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Series 1 freight containers — Specification and testing —

Part 1:
General cargo containers for general purposes

Conteneurs de la série 1 — Spécifications et essais —
Partie 1: Conteneurs d'usage général pour marchandises diverses

Reference number
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Contents

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 1496-1 was prepared by Technical Committee ISO/TC 104, *Freight containers*.

This fifth edition cancels and replaces the fourth edition (ISO 1496-1 : 1984). It incorporates Amendment 1 and Draft Amendment 2.

ISO 1496 will consist of the following parts, under the general title *Series 1 freight containers — Specification and testing*:

- *Part 1: General cargo containers for general purposes*
- *Part 2: Thermal containers*
- *Part 3: Tank containers for liquids, gases and pressurized dry bulk*
- *Part 4: Non-pressurized containers for dry bulk*
- *Part 5: Platform and platform-based containers*

Annexes A to F form an integral part of this part of ISO 1496. Annex G is for information only.

ADOPTION NOTICE

ISO1496-1, "Series 1 Freight Containers - Specification and Testing - Part 1: General Cargo Containers for General Purposes," was adopted on October 3, 1994, for use by the Department of Defense (DoD). Proposed changes by DoD activities must be submitted to the DoD Adopting Activity: Commander, Program Support Directorate, Marine Corps Systms Command, 2033 Barnett Avenue, Suite 315, Quantico, VA 22134-5010. DoD activities may obtain copies of this standard from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. The private sector and other Government agencies may purchase copies from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

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Introduction

The following grouping of container types is used for specification purposes in ISO 1496:

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NOTE — Container types 90 to 99 are reserved for air/surface containers: see ISO 8323.

Series 1 freight containers — Specification and testing —

Part 1:
General cargo containers for general purposes

1 Scope

1.1 This part of ISO 1496 specifies the basic specifications and testing requirements for ISO series 1 freight containers of the totally enclosed general purpose types and certain specific purpose types (closed, vented, ventilated or open top) which are suitable for international exchange and for conveyance by road, rail and sea, including interchange between these forms of transport.

1.2 The container types covered by this part of ISO 1496 are given in table 1.

Table 1 — Container types

Type code designation[1)]	Type
00 to 04	Closed, including opening roof
10, 11	Closed, vented
13, 15, 17	Closed, ventilated
50 to 53	Open-top

1) In accordance with ISO 6346.

This part of ISO 1496 does not cover ventilation arrangements, either vented or ventilated.

1.3 The marking requirements for these containers are given in ISO 6346.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 1496. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 1496 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 668 : 1988, *Series 1 freight containers — Classification, dimensions and ratings.*

ISO 830 : 1981, *Freight containers — Terminology.*

ISO 1161 : 1984, *Series 1 freight containers — Corner fittings — Specification.*

ISO 6346 : 1984, *Freight containers — Coding, identification and marking.*

3 Definitions

For the purposes of this part of ISO 1496, the definitions given in ISO 830 apply.

4 Dimensions and ratings

4.1 External dimensions

The overall external dimensions and tolerances of the freight containers covered by this part of ISO 1496 shall be those established in ISO 668 except that open-top containers may be of reduced height, in which case they shall be designated 1AX, 1BX, 1CX and 1DX. No part of the container shall project beyond these specified overall external dimensions.

4.2 Internal dimensions

Internal dimensions of containers shall be as large as possible, but, in any case:

— closed containers type 00 shall comply with the requirements for minimum internal length, width and height given in 4.3;

— containers type 02, having partial opening(s) in the side(s), shall comply with the requirements for minimum internal length and height given in 4.3;

— containers type 03, having an opening roof, shall comply with the requirements for minimum internal length and width given in 4.3;

— containers types 01 and 04, having openings in the side(s) and/or roof, shall comply with the requirements for minimum internal length given in 4.3;

— closed, vented containers types 10 and 11 shall comply with the requirements for minimum internal length, width and height given in 4.3;

— closed, ventilated containers type 13 shall comply with the requirements for minimum internal length, width and height given in 4.3.

4.3 Minimum internal dimensions

The minimum internal dimensions for ISO series 1 general purpose cargo containers are specified in table 2.

The dimensions apply when measured at a temperature of 20 °C (68 °F). Measurements taken at other temperatures shall be adjusted accordingly.

Where a top corner fitting projects into the internal space specified by table 2, that part of the corner fitting projecting into the container shall not be considered as reducing the size of the container.

4.4 Ratings

The values of the rating R, being the gross mass of the container, are those given in ISO 668.

5 Design requirements

5.1 General

All containers shall be capable of fulfilling the following requirements.

The strength requirements for containers are given in diagrammatic form in annex A (these requirements are applicable to all containers except where otherwise stated). They apply to containers as complete units.

The strength requirements for corner fittings (see also 5.2) are given in ISO 1161.

The container shall be capable of withstanding the loads and loadings detailed in clause 6.

As the effects of loads encountered under any dynamic operating condition should only approach, but not exceed, the effects of the corresponding test loads, it is implicit that the capabilities of containers indicated in annex A and demonstrated by the test described in clause 6 shall not be exceeded in any mode of operation.

Any closure in a container which, if unsecured, could lead to a hazardous situation, shall be provided with an adequate securing system having external indication of the positive securement of that closure in the appropriate operating position.

In particular, doors should be capable of being securely fastened in the open or closed position.

Any removable roof or roof section shall be fitted with locking devices such that an observer at ground level can check (when the container is on a rail or highway carrying vehicle) that its roof is secured.

All closed containers and all open containers fitted with covers which were designed for them, shall be weatherproof as required by test No. 13 (see 6.14).

5.2 Corner fittings

All containers shall be equipped with top and bottom corner fittings. The requirements and positioning of the corner fittings are given in ISO 1161. The upper faces of the top corner fittings shall protrude above the top of the container by a minimum of 6 mm[1)] (see 5.3.4). The "top of the container" means the highest level of the cover of the container, for example the level of the top of a soft cover. However, if reinforced zones or doubler plates are provided to afford protection to the roof in the vicinity of the top corner fittings, such plates and their securements shall not protrude above the upper faces of the top corner fittings. These plates shall not extend more than 750 mm[1)] from either end of the container but may extend the full width.

5.3 Base structure

5.3.1 All containers shall be capable of being supported by their bottom corner fittings only.

5.3.2 All containers, other than 1D and 1DX, shall also be capable of being supported only by load transfer areas in their base structure.

5.3.2.1 Consequently, these containers shall have end transverse members and sufficient intermediate load transfer areas (or a flat underside) of sufficient strength to permit ver-

Table 2 — Minimum internal dimensions

Freight container designation	Minimum height	Minimum width		Minimum length		
		mm	in	mm	ft	in
1 A	Nominal container external height minus 241 mm (9 1/2 in)	2 330	91 3/4	11 998	39	4 3/8
1 AA				11 998	39	4 3/8
1 B				8 931	29	3 5/8
1 BB				8 931	29	3 5/8
1 C				5 867	19	3
1 CC				5 867	19	3
1 D				2 802	9	2 5/16

1) 6 mm = 1/4 in
750 mm = 29 1/4 in

tical load transfer to or from the longitudinal member of a carrying vehicle. Such longitudinal members are assumed to lie within the two 250 mm[1] wide zones defined by the broken lines in figure B.1.

5.3.2.2 The lower faces of the load transfer areas, including those of the end transverse members, shall be in one plane located

$12{,}5 \text{ mm } {}^{+5}_{-1{,}5} \text{ mm}$[1]

above the plane of the bottom faces of the lower corner fittings of the container. Apart from the bottom corner fittings and bottom side rails, no part of the container shall project below this plane.

However, doubler plates may be provided in the vicinity of the bottom corner fittings to afford protection to the understructure.

Such plates shall not extend more than 550 mm[1] from the outer end and not more than 470 mm[1] from the side faces of the bottom corner fittings, and their lower faces shall be at least 5 mm[1] above the lower faces of the bottom corner fittings of the container.

5.3.2.3 The transfer of load between the underside of the bottom side rails and carrying vehicles is not envisaged.

The transfer of load between side rails and handling equipment should only occur when provisions have been made in accordance with 5.8.1 and 5.8.2.

5.3.2.4 Containers having all their intermediate transverse members spaced at 1 000 mm[1] apart or less (or having a flat underside) shall be deemed to comply with the requirements laid down in 5.3.2.1.

5.3.2.5 Requirements for containers not having transverse members spaced 1 000 mm[1] apart or less (and not having a flat underside) are given in annex B.

5.3.3 For containers 1D and 1DX, the level of the underside of the base structure is not specified, except in so far as it is implied in 5.3.4.

5.3.4 For all containers under dynamic conditions, or the static equivalent thereof, with the container having a load uniformly distributed over the floor in such a way that the combined mass of the container and test load is equal to 1,8 R, no part of the base of the container shall deflect more than 6 mm[1] below the base plane (bottom faces of the lower corner fittings).

