

Корсет

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Series 1 freight containers — Specification and testing — Part I : General cargo containers

Conteneurs de la série 1 — Spécifications et essais — Partie I : Conteneurs pour usage général

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 1496/1 (originally Draft International Standard ISO/DIS 2973) was drawn up by Technical Committee ISO/TC 104, *Freight containers*, and circulated to the Member Bodies in October 1972.

It has been approved by the Member Bodies of the following countries :

Australia	Germany	Romania
Austria	Hungary	South Africa, Rep. of
Belgium	India	Sweden
Brazil	Israel	Switzerland
Bulgaria	Japan	Thailand
Canada	Netherlands	Turkey
Czechoslovakia	New Zealand	United Kingdom
Egypt, Arab Rep. of	Poland	U.S.A.
France	Portugal	U.S.S.R.

This International Standard has also been approved by the International Union of Railways (UIC).

No Member Body expressed disapproval of the document.

International Standard ISO 1496, parts I to VII, cancels and replaces ISO Recommendation R 1496-1970.

Series 1 freight containers – Specification and testing – Part I : General cargo containers

0 INTRODUCTION

Grouping of container types for specification purposes

Part I General cargo	00 to 09, 50 to 59, 65 to 69
Part II Thermal	20 to 49
Part III Tank	70 to 79
Part IV Bulk	80 to 84
Part V Platform container	60
Part VI Folding	61 to 64
Part VII Air mode	90 to 99

NOTE – Container groupings for Parts II to VII will be set forth in detail in the relevant documents.

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard sets out the basic requirements for the specification and testing of ISO series 1 freight containers for general cargo 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 International Standard are as follows :

Type code designation*	Type
00 to 09	Closed, including opening roof
50 to 53 and 56 to 59	Open top
65 to 69	Open side
54	Open top/open side(s)
55	Open top/open side(s)/open end(s)

* In accordance with ISO 2716.

1.3 The marking requirements for these containers are to be in accordance with the principles embodied in ISO 790 and ISO 2716 for the marking of series 1 containers.

2 REFERENCES

ISO 668, *Dimensions and ratings of freight containers.*

ISO 790, *Marking of series 1 freight containers.*

ISO/R 1161, *Specification of corner fittings for series 1 freight containers.*

ISO/R 1894, *General purpose series 1 freight containers – Minimum internal dimensions.*

ISO 2716, *Identification marking code for freight containers.*

3 DIMENSIONS AND RATINGS

3.1 External dimensions

The overall external dimensions and tolerances of the freight containers covered by this International Standard are those established in ISO 668. No part of the container shall project beyond these overall external dimensions.

3.2 Internal dimensions

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

- closed containers type 00 shall comply with the minimum internal length, width and height given in ISO/R 1894;
- containers type 02, having partial opening(s) in the side(s), shall comply with the minimum internal length and height given in ISO/R 1894;
- containers type 03, having an opening roof, shall comply with the minimum internal length and width given in ISO/R 1894;
- containers types 01 and 04, having openings in the side(s) and/or roof, shall comply with the minimum internal length given in ISO/R 1894.

3.3 Ratings

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

$$R = P + T$$

where P is the maximum operating payload and T is the tare weight.

4 DESIGN REQUIREMENTS

4.1 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 4.2) are given in annex C of ISO/R 1161.

The container shall be capable of withstanding the loads and applied forces detailed in clause 5.

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 clause 5 shall not be exceeded in any mode of operation.

All closed containers and all open containers fitted with the covers which were designed for them, shall be weatherproof as required by test number 13 (see 5.14).

4.2 Corner fittings

All series 1 containers shall be equipped with corner fittings at the top corners. 1AA, 1A, 1B, 1C and 1D containers shall, in addition, be equipped with corner fittings at the bottom corners. The requirements and positioning of the corner fittings are given in ISO/R 1161. The upper faces of the top corner fittings shall protrude above the top of the container by a minimum of 6 mm (1/4 in) (see 4.3.3). 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.

4.3 Base structure

4.3.1 For containers 1AA, 1A, 1B and 1C, the height of the lower faces of all transverse members in the base of the containers (including end transverse members) above the base plane (bottom faces of lower corner fittings) shall be $12,5 + 5,0$ mm ($1/2 + 3/16$ in).

