

f) the name or symbol of the manufacturer and other identification of the container
flexible intermediate bulk as specified by the authority
competent;

g) the load of stacking test in kg;

h) The maximum permissible gross mass in kilograms.

The marking shall be applied in the sequence shown in paragraphs "a" to "H". Each of the marking elements required here must be clearly separated, for example, by means of a bar or a space in order to ensure that all the parts of the mark are easily identified.

6.8.5.5.2 Markup sample

BK3 / Z / 11 09
RUS / NTT / MK -14-10
56000/14000

738