5.3.5 The base structure shall be designed to withstand all forces, particularly lateral forces, induced by the cargo in service. This is particularly important where provisions are made for securement of cargo to the base structure of the container.

5.4 End structure

For all containers other than 1D and 1DX, the sideways deflection of the top of the container with respect to the bottom of the container, at the time it is under full transverse rigidity test conditions, shall not cause the sum of the changes in length of the two diagonals to exceed 60 mm[1].

5.5 Side structure

For all containers other than 1D and 1DX, the longitudinal deflection of the top of the container with respect to the bottom of the container, at the time it is under full longitudinal rigidity test conditions, shall not exceed 25 mm[1].

5.6 Walls

Where openings are provided in end or side walls, the ability of these walls to withstand tests Nos. 5 and 6 shall not be impaired.

5.7 Door opening

Each container shall be provide with a door opening at least at one end.

All door openings and end openings shall be as large as possible.

Closed-type containers designated 1A, 1B, 1C and 1D (types 00 and 02) shall have a door opening, preferably having dimensions equal to those of the internal cross-section of the containers and, in any case, not less than 2 134 mm[1] high and 2 286 mm[1] wide.

Closed-type containers designated 1AA, 1BB and 1CC (types 00 and 02) shall have a door opening, preferably having dimensions equal to those of the internal cross-section of the containers, and, in any case, not less than 2 261 mm[1] high, and 2 286 mm[1] wide.

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1) 250 mm = 10 in
$12{,}5 \text{ mm } {}^{+5}_{-1{,}5}$ mm = 1/2 in $^{+3/16}_{-1/16}$ in
550 mm = 22 in
470 mm = 18 1/2 in
5 mm = 3/16 in
1 000 mm = 39 3/8 in
6 mm = 1/4 in
60 mm = 2 3/8 in
25 mm = 1 in
2 134 mm = 7 ft
2 261 mm = 7 ft 5 in
2 286 mm = 7 ft 6 in

5.8 Requirements — Optional features

5.8.1 Fork-lift pockets

5.8.1.1 Fork-lift pockets used for handling 1CC, 1C, 1CX, 1D and 1DX containers in the loaded or unloaded condition may be provided as optional features.

Fork-lift pockets shall not be provided on 1AA, 1A, 1AX, 1BB, 1B and 1BX containers.

5.8.1.2 Where a set of fork-lift pockets has been fitted as in 5.8.1.1, a second set of fork-lift pockets may, in addition, be provided on 1CC, 1C and 1CX containers for empty handling only.

5.8.1.3 The fork-lift pockets, where provided, shall meet the dimensional requirements specified in annex C and shall pass completely through the base structure of the container so that lifting devices may be inserted from either side. It is not necessary for the base of the fork-lift pockets to be the full width of the container but it shall be provided in the vicinity of each end of the fork pockets.

5.8.2 Grappler arms or similar devices

Fixtures for handling all containers by means of grappler arms or similar devices may be provided as optional features. The dimensional requirements for such fixtures are specified in annex D.

5.8.3 Gooseneck tunnels

Gooseneck tunnels may be provided as optional features in containers 1AA, 1A and 1AX. The dimensional requirements are specified in annex E and, in addition, all other parts of the base structure shall be as specified in 5.3.

5.8.4 Cargo securing devices

Cargo securing devices may be provided as optional features in all series 1 general purpose containers. The requirements for such devices are specified in annex F.

6 Testing

6.1 General

Unless otherwise stated, containers complying with the design requirements specified in clause 5 shall, in addition, be capable of withstanding the tests specified in 6.2 to 6.14, as applicable. Containers shall be tested in the condition in which they are designed to be operated. Also, containers equipped with removable structural items shall be tested with these items in position. It is recommended that the test for weatherproofness (test No. 13) be carried out last.

6.1.1 The symbol P denotes the maximum payload of the container to be tested, that is:

$$P = R - T$$

where

R is the rating;

T is the tare.

NOTE — R, P and T, by definition, are in units of mass. Where test requirements are based on the gravitational forces derived from these values, those forces, which are inertial forces, are indicated thus :

Rg, Pg, Tg

the units of which are in newtons or multiples thereof.

The word "load", when used to describe a physical quantity to which units may be ascribed, implies mass.

The word "loading", for example as in "internal loading", implies force.

6.1.2 The test loads or loadings within the container shall be uniformly distributed.

6.1.3 The test load or loading specified in all of the following tests are the minimum requirements.

6.1.4 The dimensional requirements to which reference is made in the requirements sub-clause after each test are those specified in:

a) the dimensional and design requirement clauses of this part of ISO 1496;

b) ISO 668;

c) ISO 1161.

6.2 Test No. 1 — Stacking

6.2.1 General

This test shall be carried out to prove the ability of a fully loaded container to support a superimposed mass of containers, taking into account conditions aboard ships at sea and the relative eccentricities between superimposed containers.

Table 3 specifies the force to be applied as a test to each pair of corner fittings and the superimposed mass that the test force represents.

6.2.2 Procedure

The container shall be placed on four level pads, one under each bottom corner fitting.

The pads shall be centralized under the fittings, and shall be substantially of the same plan dimensions as the fittings. The container shall have a load uniformly distributed over the floor in such a way that the combined mass of the container and the test load is equal to 1,8 R.

The container shall be subjected to vertical forces, applied either to all four corner fittings simultaneously or to each pair of end fittings, at the appropriate level specified in table 3. The

Table 3 — Forces to be applied in stacking test

Container designation	Test force per container (all four corners simultaneously)		Test force per pair of end fittings		Superimposed mass represented by test force	
	kN	lbf	kN	lbf	kg	lb
1A, 1AA and 1AX	3 392	762 550	1 696	381 275	192 000	423 290
1B, 1BB and 1BX	3 392	762 550	1 696	381 275	192 000	423 290
1C, 1CC and 1CX	3 392	762 550	1 696	381 275	192 000	423 290
1D and 1DX	896	201 600	448	100 800	50 800	112 000

NOTE — The test force of 3 392 kN per container is derived from the superimposed mass of nine-high stacking, i.e. eight containers stacked on top of one container, all being rated to 24 000 kg, and an acceleration force of 1,8 *g*. [The corner posts of such containers are known to have been tested to 86 400 kg (190 480 lb).]

forces shall be applied through a test fixture equipped with corner fittings as specified in ISO 1161, or equivalent fittings which have imprints of the same geometry (i.e. with the same external dimensions, chamfered aperture and rounded edges) as the bottom face of the bottom corner fitting specified in ISO 1161. If equivalent fittings are used, they shall be designed to produce the same effect on the container under the test loads as when corner fittings are used.

In all cases, the forces shall be applied in such a manner that rotation of the planes through which the forces are applied and on which the container is supported is minimized.

Each corner fitting or equivalent test fitting shall be offset in the same direction by 25,4 mm[1] laterally and 38 mm[1] longitudinally.

6.2.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.3 Test No. 2 — Lifting from the four top corner fittings

6.3.1 General

This test shall be carried out to prove the ability of a container, other than a 1D or a 1DX container, to withstand being lifted, from the four top corner fittings, with the lifting forces applied vertically, and the ability of a 1D or a 1DX container to withstand being lifted from the top corner fittings with the lifting forces applied at any angle between the vertical and 60° to the horizontal, these being the only recognized methods of lifting these containers by the four top corner fittings.

This test shall also be regarded as proving the ability of the floor and base structure to withstand the forces arising from acceleration of the payload in lifting operations.

6.3.2 Procedure

The container shall have a load uniformly distributed over the floor in such a way that the combined mass of the container and test load is equal to 2 R, and it shall be carefully lifted from all four top corners in such a way that no significant acceleration or deceleration forces are applied.

For a container other than a 1D or a 1DX container, the lifting forces shall be applied vertically.

For a 1D or a 1DX container, lifting shall be carried out by means of slings, the angle of each leg being at 60° from the horizontal.

After lifting, the container shall be suspended for 5 min and then lowered to the ground.

6.3.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.4 Test No. 3 — Lifting from the four bottom corner fittings

6.4.1 General

This test shall be carried out to prove the ability of a container to withstand being lifted, from its four bottom corner fittings, by means of lifting devices bearing on the bottom corner fittings only and attached to a single transverse central spreader beam, above the container.

1) 25,4 mm = 1 in
38 mm = 1 1/2 in

6.4.2 Procedure

The container shall have a load uniformly distributed over the floor in such a way that the combined mass of container and test load is equal to 2 R, and it shall be carefully lifted from the side apertures of all four bottom corner fittings in such a way that no significant acceleration or deceleration forces are applied.

Lifting forces shall be applied at

30° to the horizontal for 1AA, 1A and 1AX containers;

37° to the horizontal for 1BB, 1B and 1BX containers;

45° to the horizontal for 1CC, 1C and 1CX containers;

60° to the horizontal for 1D and 1DX containers.

In each case, the line of action of the lifting force and the outer face of the corner fitting shall be no farther apart than 38 mm[1]. The lifting shall be carried out in such a manner that the lifting devices bear on the four bottom corner fittings only.