4.3.2 For containers 1D, 1E and 1F the level of the underside of the base structure is not specified, except in so far as it is implied in 4.3.3.

4.3.3 For series 1 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 weight 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 (1/4 in) below the base plane (bottom faces of the lower corner fittings).

4.4 End structure

For containers 1AA, 1A, 1B and 1C, 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 (2 3/8 in).

4.5 Side structure

For containers 1AA, 1A, 1B and 1C, 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 in).

4.6 Walls

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

Where containers (other than closed containers) are provided with end(s) or side(s) which are not able to

withstand tests numbers 5 and 6, means shall be provided for securing the cargo to the base structure in such a manner that the cargo does not transmit forces to the ends or sides.

Where containers do not have end or side walls, means shall be provided for securing the cargo to the base structure.

4.7 Door opening

Each container, except those containers with open ends, shall be provided with a door opening at least at one end, except in the case of 1E and 1F containers, where the opening may be provided in a side wall.

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 (7 ft 0 in) high and 2 286 mm (7 ft 6 in) wide.

Closed-type containers designated 1AA (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 (7 ft 5 in) high, and 2 286 mm (7 ft 6 in) wide.

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

OPTIONAL REQUIREMENTS

4.8 Fork lift pockets

Fork lift pockets may be provided as optional features for handling 1C, 1D, 1E and 1F containers in the loaded or unloaded condition. The dimensional requirements for such pockets are specified in annex B.

Fork pockets, when provided, 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 should be provided in the vicinity of each end.

4.9 Provision for handling at the base by means of grapple arms or similar devices

Provision for handling 1AA, 1A, 1B, 1C and 1D containers by means of grapple arms or similar devices may be provided as optional features. The dimensional requirements for such provisions are specified in annex C.

4.10 Gooseneck tunnels

Gooseneck tunnels may be provided as optional features in containers 1AA and 1A. The dimensional requirements are specified in annex D and, in addition, all other parts of the base structure shall be as specified in 4.3.

NOTE – The requirements of 4.2, 4.8 and 4.9 do not preclude the provision of additional facilities for lifting, either from the top or at the bottom of the containers.

5 TESTING

5.1 General

Unless otherwise stated, containers complying with the design requirements specified in clause 4 shall, in addition, be capable of withstanding the tests specified in 5.2 to 5.14 inclusive, as applicable. It is recommended that the test for weatherproofness (Test No. 13) be made last.

5.1.1 The symbol R denotes the maximum operating gross weight of the container and the symbol P denotes the maximum operating payload of the container to be tested, that is, the tare weight T subtracted from the maximum operating gross weight R .

$$R = P + T$$

5.1.2 The test load within the container shall be uniformly distributed.

NOTE – Water is recommended as the test medium to determine the ability of the end and side walls, test numbers 5 and 6, to withstand the resultant forces imposed by cargo on these members. Other methods which produce loading equivalent to a fluid load in mass and distribution (for example, dry sand in loose bulk or in bags free to flex) may be used at the discretion of the test engineer.

5.1.3 The test loads specified in all of the following tests are the minimum requirements.

5.1.4 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 International Standard;
- b) ISO 668;
- c) ISO/R 1161.

5.2 Test No. 1 – Stacking

5.2.1 General

This test shall be carried out to prove the ability of a container to support five other fully loaded containers of the same length and rating under the acceleration conditions encountered in ships' cell structures, taking into account relative eccentricities between containers due to clearance.

5.2.2 Procedure

The container under test 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 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 weight of the container and the test load is equal to $1,8 R$.

The container under test shall be subjected to a vertical force of $2,25 R$ on each of the top corner fittings

simultaneously or $4,5 R$ on each pair of end fittings in such a manner that the planes of application of the forces and the supports of the container remain horizontal and unchanged during the test. The forces shall be applied through a corner fitting or a pad of the same plan area as a corner fitting. Each pad shall be offset in the same direction by 25,4 mm (1 in) laterally and 38 mm (1 1/2 in) longitudinally.

5.2.3 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.

