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Series 1 freight containers — Specification and testing —

Part 5: Platform and platform-based containers

Conteneurs de la série 1 — Spécifications et essais —

Partie 5: Conteneurs plates-formes et type plate-forme

Reference number
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Contents

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Annexes

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 1496-5 was prepared by Technical Committee ISO/TC 104, *Freight containers*, Sub-Committee SC 1, *General purpose containers*.

This second edition cancels and replaces the first edition (ISO 1496-5:1977), as well as ISO 1496-6C:1977, of which it constitutes a technical revision.

ISO 1496 consists 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*

— *Part 6: International cargo-security devices*

Annexes A, B, C, D, E and F form an integral part of this part of ISO 1496. Annexes G and H are for information only.

Introduction

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

Part 1	
General purpose	00 to 09
Specific purpose	
closed, vented/ventilated	10 to 19
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Part 2	
Thermal	30 to 49
Part 3	
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Dry bulk, pressurized	85 to 89
Part 4	
Bulk, non-pressurized (box type)	20 to 24
Bulk, non-pressurized (hopper type)	80 to 84
Part 5	
Platform (container)	60
Platform-based with incomplete superstructure and fixed ends	61 and 62
Platform-based with incomplete superstructure and folding ends	63 and 64
Platform-based with complete superstructure	65 to 69

NOTE 1 Containers types 90 to 99 are reserved for air/surface containers (see ISO 8323).

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Series 1 freight containers — Specification and testing —

Part 5:
Platform and platform-based containers

1 Scope

1.1 This part of ISO 1496 specifies the basic specifications and testing requirements for ISO series 1 freight containers of the platform and platform-based types designated 1AA, 1A, 1AX, 1BB, 1B, 1BX, 1CC, 1C and 1CX which are suitable for international exchange and for conveyance by road, rail and sea, including interchange between these forms of transport, with certain limitations (for example, when loaded, platforms cannot be stacked or top lifted by means of conventional spreaders).

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

Table 1 — Container types

Type	Type code designation[1)]
Platform	60
Platform-based container	
With incomplete superstructure	
with fixed complete end structure	61
with fixed free-standing posts	62
with folding complete end structure	63
with folding free-standing posts	64
With complete superstructure	
with roof	65
with open top	66
with open top, open ends (skeletal)	67

1) In accordance with ISO 6346.

1.3 The marking requirements for these containers shall be in accordance with the principles embodied 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,* and its amendments: ISO 830:1981/Amd.1:1984 and ISO 830:1981/Amd.2:1988.

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

ISO 6346:1984, *Freight containers — Coding, identification and marking,* and its amendment: ISO 6346:1984/Amd.1:1988.

3 Definitions

For the purposes of this part of ISO 1496, the definitions given in ISO 830, together with the following, apply. However, for practical reasons, certain definitions taken and adapted from ISO 830 are given below.

3.1 platform: Flat structure having no superstructure whatever. The equipment covered by this part of ISO 1496 is defined as a loadable platform having no superstructure whatever but having the same length and width as the base of series 1 containers, and equipped with top and bottom corner fittings, located in plan view as on other series 1 containers,

so that some securing and lifting devices used on other series 1 containers of the same length can also be used on platforms.

3.2 platform-based container: Container having no side walls but which has a base similar to that of a platform container.

3.3 incomplete superstructure: Lack of any permanently fixed longitudinal load-carrying structure between the ends other than at the base.

3.4 fixed complete end structure: Fixed end frame with a complete load-bearing end wall between corner posts.

3.5 folding complete end structure: Folding end frame with a transverse structural connection between corner posts.

3.6 interlocked pile: A number of platform containers or folding platform-based containers, with ends folded down, which are interlocked to form a unit (module) (see 4.1.3).

4 Dimensions and ratings

4.1 External dimensions

4.1.1 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 the requirements for the overall top lengths (L) of platform-based containers with incomplete superstructure may be relaxed to the extreme limits specified in table 2.

Table 2 — Overall top dimension, L

Dimensions in millimetres

Container designation	Overall top dimension in tare condition T L_{max}	Overall top dimension when loaded to R L_{min}
1AA, 1A and 1AX	12 202	12 172
1BB, 1B and 1BX	9 135	9 105
1CC, 1C and 1CX	6 068	6 042

Any movement of the corner posts resulting from the change from the empty to the fully loaded condition of the container should, as far as practicable, be equally disposed about the mean of the values of L_{max} and L_{min}.

1) 2 591 mm = 102 in

Taking into account the fact that the mechanism of the folding end structures may introduce natural play, the values of L_{max} and L_{min} specified in table 2 shall be met. Failure to comply with this requirement is liable to lead to handling difficulties.

4.1.2 No part of the platform or platform-based container shall project beyond the envelope defined by the overall external dimensions specified in

— ISO 668 for the plan dimensions of the base structure of all containers, the plan dimensions of the top part of container with complete superstructure, or the overall maximum height of all containers which may also be of reduced dimensions, or

— table 2 for the plan dimensions of the top part of containers with incomplete superstructure.