The container shall be suspended for 5 min and then lowered to the ground.

6.4.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.5 Test No. 4 — Restraint (longitudinal)

6.5.1 General

This test shall be carried out to prove the ability of a container to withstand longitudinal external restraint under dynamic conditions of railway operations, which implies acceleration of 2 g.

6.5.2 Procedure

The container shall have a load uniformly distributed over the floor in such a way that the combined mass of the container and the uniformly distributed test load is equal to R, and it shall be secured longitudinally to rigid anchor points through the bottom apertures of the bottom corner fittings at one end of the container.

A force of 2 Rg shall be applied horizontally to the container through the bottom apertures of the other bottom corner fittings, first towards and then away from the anchor points.

6.5.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.6 Test No. 5 — Strength of end walls

6.6.1 General

This test shall be carried out to prove the ability of a container to withstand forces under the dynamic conditions referred to in 6.5.1.

6.6.2 Procedure

The container shall have each end tested when one end is blind and the other equipped with doors. In the case of symmetrical construction, one end only need be tested. The container shall be subjected to an internal loading of 0,4 Pg. The internal loading shall be uniformly distributed over the wall under test and arranged to allow free deflection of the wall.

6.6.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.7 Test No. 6 — Strength of side walls

6.7.1 General

This test shall be carried out to prove the ability of a container to withstand the forces resulting from ship movement.

6.7.2 Procedure

The container shall have each side wall tested. In the case of symmetrical construction, one side only need be tested.

Each side wall of the container shall be subjected to an internal loading of 0,6 Pg. The internal loading shall be uniformly distributed, applied to each wall separately and arranged to allow free deflection of the side wall and its longitudinal members.

Open-top containers fitted with roof bows (types 50 to 53) shall be tested with the roof bows in position.

1) 38 mm = 1 1/2 in

6.7.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.8 Test No. 7 — Strength of the roof (where provided)

6.8.1 General

This test shall be carried out to prove the ability of the rigid roof of a container, where fitted, to withstand the loads imposed by persons working on it.

6.8.2 Procedure

A load of 300 kg[1)] shall be uniformly distributed over an area of 600 mm × 300 mm[1)] located at the weakest area of the rigid roof of the container.

6.8.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.9 Test No. 8 — Floor strength

6.9.1 General

This test shall be carried out to prove the ability of a container floor to withstand the concentrated dynamic loading imposed during cargo operations involving powered industrial trucks or similar devices.

6.9.2 Procedure

The test shall be performed using a test vehicle equipped with tyres, with an axle load of 5 460 kg[1)] [i.e. 2 730 kg[1)] on each of two wheels]. It shall be so arranged that all points of contact between each wheel and a flat continuous surface lie within a rectangular envelope measuring 185 mm[1)] (in a direction parallel to the axle of the wheel) by 100 mm[1)] and that each wheel makes physical contact over an area within this envelope of not more than 142 cm^2 [1)]. The wheel width shall be nominally 180 mm[1)] and the wheel centres shall be nominally 760 mm[1)]. The test vehicle shall be manœuvred over the entire floor area of the container. The test shall be made with the container resting on four level supports under its four bottom corner fittings, with its base structure free to deflect.

6.9.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.10 Test No. 9 — Rigidity (transverse)

6.10.1 General

This test shall be carried out to prove the ability of a container, other than a 1D or a 1DX container, to withstand the transversal racking forces resulting from ship movement.

6.10.2 Procedure

The container in tare condition (T) shall be placed on four level supports, one under each corner fitting, and shall be restrained against lateral and vertical movement by means of anchor devices acting through the bottom apertures of the bottom corner fittings. Lateral restraint shall be provided only at a bottom corner fitting diagonally opposite to and in the same end frame as a top corner fitting to which force is applied. When testing the two end frames separately, vertical restraint shall be applied only at the end frame under test.

Forces of 150 kN[1)] shall be applied either separately or simultaneously to each of the top corner fittings on one side of the container in lines parallel both to the base and to the planes of the ends of the container. The forces shall be applied first towards and then away from the top corner fittings.

In the case of a container with identical ends, only one end need be tested. Where an end is not essentially symmetrical about its own vertical centreline, both sides of that end shall be tested.

For allowable deflections under full test loading, see 5.4.

6.10.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.11 Test No. 10 — Rigidity (longitudinal)

6.11.1 General

This test shall be carried out to prove the ability of a container, other than a 1D or a 1DX container, to withstand the longitudinal racking forces resulting from ship movement.

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1) 300 kg = 660 lb
600 mm × 300 mm = 24 in × 12 in
5 460 kg = 12 000 lb
2 730 kg = 6 000 lb
185 mm = 7 1/4 in
100 mm = 4 in
142 cm^2 = 22 in^2
180 mm = 7 in
760 mm = 30 in
150 kN = 33 700 lbf

6.11.2 Procedure

The container in tare condition (T) shall be placed on four level supports, one under each corner fitting, and shall be restrained against longitudinal and vertical movement by means of anchor devices acting through the bottom apertures of the bottom corner fittings. Longitudinal restraint shall be provided only at a bottom corner fitting diagonally opposite to and in the same side frame as a top corner fitting to which force is applied.

Forces of 75 kN[1)] shall be applied either separately or simultaneously to each of the top corner fittings on one end of the container in lines parallel both to the base of the container and to the planes of the sides of the container. The forces shall be applied first towards and then away from the top corner fitting.

In the case of a container with identical sides, only one side need be tested. Where a side is not essentially symmetrical about its own vertical centreline, both ends of that side shall be tested.

For allowable deflections under full test loading, see 5.5.

6.11.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.12 Test No. 11 — Lifting from fork-lift pockets (where fitted)

6.12.1 General

This test shall be carried out on any 1CC, 1C, 1CX, 1D or 1DX container which is fitted with fork-lift pockets.

6.12.2 Procedure

6.12.2.1 1CC, 1C, 1CX, 1D or 1DX containers fitted with one set of fork-lift pockets

The container shall have a load uniformly distributed over the floor in such a way that the combined mass of container and test load is equal to 1,6 R and it shall be supported on two horizontal bars, each 200 mm[1)] wide, projecting 1 828 mm ± 3 mm[1)] into the fork-lift pockets, measured from the outside face of the side of the container. The bars shall be centred within the pockets.

The container shall be supported for 5 min and then lowered to the ground.

6.12.2.2 1CC, 1C or 1CX containers fitted with two sets of fork-lift pockets

The test described in 6.12.2.1 shall be applied to the outer pockets.

A second test shall be applied to the (additional) inner pockets. The procedure for this second test shall be as required in 6.12.2.1 except that in this case the combined mass of the container and test load shall be equal to 0,625 R, and the bars shall be placed in the inner pockets.

6.12.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

6.13 Test No. 12 — Lifting from the base at grappler arm positions (where fitted)

6.13.1 General

This test shall be carried out on any container which is fitted with fixtures for being lifted by grappler arms or similar devices with lifting positions as detailed in annex D.

6.13.2 Procedure

The container shall have a load uniformly distributed over the floor in such a way that the combined mass of the container and the uniformly distributed test load is equal to 1,25 R, and it shall be supported at the four positions where provision has been made for the equipment envisaged in 6.13.1, over an area of 32 mm × 254 mm[1)] centrally located at each of the four positions, clear of the safety lips.

The container shall be supported for 5 min and then lowered to the ground.

6.13.3 Requirements

Upon completion of the test, the container shall show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

1) 75 kN = 16 850 lbf
200 mm = 8 in
1 828 mm ± 3 mm = 72 in ± 1/8 in
32 mm × 254 mm = 1 1/4 in × 10 in

6.14 Test No. 13 — Weatherproofness

6.14.1 Procedure

A stream of water shall be applied on all exterior joints and seams of the container from a nozzle of 12,5 mm[1] inside diameter, at a pressure of about 100 kPa[1] (corresponding to a head of about 10 m[1] of water) on the upstream side of the nozzle. The nozzle shall be held at a distance of 1,5 m[1] from the container under test, and the stream shall be traversed at a speed of 100 mm/s[1].

Procedures involving the use of several nozzles are acceptable provided that each joint or seam is subjected to a water loading no less than that which would be given by a single nozzle.

6.14.2 Requirements

Upon completion of the test, no water shall have leaked into the container.

1) 12,5 mm = 1/2 in
100 kPa = 14,5 psi
10 m = 33 ft
1,5 m = 5 ft
100 mm/s = 4 in/s

Annex A
(normative)

Diagrammatic representation of capabilities appropriate to all types and sizes of general purpose containers, except where otherwise stated

NOTES

1 The externally applied forces shown below are for one end or one side only. The loads shown within the containers represent uniformly distributed internal loads only, and such loads are for the whole container.