5.3 Test No. 2 – Lifting from the top corner fittings

5.3.1 General

This test shall be carried out to prove the ability of 1AA, 1A, 1B and 1C containers to withstand being lifted from the top corner fittings with the lifting forces applied vertically, and the ability of 1D, 1E and 1F containers to withstand being lifted from the top corner fittings with the lifting forces applied at any angle between the vertical and 30° to the vertical, these being the only recognized methods of lifting these containers by the 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.

5.3.2 Procedure

The container under test shall have a load uniformly distributed over the floor in such a way that the combined weight 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 1AA, 1A, 1B and 1C containers the lifting forces shall be applied vertically.

For 1D, 1E and 1F containers, lifting shall be by means of slings, the angle of each leg being at 30° from the vertical.

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

5.3.3 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.

5.4 Test No. 3 – Lifting from the bottom corner fittings

5.4.1 General

This test shall be carried out to prove the ability of containers to withstand being lifted from 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.

This test shall be carried out on 1AA, 1A, 1B, 1C and 1D containers. It shall also be carried out on 1E and 1F containers if they are equipped with bottom corner fittings.

5.4.2 Procedure

The container under test shall have a load uniformly distributed over the floor in such a way that the combined weight 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 and 1A containers;
- 37° to the horizontal for 1B containers;
- 45° to the horizontal for 1C containers;
- 60° to the horizontal for 1D, 1E and 1F 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 1/2 in). The lifting shall be carried out in such a manner that the lifting devices bear on the bottom corner fittings only.

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

5.4.3 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.

5.5 Test No. 4 – Restraint (longitudinal)

5.5.1 General

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

5.5.2 Procedure

1AA, 1A, 1B, 1C and 1D containers and also 1E and 1F containers with bottom corner fittings shall be restrained

longitudinally by securing the bottom corner fittings at one end to suitable anchor points. Each end shall be tested. 1E and 1F containers shall subsequently be restrained laterally by securing the bottom corner fittings at one side to suitable anchor points. Each side shall be tested. The container under test shall have a load uniformly distributed over the floor in such a way that the combined weight of container and test load is equal to R , and it shall be secured to rigid anchor points through the bottom apertures of the bottom corner fittings at one end of the container.

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

5.5.3 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.

5.6 Test No. 5 – Strength of end walls (where provided)

5.6.1 General

This test shall be carried out to prove the ability of containers to withstand forces under the dynamic conditions referred to in 5.5.1.

5.6.2 Procedure

The container shall have each end tested when one end is blind and the other equipped with doors. In case of symmetrical construction, one end only need be tested. 1AA, 1A, 1B, 1C and 1D containers shall be subjected to an internal load of $0,4P$; 1E and 1F containers should be subjected to $0,6P$. The internal load shall be uniformly distributed over the wall under test.

The reaction forces shall be confined to the base structure of the container being tested, i.e. the container shall be supported at the bottom corner fittings and the top corner fittings shall be unsupported and free to deflect.

NOTE – The test procedure covers both the end and side wall strength of the 1E and 1F containers.

5.6.3 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.

5.7 Test No. 6 – Strength of side walls (where provided)

5.7.1 General

This test shall be carried out to prove the ability of containers to withstand the forces resulting from ship motions.

5.7.2 Procedure

Each side wall of 1AA, 1A, 1B, 1C and 1D containers (or one only in the case of symmetrical construction) shall be subjected to an internal uniformly-distributed load of $0,6P$. The reaction forces shall be confined to the base structure of the container being tested, i.e. the container shall be supported at the bottom corner fittings so that the structure above the base structure is free to deflect.

Open-topped containers (types 50 to 59) shall be tested in the condition in which they are designed to be operated, for example with removable top members in position.

5.7.3 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.

5.8 Test No. 7 – Strength of the roof (where provided)

5.8.1 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.

5.8.2 Procedure

A load of 300 kg (660 lb) shall be uniformly distributed over an area of 600 mm X 300 mm (24 in X 12 in) located at the weakest area of the rigid roof of the container.

5.8.3 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.

5.9 Test No. 8 – Floor strength

5.9.1 General

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

The test applies to 1AA, 1A, 1B, 1C and 1D containers.