4.1.3 An interlocked pile of either platform or folded platform-based containers shall have the plan dimensions specified in ISO 668 and a pile height not exceeding 2 591 mm[1].

4.2 Internal dimensions

Internal dimensions are not specified; however, minimum internal dimensions of existing 1CC, 1C and 1CX platform-based containers for the carriage of small containers are given in annex G . The values are given as a guide to the design of small intermodal containers.

4.3 Ratings

The values of the rating R, the maximum gross mass of these containers, shall be those specified in ISO 668.

5 Design requirements

5.1 General

All containers shall be capable of fulfilling the requirements given in 5.1.1 to 5.1.4.

5.1.1 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, i.e. those removable components in position as required for the intended operating conditions.

5.1.2 The strength requirements for corner fittings (see also 5.3) are specified in ISO 1161.

5.1.3 All containers, except containers with folding ends (codes 63 and 64) in the folded condition, shall be capable of withstanding the loads and loadings specified in clause 6.

Containers with folding ends in the folded condition shall be capable of withstanding the loads and loadings specified in clause 7.

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 tests described in clauses 6 and 7 shall not be exceeded in any mode of operation.

Containers need not be weatherproof but if designed to be weatherproof they shall satisfy test No. 13 (see 6.13).

5.1.4 Any movable part 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 part in the appropriate operating position.

5.2 Interlocked pile of folded containers

Horizontal free play shall be limited between individual folded containers forming an interlocked pile so that the pile is capable of complying with the dimensional requirements of 4.1.3.

5.3 Corner fittings

5.3.1 All containers shall be equipped with top and bottom corner fittings (see notes 2 and 3). The requirements and positioning of the corner fittings are given in ISO 1161, except for the case mentioned in 4.1.1.

NOTES

2 For 1CX platforms, the top and bottom corner fittings may be combined providing they comply with ISO 1161.

3 Due to the greater inherent longitudinal flexibility of 1CX containers, the top corner fittings may have their top aperture increased by 10 mm towards the end wall. In such a case, the end aperture should be omitted in order to retain corner fitting strength.

5.3.2 Containers with folding ends shall be equipped with features such that in the folded condition they may be stacked and secured, lifted from the top by means of a spreader equipped with corner fitting locking devices (e.g. twistlocks), and interlocked with other containers having similar folding end structures.

The features shall have at least an equivalent to the upper face and internal cavity of the top corner fitting.

The positioning of the features in the folded condition shall meet the requirements of ISO 1161.

5.3.3 For all containers, including containers with folding ends folded down, the upper faces of the top corner fittings or equivalent features (performing some of the functions of top corner fittings — see 5.3.2) shall protrude above the top of the container by a minimum of 6 mm[2] (see 5.4.3). By "top of the container" is understood the highest level of any part 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 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[2] from either end of the container but may cover the full width.

5.4 Base structure

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

5.4.2 All containers shall be capable of being supported only by load-transfer areas in their base structure.

5.4.2.1 Consequently, these containers shall have end transverse members and sufficient intermediate load-transfer areas (or a flat underside) of sufficient strength to permit vertical load transfer to or from the longitudinal members of a carrying vehicle. Such longitudinal members are assumed to lie within the two 250 mm[2] wide zones defined by the broken lines in figure B.1.

5.4.2.2 The lower faces of the load-transfer areas in the container base structure, including those of the end transverse members, shall be in one plane located

$$12{,}5 \text{ mm } {}^{+5}_{-1{,}5} \text{ mm}^{2)}$$

above the plane of the lower faces of the bottom corner fittings of the container (base plane), except where camber is provided (see 5.4.5).

Apart from the bottom corner fittings and bottom side rail, no part of the container shall project below this plane. However, doubler plates may be provided

2) 6 mm = 1/4 in; 12,5 mm $^{+5}_{-1,5}$ mm = 1/2 in $^{+3/16}_{-1/16}$ in; 250 mm = 10 in; 750 mm = 29 1/2 in

in the vicinity of the bottom corner fittings to afford protection to the understructure.

Such plates shall not extend more than 550 mm[3] from the outer end and not more than 470 mm[3] from the side faces of the bottom corner fittings and their lower faces shall be at least 5 mm[3] above the base plane of the container.

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

The transfer of load between bottom side rails and handling equipment should only occur when provision has been made in accordance with 5.9.1 and 5.9.2.

5.4.2.4 Containers having all their intermediate transverse members spaced 1 000 mm[3] apart or less (or having a flat underside) shall be deemed to comply with the requirements of 5.4.2.1.

5.4.2.5 Requirements for containers not having transverse members spaced 1 000 mm[3] apart or less (and not having a flat underside) are given in annex B.

5.4.3 For all containers under dynamic conditions, or the static equivalent of a 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 $1{,}8R$, no part of the base of the container shall deflect more than 6 mm[3] below the base plane of the container.

5.4.4 The base structure shall be designed to withstand all forces, particularly lateral forces, induced by the cargo in service (see also 5.7.3, 5.7.4 and figures A.7 and A.8). This is particularly important where provisions are made for securement of cargo to the base structure of the container.

5.4.5 Camber may be provided with respect to the end transverse members, which shall be located at the height specified in 5.4.2.2.