2 The figures in this annex correspond to tests described in 6.2 to 6.13 only where marked.

3 For definitions of R, P and T, see 6.1.1.

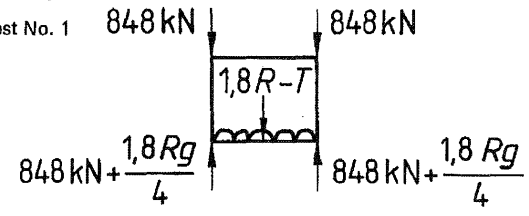
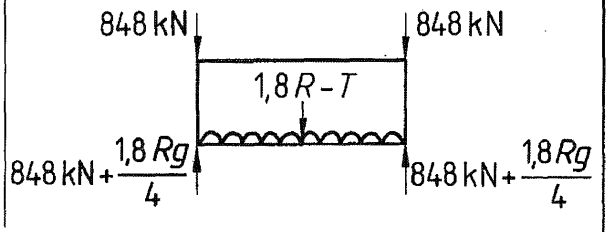
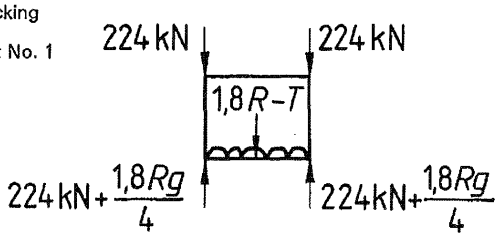
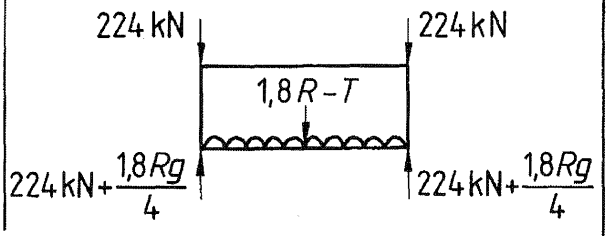
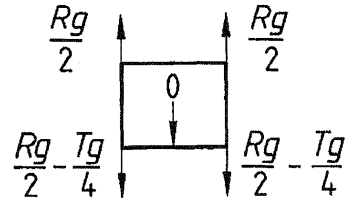
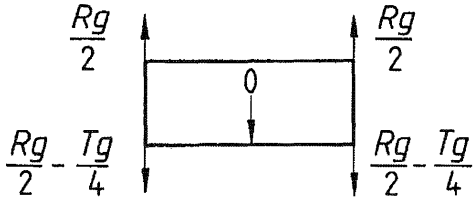
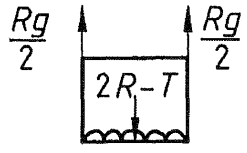
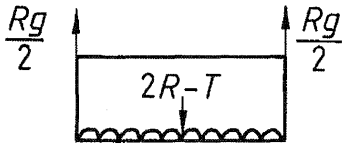
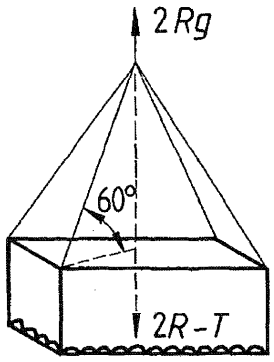
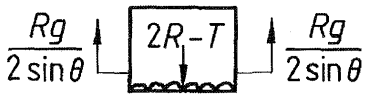
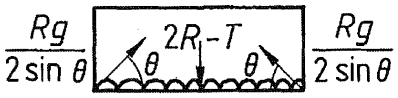
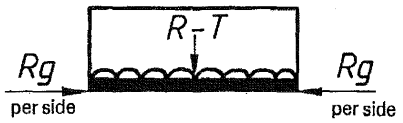
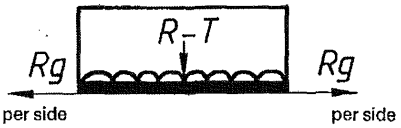
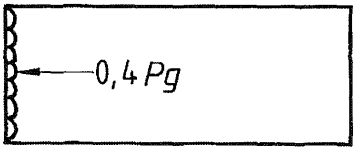
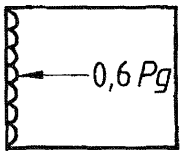
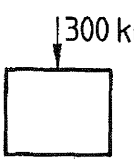
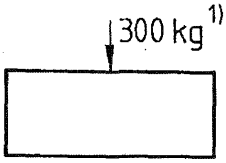
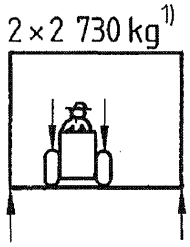
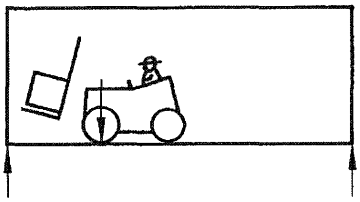
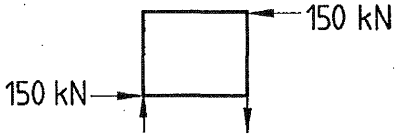
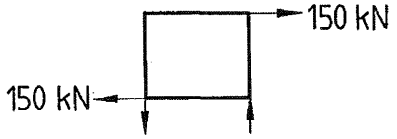
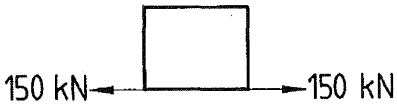
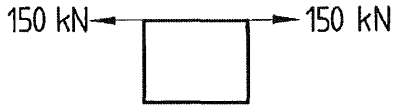
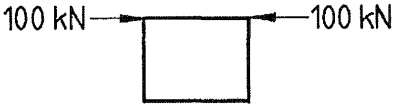
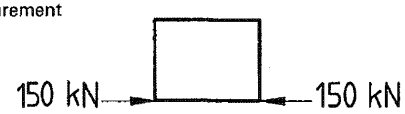
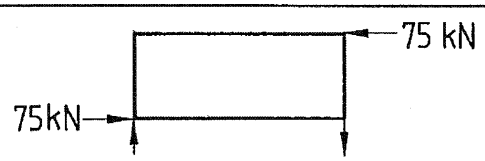
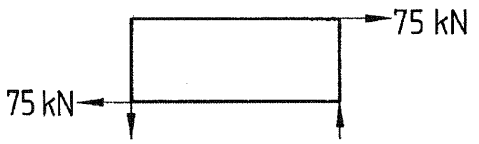
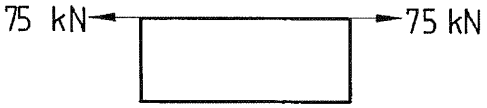
Figure No.	End elevations	Side elevations
A.1	Stacking Test No. 1 	
	Not applicable to 1D and 1DX containers	
A.1A	Stacking Test No. 1 	
	Applicable to 1D and 1DX containers only	
A.2	Top lift 	
A.3	Top lift Test No. 2 	
	Not applicable to 1D and 1DX containers	

Figure No.	End elevations	Side elevations
A.3A	Top lift Test No. 2  Applicable to 1D and 1DX containers only	
A.4	Bottom lift Test No. 3 	
A.5	Restraint (longitudinal) Test No. 4	
A.6		
A.7	End loading Test No. 5	
A.8	Side loading Test No. 6 	
A.9	Roof load Test No. 7  Applicable where a rigid roof is provided	

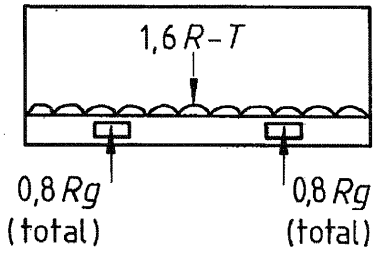
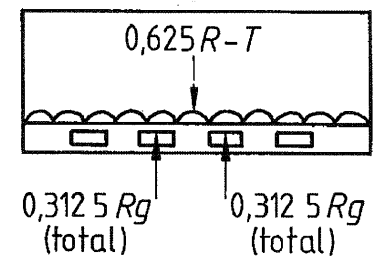
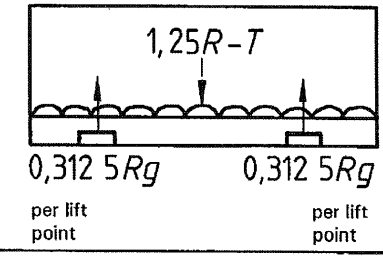
1) 300 kg = 660 lb

Figure No.	End elevations	Side elevations
A.10	Wheel loads Test No. 8 	
A.11	Rigidity (tranvserse) Test No. 9 	Not applicable to 1D and 1DX containers
A.12	Rigidity (tranvserse) Test No. 9 	
A.13	Lashing / securement 	
A.14	 Lashing / securement	
A.15	 Lashing / securement	
A.16	Lashing / securement 	

1) 2 × 2 730 kg = 2 × 6 000 lb

Figure No.	End elevations	Side elevations
A.17	Rigidity (longitudinal) Test No. 10 Not applicable to 1D and 1DX containers	
A.18		
A.19	Lashing / securement (This type of loading is inadmissible except as applied in A.3A)	
A.20	Lashing / securement Not applicable to 1D and 1DX containers	

Optional features

Figure No.	End elevations	Side elevations
A.21	Fork-lift pockets Test No. 11 Applicable to 1CC, 1C, 1CX, 1D and 1DX containers when fitted with one set of fork-lift pockets	
A.22	Fork-lift pockets Test No. 11 Applicable to 1CC, 1C and 1CX containers when fitted with a second set of fork-lift pockets	
A.23	Grappler lift Test No. 12 Applicable to all sizes when fitted with grappler arm lift positions	

Annex B
(normative)

Details of requirements for load transfer areas in base structures of containers

B.1 The base structures of containers, i.e. the end transverse members and such intermediate members as may be fitted (or such flat underside as may be provided) to constitute load transfer areas, shall be capable of transferring load to or from the longitudinal members of a carrying vehicle which are assumed to lie within the two 250 mm[1] wide zones defined (by the broken lines) in figure B.1.