5.9.2 Procedure

A truck equipped with tyres, loaded to an axle weight of 5 460 kg (12 000 lb) [that is, 2 730 kg (6 000 lb) on each of two wheels] having, when loaded, a total contact area of 284 cm² (44 in²) [that is, 142 cm² (22 in²) on each

wheel], the wheel width being 180 mm (7 in), and with wheel centres of 760 mm (30 in), shall be manoeuvred 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.

5.9.3 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.

5.10 Test No. 9 – Rigidity (transverse)

5.10.1 General

This test shall be carried out to prove the ability of 1AA, 1A, 1B and 1C containers to withstand the racking forces resulting from ship motions.

5.10.2 Procedure

The container under test in tare condition (*T*) shall be placed on four level supports, one under each corner fittings, and shall be restrained against lateral and vertical movement by means of anchor devices acting through the bottom apertures of the bottom corner fittings. The lateral restraint shall be provided only at the corner fittings diagonally opposite to those at which the forces are applied.

Forces of 150 kN (15 000 kgf) (15 tf) 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 containers in which each end is symmetrical about its own vertical centre line, one side only need be tested, but both sides of containers with asymmetric ends shall be tested.

5.10.3 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.

5.11 Test No. 10 – Rigidity (longitudinal)

5.11.1 General

This test shall be carried out to prove the ability of 1AA, 1A, 1B and 1C containers to withstand the longitudinal racking forces resulting from ship motions.

5.11.2 Procedure

The container under test, 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. The longitudinal restraint shall be provided only at the corner fittings diagonally opposite to those at which the forces are applied.

Forces of 75 kN (7 500 kgf) (7,5 tf) 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 fittings. In cases where containers have sides which are symmetrical about their own vertical centre lines and which are also of similar construction, force need only be applied at one side of one end. Where asymmetry or dissimilarity exists, sufficient tests shall be carried out to cover all possible modes of response.

5.11.3 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.

5.12 Test No. 11 – Lifting from fork lift pockets (where fitted)

5.12.1 General

This test applies to containers 1C, 1D, 1E and 1F, where fitted with fork lift pockets.

5.12.2 Procedure

The container under test shall have a load uniformly distributed over the floor in such a way that the combined weight of container and test load is equal to $1,25 R$, and it shall be supported on two horizontal bars, each 200 mm (8 in) wide, projecting $1\,828 \pm 3$ mm ($72 \pm 1/8$ in) into the fork pocket, measured from the outside face of the side of the container. The bars shall be centered within the pockets.

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

5.12.3 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.

5.13 Test No. 12 – Lifting from the base at grapple arm positions (where fitted)**5.13.1 General**

This test shall be carried out on all containers with provisions for being lifted by grapple arms or similar devices with lifting positions as detailed in Appendix Y.

5.13.2 Procedure

The container under test shall have a load uniformly distributed over the floor in such a way that the combined weight of container and 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 in 5.13.1, over an area of $32 \text{ mm} \times 254 \text{ mm}$ (1.25 in \times 10 in), 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.

5.13.3 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.

5.14 Test No. 13 – Weatherproofness**5.14.1 Procedure**

A stream of water shall be applied on all exterior joints and seams of the container from a nozzle of 12,5 mm (0.5 in) inside diameter, at a pressure of about 1 bar [corresponding to a head of about 10 m (33 ft) of water]. The nozzle shall be held at a distance of 1,5 m (5 ft) from the container under test, and the stream shall be traversed at a speed of 100 mm/s (4 in/s). 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.

5.14.2 Requirements

Upon completion of the test the container shall be free from penetration of water.

ANNEX A

DIAGRAMMATIC REPRESENTATION OF CAPABILITIES APPROPRIATE TO ALL TYPES AND SIZES OF PART I CONTAINERS, EXCEPT WHERE OTHERWISE STATED

NOTE – The externally applied forces shown below are for one end or one side only. The internal loads are for the whole container.

	End elevations	Side elevations
1		
Applies to all sizes		
2		
3		
Applicable to 1AA, 1A, 1B and 1C containers only		
3A		
Applicable to 1D, 1E and 1F containers only		
4		
Applicable to all containers fitted with bottom corner fittings		