When determining camber of a platform-based container, note should be taken of the relationship between the base deflections which occur under load and the longitudinal movement which is permitted at the top of the corner posts (for which the limit is specified in 4.1.1).

When a container with camber is loaded to its rating R, the base should be approximately horizontal to facilitate the transport of the container when it is supported by its base structure only.

5.5 End structure (platform-based containers only)

For all platform-based containers, the sideway 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[3].

5.6 Side structure (platform-based containers only)

For all platform-based containers, 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 42 mm[3].

5.7 Walls and securing devices

5.7.1 Where containers are provided with end walls, these shall be able to withstand the effects of test No. 5 except insofar as is implied in 5.7.3.

5.7.2 Where openings are provided in end walls, the ability of these walls to withstand test No. 5 shall not be impaired.

5.7.3 Where containers are provided with ends which are not able to withstand test No. 5, means shall be provided for securing the cargo to the base structure in such a manner that the cargo does not transmit longitudinal forces to the ends.

5.7.4 Since the containers do not have side walls, adequate means shall be provided to permit the securing of the cargo against lateral movement.

5.7.5 The design requirements for cargo-securing devices presented in 5.7.3 and 5.7.4 are specified in annex F.

5.8 Door openings

Door openings need not be provided.

5.9 Requirements — Optional features

5.9.1 Fork-lift pockets

5.9.1.1 Fork-lift pockets for handling 1CC, 1C and 1CX 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.

3) 5 mm = 3/16 in; 6 mm = 1/4 in; 42 mm = 1 3/4 in; 60 mm = 2 3/8 in; 470 mm = 18 1/2 in; 550 mm = 22 in; 1 000 mm = 39 3/8 in

5.9.1.2 Where a set of fork-lift pockets has been fitted as in 5.9.1.1, a second set of fork-lift pockets may, in addition, be provided on 1CC, 1C and 1CX containers for empty handling only.

5.9.1.3 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. The base of the fork-lift pockets need not be the full width of the container but shall be provided near each end of the fork-lift pockets.

5.9.2 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 provisions are specified in annex D.

5.9.3 Gooseneck tunnels

Gooseneck tunnels may be provided as optional features in 1AA, 1A and 1AX containers. The dimensional requirements are specified in annex E and, in addition, all other parts of the base structure shall be as specified in 5.4.

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 6.13 and 7.1 to 7.3, as applicable. Containers shall be tested in the condition for which they are designed to be operated. 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), where appropriate, be made 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 4 R, P and T, by definition, are in units of mass. Where test requirements are based on the gravitational forces derived from these values, these 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 load or loading on the platform or platform-based container shall be uniformly distributed.

6.1.3 The test loads and loadings specified in all of the following tests are minimum requirements.

6.1.4 The dimensional requirements to which reference is made 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

6.2.2.1 Platform container

The container in the tare condition shall be placed on four level pads, one under each bottom corner fitting or equivalent corner structure. The pads shall be centralized under the fittings, and shall be substantially of the same plan dimensions as the fittings.

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.

6.2.2.2 Platform-based container

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 test load is equal to 1,8R.

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.

6.2.2.3 Application of force

For platform or platform-based containers, the 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 lower 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 fitting shall be offset in the same direction by 25,4 mm[4] laterally and 38 mm[4] longitudinally.

6.2.3 Requirements

On completion of the test, the container shall show neither permanent deformation 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 to withstand being lifted from the four top corner fittings with the lifting forces applied vertically. These are the only recognized ways of lifting these platform containers by the four top corner fittings.

NOTE 5 Loaded platforms should be lifted by means of spreaders with extensions.

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 2R, 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 all platform containers, the lifting forces shall be applied vertically.

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

6.3.3 Requirements

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

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
1AA, 1A and 1AX	3 392	763 200	1 696	381 600	192 000	423 320
1BB, 1B and 1BX	3 392	763 200	1 696	381 600	192 000	423 320
1CC, 1C and 1CX	3 392	763 200	1 696	381 600	192 000	423 320

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 of 1,8g. [The corner posts of such containers are known to have been tested to 86 400 kg (190 480 lb).]

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

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.

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 $2R$, and 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 an angle of

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.

In each case, the line of action of the lifting force and the outer face of the corner fitting shall be no further apart than 38 mm[5]. The lifting shall be carried out in such a manner that the lifting devices bear on the four bottom corner fittings only.

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

6.4.3 Requirements

On completion of the test, the container shall show neither permanent deformation 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 — External 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 $2g$.

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 aperture of the bottom corner fittings at one end of the container.

A force of $2Rg$ 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

On completion of the test, the container shall show neither permanent deformation 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 (where provided)[6]

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 special features. In the case of symmetrical construction, one end only need be tested. The container shall be subjected to an internal loading of $0{,}4Pg$. The internal loading shall be uniformly distributed over the wall under test and arranged to allow free deflection of the wall.

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5) 38 mm = 1 1/2 in

6) Tests No. 5 and No. 7 are applicable to only some types of platform-based containers. Test No. 6 of ISO 1496-1:1990 (strength of side walls) is not applicable.