B.2 Containers not having transverse members spaced 1 000 mm[1] apart or less (and not having a flat underside) shall have load transfer areas as indicated in figures B.2 to B.9, capable of meeting the following requirements.

B.2.1 Each pair of load transfer areas associated with an end transverse member shall be capable of transferring loads of not less than 0,5 R, i.e. the loads which may occur when a container is placed onto a carrying vehicle of the kind which does not support the container by its corner fittings.

Furthermore, each pair of intermediate load transfer areas shall be capable of transferring loads of not less than 1,5 R/n, where n is the number of pairs of intermediate load transfer areas, i.e. loads which may occur during transport operations.

B.2.2 The minimum number of pairs of load transfer areas are :

For 1CC, 1C and 1CX containers	4
For 1BB, 1B and 1BX containers	5
For 1AA, 1A and 1AX containers	5
For 1AA, 1A and 1AX containers fitted with a non-continuous gooseneck tunnel	6

Where a greater number of pairs of load transfer areas are provided, these should be approximately equally spaced along the length of the container.

B.2.3 The spacing between the end transverse member and the nearest intermediate pair of load transfer areas shall be

— between 1 700 mm and 2 000 mm[2] for containers having the minimum number of pairs of load transfer areas for the container concerned;

— between 1 000 mm and 2 000 mm[2] for containers having one more pair of load transfer areas than the minimum required for the containers concerned.

Dimensions in millimetres

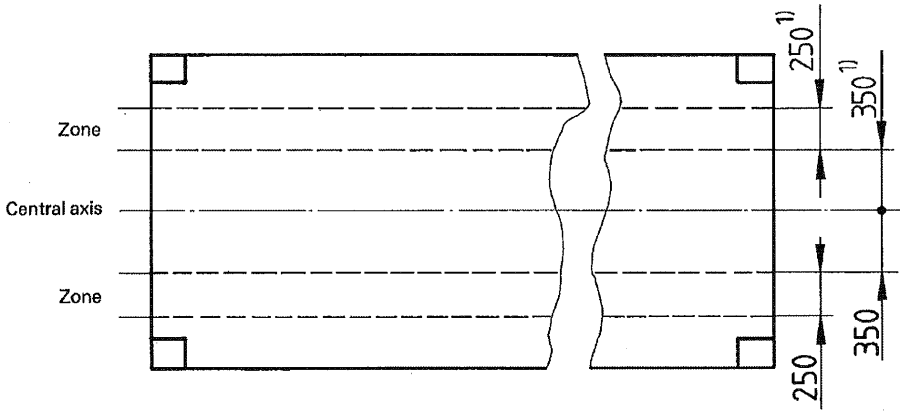


Figure B.1

1) 250 mm = 10 in
1 000 mm = 39 3/8 in
350 mm = 14 in

2) 1 700 mm to 2 000 mm = 66 15/16 in to 78 3/4 in
1 000 mm to 2 000 mm = 39 3/8 in to 78 3/4 in

B.2.4 Each load transfer area shall have a longitudinal dimension of at least 25 mm[1].

NOTE — In figures B.2 to B.9, the load transfer areas associated with the container base are shown in black. Gooseneck tunnel transfer areas are shown in black in figure B.10.

B.3 Minimum requirements for load transfer areas in the vicinity of the gooseneck tunnel are shown in figure B.10.

1C, 1CC, or 1CX containers

Minimum requirements: 4 pairs of load transfer areas
(1 pair at each end plus 2 intermediate pairs)

Dimensions in millimetres[2]

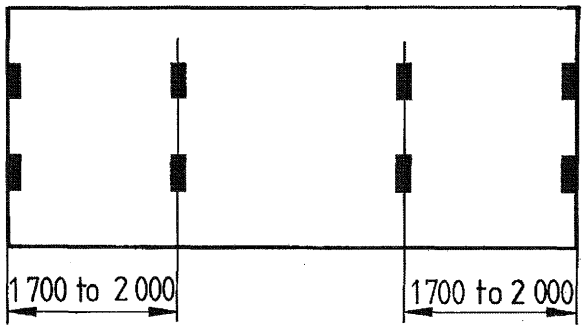


Figure B.2

Requirements applicable if 5 pairs of load transfer areas are to be fitted:

Dimensions in millimetres[2]

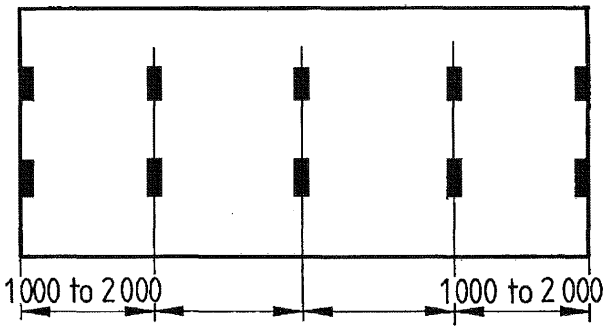


Figure B.3

1) 25 mm = 1 in

2) 1 700 mm to 2 000 mm = 66 15/16 in to 78 3/4 in
1 000 mm to 2 000 mm = 39 3/8 in to 78 3/4 in

1B, 1BB, or 1BX containers

Minimum requirements: 5 pairs of load transfer areas
(1 pair at each end plus 3 intermediate pairs)

Dimensions in millimetres[1)]

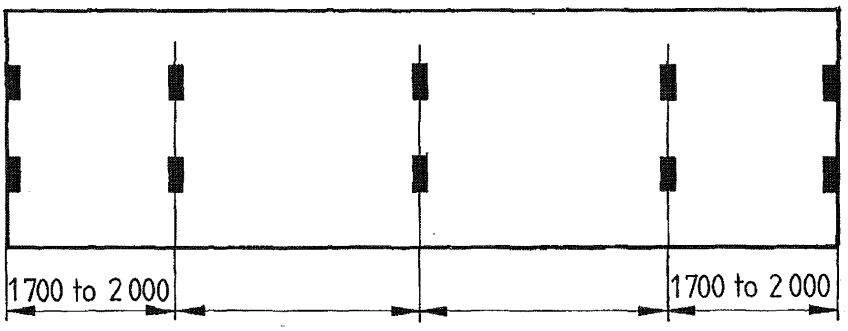


Figure B.4

Requirements applicable if 6 pairs of load transfer areas are to be fitted:

Dimensions in millimetres[1)]

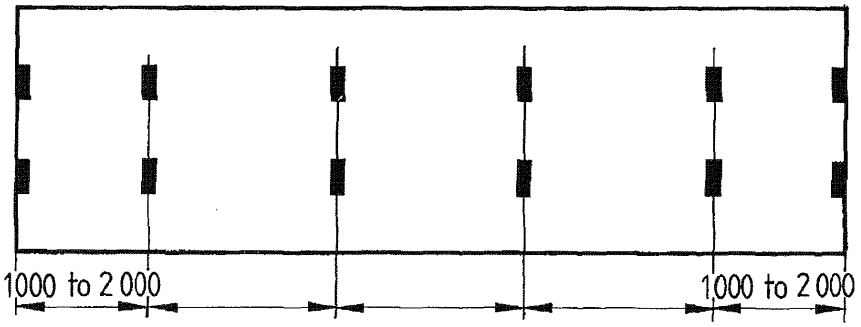


Figure B.5

1) 1 700 mm to 2 000 mm = 66 15/16 in to 78 3/4 in
1 000 mm to 2 000 mm = 39 3/8 in to 78 3/4 in

1A, 1AA, or 1AX containers — Without gooseneck tunnel

Minimum requirements: 5 pairs of load transfer areas
(1 pair at each end plus 3 intermediate pairs)

Dimensions in millimetres[1)]

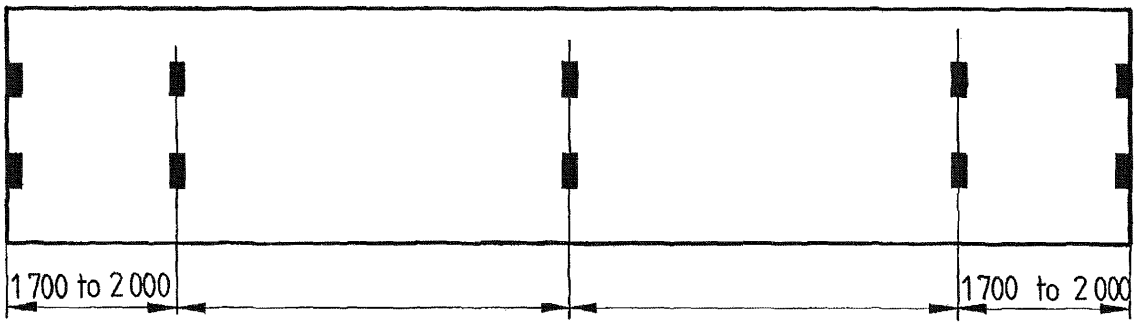


Figure B.6

Requirements applicable if 6 pairs of load transfer areas are to be fitted:

Dimensions in millimetres[1)]

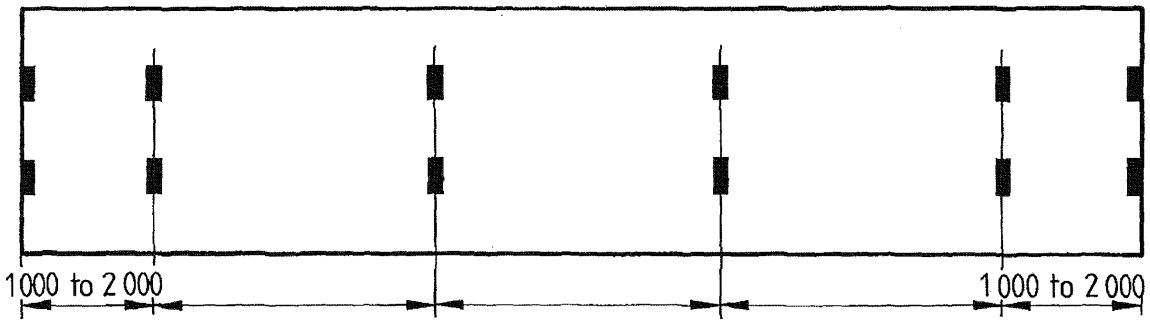


Figure B.7

1) 1 700 mm to 2 000 mm = 66 15/16 in to 78 3/4 in
1 000 mm to 2 000 mm = 39 3/8 in to 78 3/4 in

1A, 1AA, or 1AX containers — With gooseneck tunnel (with minimum localized structure)

Minimum requirements: 6 pairs of load transfer areas
(1 pair at each end plus 4 intermediate pairs)

Dimensions in millimetres[1)]

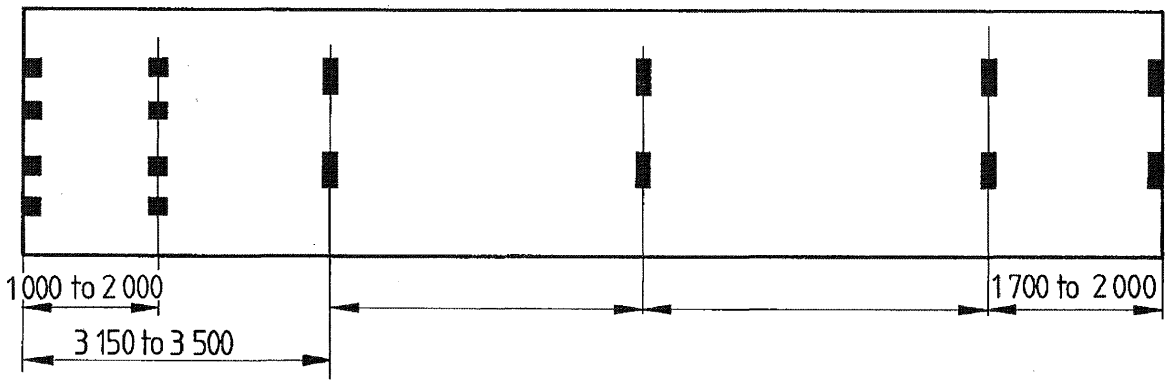


Figure B.8

(See also figure B.10)

Requirements applicable if 7 pairs of load transfer areas are to be fitted:

Dimensions in millimetres[1)]

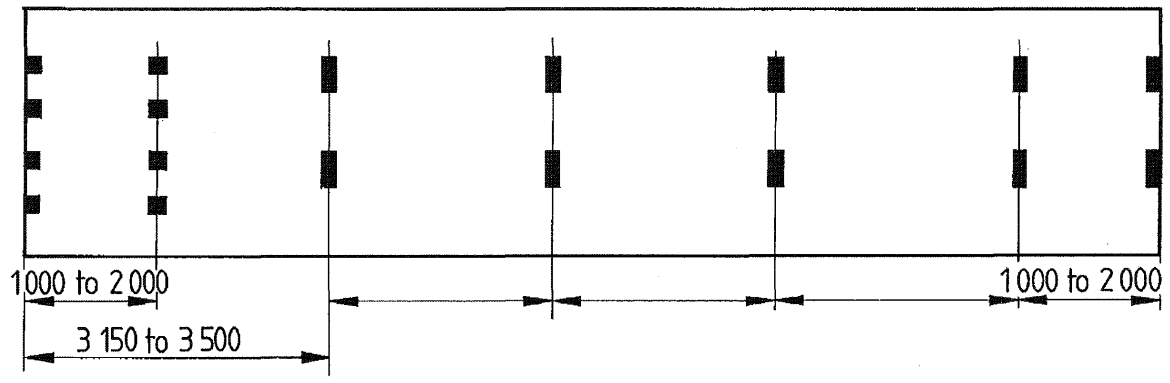


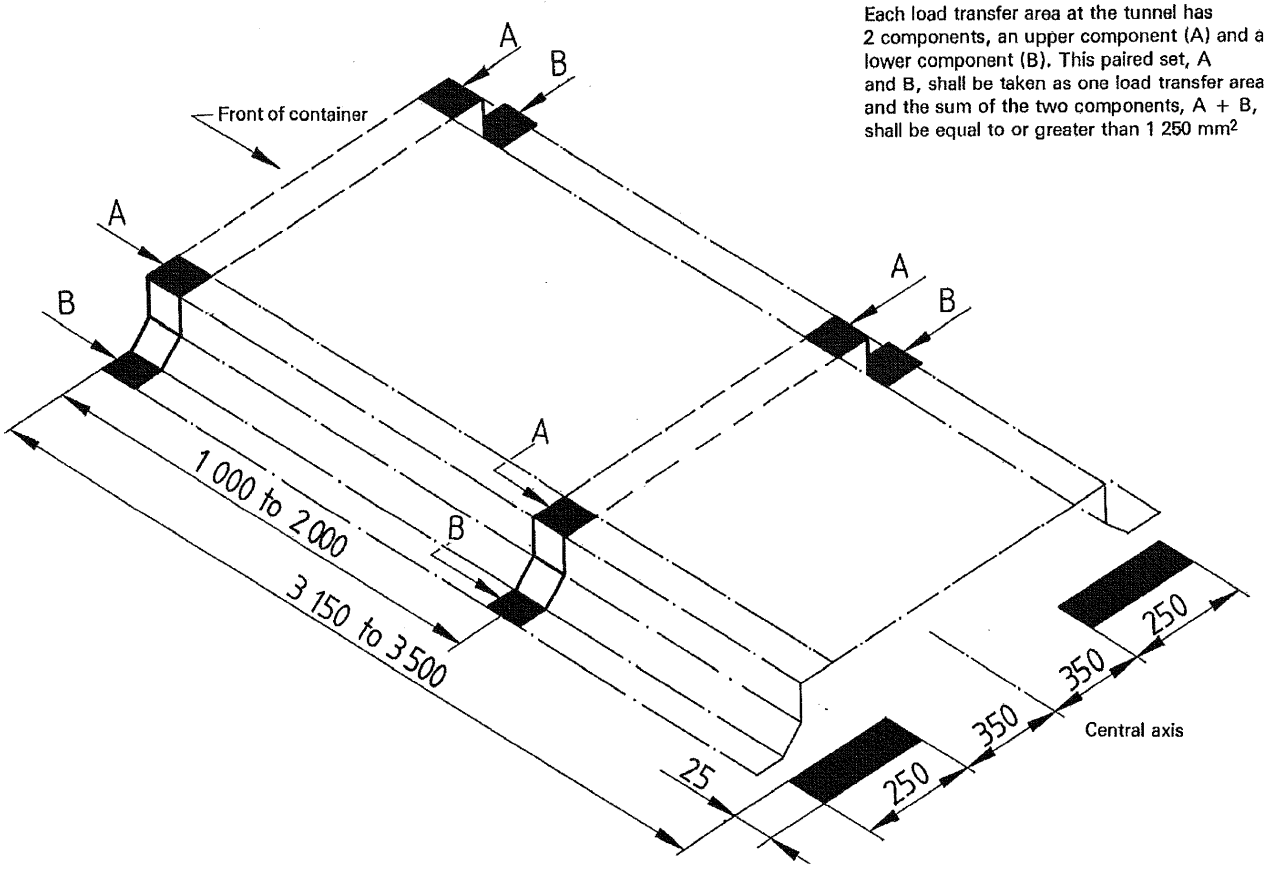
Figure B.9

(See also figure B.10)

1) 1 700 mm to 2 000 mm = 66 15/16 in to 78 3/4 in
1 000 mm to 2 000 mm = 39 3/8 in to 78 3/4 in
3 150 mm to 3 500 mm = 124 1/4 in to 137 7/8 in

Minimum requirements for load transfer areas in the vicinity of the gooseneck tunnel

Dimensions in millimetres[1)]



(See annex E for details of tunnel section)

NOTE — Where continuous tunnel side members are provided, the load transfer areas shown in the figure between 3 150 mm and 3 500 mm from the end of the container may be omitted.

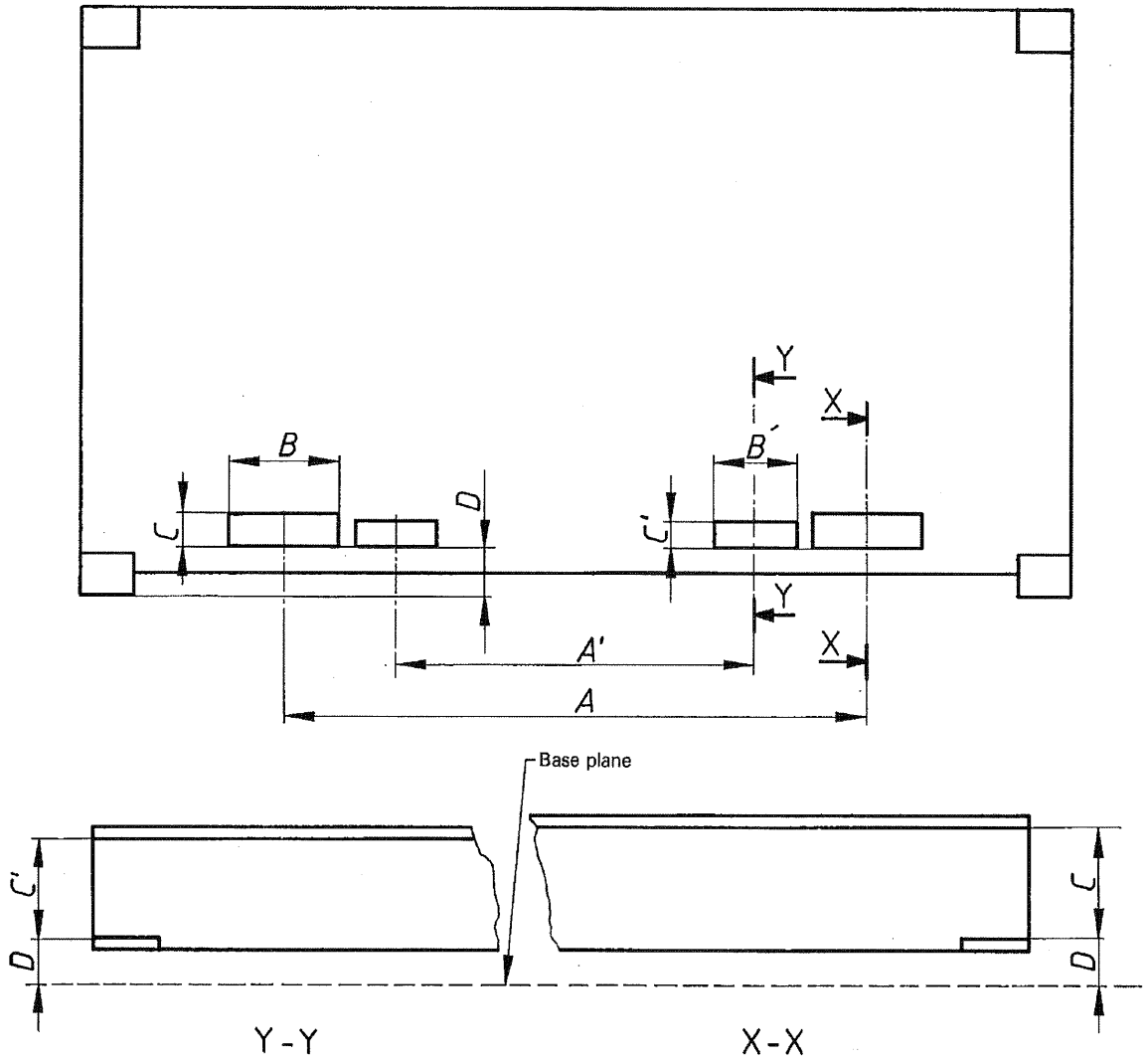
Figure B.10

1) 1 000 mm to 2 000 mm = 39 3/8 in to 78 3/4 in
3 150 mm to 3 500 mm = 124 1/4 in to 137 7/8 in
25 mm = 1 in
250 mm = 10 in
350 mm = 14 in

Annex C
(normative)

Dimensions of fork-lift pockets

(where provided) (see 5.8.1)



Container	Dimensions													
	Fork-lift pockets for loaded and unloaded containers								Fork-lift pockets for unloaded containers only					
	mm				in				mm			in		
	A	*B*	*C*	*D*	*A*	*B*	*C*	*D*	*A'*	*B'*	*C'*	*A'*	*B'*	*C'*
1CC, 1C and 1CX	2 050 ± 50	355 min.	115 min.	20 min.	81 ± 2	14 min.	4 1/2 min.	0,8 min.	900 ± 50	305 min.	102 min.	35 1/2 ± 2	12 min.	4 min.
1D and 1DX	900 ± 50	305 min.	102 min.	20 min.	35 1/2 ± 2	12 min.	4 min.	0,8 min.						
NOTE — *C* = Clear opening														

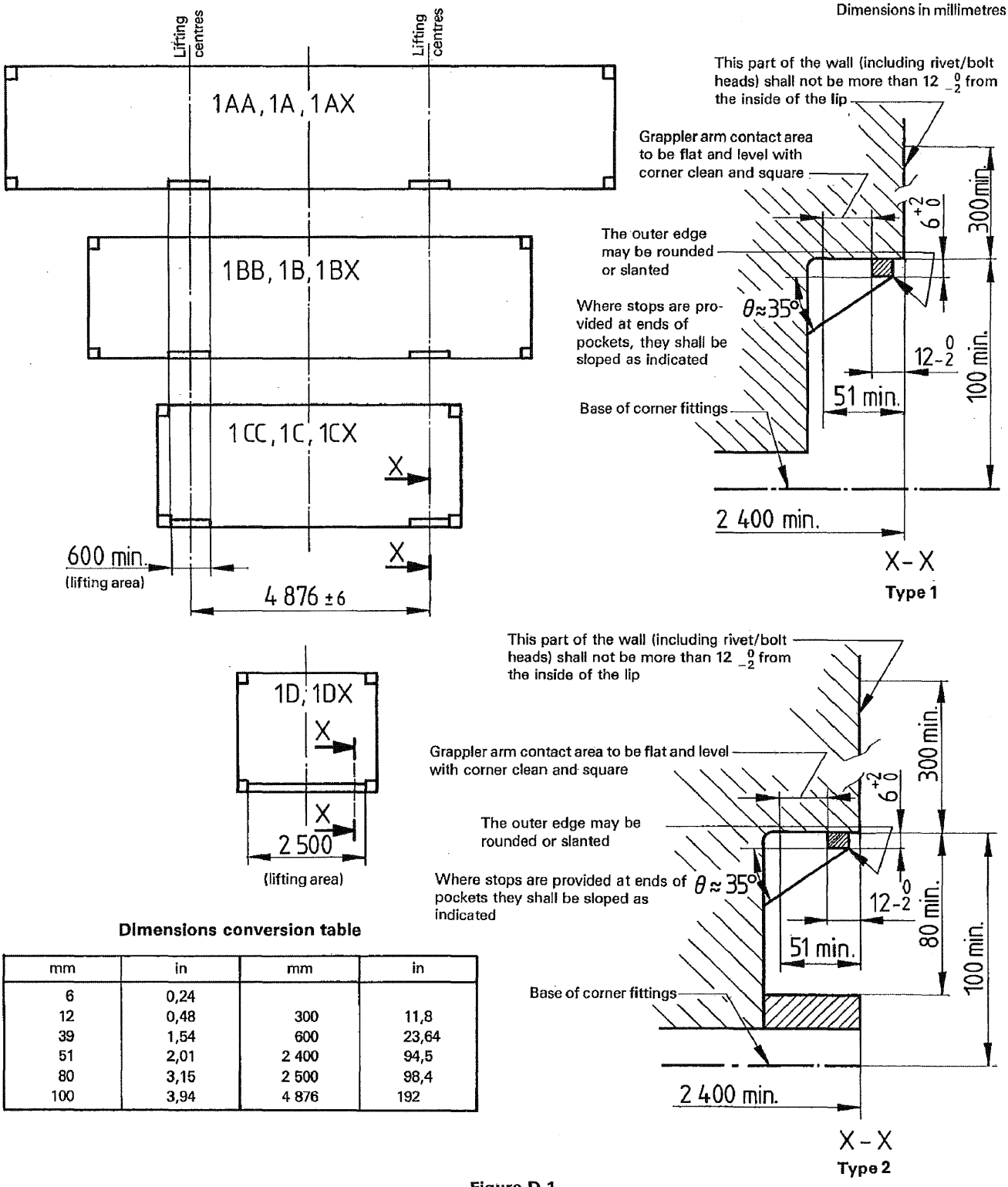
Figure C.1

Annex D
(normative)

Dimensions of grappler arm fitting areas

(where provided) (see 5.8.2)

Dimensions in millimetres



Dimensions conversion table

mm	in	mm	in
6	0,24		
12	0,48	300	11,8
39	1,54	600	23,64
51	2,01	2 400	94,5
80	3,15	2 500	98,4
100	3,94	4 876	192

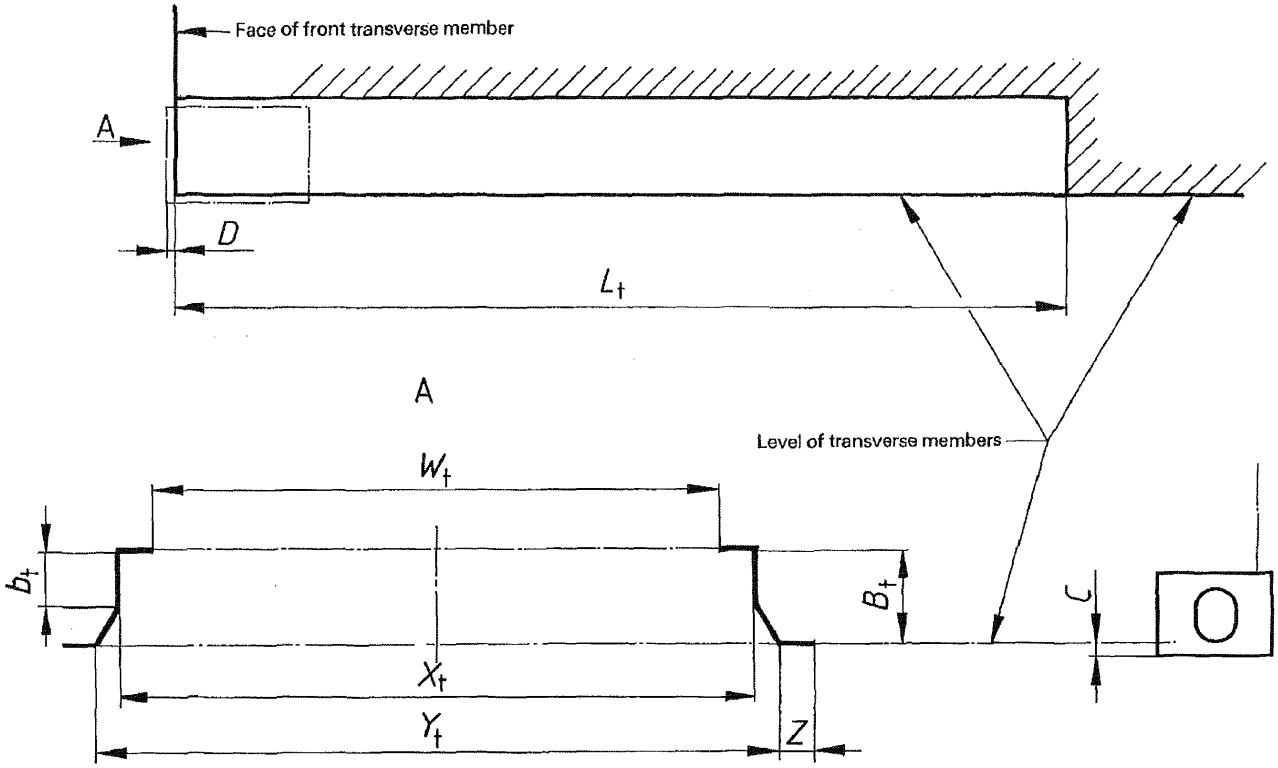
Figure D.1

Annex E
(normative)

Dimensions of gooseneck tunnels

(where provided) (see 5.8.3)

The space required to constitute a gooseneck tunnel into which the gooseneck of a trailer may fit is shown in figure E.1.



		Dimensions	
		mm	in
Length	L_t	3 150 to 3 500	124 1/4 to 137 7/8
	D	$6\ ^{+1}_{-2}$	$1/4\ ^{+3/64}_{-3/32}$
Width	W_t	930 max.	36 5/8 max.
	X_t	$1\ 029\ ^{+3}_{0}$	$40\ 1/2\ ^{+1/8}_{0}$
	Y_t	1 070 min.	42 1/8 min.
		1 130 max.	44 1/2 max.
	Z	25 min.	1 min.
Height	B_t	$120\ ^{0}_{-3}$	$4\ 23/32\ ^{0}_{-1/8}$
	b_t	35 min.	1 3/8 min.
		70 max.	2 3/4 max.
	C	$12{,}5\ ^{+5}_{-1{,}5}$	$1/2\ ^{+3/16}_{-1/16}$

NOTES

1 Tolerance B_t shall be measured in the back part of the tunnel, over a length of about 600 mm (23 5/8 in).

2 The tunnel structure may be formed by continuous members having the minimum length specified in the table and the internal dimensions given for the thick lines in the figure or, alternatively, localized structures may be provided at the positions shown in black in figure B.10 (see annex B).

Figure E.1

Annex F
(normative)

Cargo securing systems
(where provided) (see 5.8.4)

F.1 General

F.1.1 A cargo securing system is designed to restrain the movement of cargo resulting from dynamic forces induced during transportation.

F.1.2 Cargo securing systems consist of:

- shoring, or
- cargo securing devices, or
- a combination of both.

F.1.3 This annex describes cargo securing devices only. They are permanent fixtures to which lashings (such as ropes, straps, chains, cables, etc.) may be attached.

Such devices are not intended for any other purpose, for example handling or securing containers.

They are either fixed, hinged or sliding eyes, rings or bars.

F.1.3.1 Anchor points are securing devices located in the base structure of the container.

F.1.3.2 Lashing points are securing devices located in any part of the container other than their base structure.

F.2 Design requirements

For general purpose containers, cargo securing devices are optional. However, when fitted, they shall comply with the requirements given in F.2.1 to F.2.6.

F.2.1 They shall not infringe on the prescribed minimum internal dimensions as specified in 4.3.

F.2.2 The typical number, N, of cargo securing devices are

a) for anchor points:
   - for 1AA, 1A and 1AX containers, $N = 16$
   - for 1BB, 1B and 1BX containers, $N = 12$
   - for 1CC, 1C and 1CX containers, $N = 10$
   - for 1D and 1DX containers, $N = 8$

b) for lashing points, N is unspecified.

F.2.3 Neither anchor points, nor lashing points shall obstruct the door opening dimensions as specified in 5.7.

F.2.4 Cargo securing devices shall provide, on all sides, an unobstructed access for a minimum of 50 mm from any fixed surface to allow for

- passage of the lashing through the aperture of cargo securing devices, or
- attachment of restraint fixtures such as hooks, clips, shackles, bars, etc.

F.2.5 Each anchor point as specified in F.2.2a) and F.2.3 shall be designed and installed to provide a minimum rated load of 1 000 kg applied in any direction.

F.2.6 Each lashing point as specified in F.2.2b) shall be designed and installed to provide a minimum rated load of 500 kg applied in any direction.

F.3 Testing

F.3.1 For proof testing of cargo securing devices, a tensile force equal to 1,5 times the rated load shall be applied, using a hook or shackle having a maximum diameter of 10 mm in a plane perpendicular to the axis of the container structural member to which it is attached and at an angle of 45° to the horizontal plane.

For cargo securing devices installed at positions above the floor plane, the test force shall wherever possible be applied at 45° upwards and downwards from the horizontal plane. For devices installed at the roof plane (or other extreme heights) the test angle shall be 45° downwards.

The tensile force shall be continuously applied at the specified angle for 5 min.

F.3.2 When containers are fitted with cargo securing devices of different types, at least one device of each type shall be tested.

F.3.3 On completion of the test, neither the cargo securing devices, nor their attachments to the container structure, nor the container structure itself shall show any permanent deformation or abnormality which will render it unsuitable for continuous service at full rated load.

Annex G
(informative)

Bibliography

[1] ISO 8323 : 1985, *Freight containers — Air/surface (intermodal) general purpose containers — Specification and tests.*

UDC 621.869.88

Descriptors: containers, freight containers, specifications, dimensions, tests, performance tests.

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