BS ISO 1161:2016

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Series 1 freight containers — Corner and intermediate fittings — Specifications

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National foreword

This British Standard is the UK implementation of ISO 1161:2016. It supersedes BS 3951-1.2:1985 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee TW/1, Freight containers and swap bodies.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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INTERNATIONAL STANDARD

ISO 1161

Fifth edition
2016-07-15

Series 1 freight containers — Corner and intermediate fittings — Specifications

Conteneurs de la série 1 — Pièces de coin et pièces de fixation intermédiaires — Spécifications

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 104, *Freight containers*, Subcommittee SC 1, *General purpose containers*.

This fifth edition cancels and replaces the fourth edition (ISO 1161:1984), which has been technically revised with the following changes:

— added ISO 148-1 in Clause 2;

— added mechanical properties and reference to heat treatment in Clause 4;

— revised design load values for top, bottom and intermediate fittings in 5.1.1 to 5.1.3 in accordance with the maximum superimposed mass represented in ISO 1496-1;

— added 5.1.4;

— added interior walls, top and bottom plates as new compulsory features in 5.2;

— added new compulsory markings in Clause 7;

— added Clause 8;

— added interior wall thickness and bottom plate thickness, hitherto unspecified in Figure 1 a);

— added interior wall thickness and bottom plate thickness, hitherto unspecified in Figure 2 a);

— added interior wall thickness and top plate thickness, hitherto unspecified in Figure 3 a);

— added interior wall thickness and top plate thickness, hitherto unspecified in Figure 4 a);

— added wall thickness, hitherto unspecified in Figure 1 b);

— added wall thickness, hitherto unspecified in Figure 2 b);

— added wall thickness, hitherto unspecified in Figure 3 b);

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— added wall thickness, hitherto unspecified in Figure 4 b);

— revised diagram for internal lashing in Figure 5;

— removed existing Annex A, “Examples of overall dimensions of box-shaped corner fittings”;

— added new Annex A, “Testing methodology”;

— removed Annex C “Guide on the choice of sizes for, and the positioning of, twistlock tie-down devices for securing series 1 freight containers to carrying vehicles” (intent to transfer to ISO 3874 as more appropriate home for this information).

It also incorporates the Amendment ISO 1161:1984/Amd 1:2007 and the Technical Corrigendum ISO 1161:1984/Cor 1:1990.

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Introduction

This International Standard on corner fittings is the result of the efforts of technical and operational personnel drawn from all phases of the transportation industry. The figures show the fittings for the top and bottom corners of series 1 freight containers which will provide compatibility in interchange between transportation modes. Care has been taken to limit consideration only to those details vital to this function.

The size and configuration of corner and intermediate fitting apertures are specified. The faces of the corner and intermediate fittings having apertures for the engagement of handling and securing devices have specified thickness and tolerances as shown in Figures 1 to 4. The minimum thickness of the blank walls is specified even though they are not involved in the engagement of the handling and securing devices; they can be thicker than the minimum provided that their inner surfaces do not protrude into the corner fitting cavity reserved for the engaging device.

The purpose of this International Standard is to define some details of design vital to container interchange in automatic, semi-automatic and conventional systems.

The strength and testing requirements specified in this International Standard do not take any account of the stresses which can result from the practice of end-to-end coupling of containers.

NOTE The requirements of this International Standard do not preclude the Provision of additional facilities for lifting either from the top or at the base of the freight container.

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INTERNATIONAL STANDARD ISO 1161:2016(E)

Series 1 freight containers — Corner and intermediate fittings — Specifications

1 Scope

This International Standard establishes the basic dimensions and the functional and strength requirements of corner and intermediate fittings for series 1 freight containers, i.e. containers which conform to ISO 668 and ISO 1496 (all parts) with the exception of air mode containers (see ISO 8323).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1496-1, *Series 1 freight containers — Specification and testing — Part 1: General cargo containers for general purposes*

ISO 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

3 Dimensional requirements

3.1 General

3.1.1 The dimensions and tolerances of the corner and intermediate fittings shall conform to Figures 1 to 4.

Each series 1 container shall have two right-hand top corner fittings (on the right as the observer faces either end of the container) and two left-hand top corner fittings which are the mirror image of the right-hand fittings.

The bottom corner fittings shall have a similar configuration except in respect of the end aperture.

Apart from the above, 45 ft containers shall have four top intermediate fittings in the 40 ft position [see Figures 1 b) and 2 b)] and four bottom intermediate fittings in the 40 ft position [see Figures 3 b) and 4 b)].

The corner fittings shown in Figures 1 to 4 illustrate right-hand top and bottom fittings only; for the left-hand corner fittings, the dimensions are simply transposed.

3.2 Detailed dimensional and manufacturing requirements

3.2.2 Where the dimensions are not specified for inner and outer edges of apertures, these edges shall be given a radius of:

$$3^{0}_{-1,5}\ \text{mm}\left(1/8^{0}_{-1/16}\ \text{in}\right) \tag{1}$$

3.2.3 At the junction of the two 6 mm (1/4 in) outside edge radii with the 14,5 mm (9/16 in) edge radius, the corner should be rounded by blending the radiused edges, removing minimum amounts of material from the flat outer faces and walls.

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3.2.4 Where a corner or intermediate fitting has an optional inner side wall and is made to the minimum dimension of 149 mm (5 7/8 in), the junction of the mandatory horizontal face to the optional inner side wall may be provided with a radius not exceeding 5,5 mm (7/32 in).

If a greater radius is required, the 149 mm (5 7/8 in) dimensions shall be increased accordingly.

4 Strength requirements

The corner or intermediate fittings shall be designed, constructed and tested in such a manner and of such materials as to enable them to pass the operating and testing requirements laid down in ISO 1496-1 and Clauses 5 and 8.

The mechanical properties of raw materials used to produce corner fittings shall meet or exceed the following:

Yield Strength:	275 MPa;
Tensile strength:	480 Mpa;
Impact Energy at -20°C	27 KV (Joule)[a];
Impact Energy at -40°C:	21 KV (Joule)[a];
Elongation:	25 %;
Reduction of area:	40 %.

a Impact tests in accordance with ISO 148-1.

The above is to be regarded as the minimum values for strength requirements. Certification societies may approve higher values, but not lower. Testing at temperatures lower than -40 °C may be approved if required.

Manufacturers are responsible for ensuring that quantities of undesirable elements in the raw materials used to produce corner fittings are kept to an absolute minimum and that the composition of the resultant material is such as to ensure good weldability.

All corner or intermediate fittings produced by a casting process are to be suitably heat treated to comply with the specified mechanical properties above. Heat treatment batches are to be limited to the size required so as to ensure that all fittings receive a comparable treatment regime and that there are no cold or hot spots in the batch.

5 Design requirements

5.1 Loading

5.1.1 General

The following container design loadings and criteria were used in establishing the dimensional design of corner or intermediate fittings specified in this International Standard.

Corner and intermediate fittings for series 1 freight containers shall be capable of withstanding the loads calculated in accordance with the requirements of ISO 1496-1 and the lifting methods of ISO 3874 for 1AA, 1A, 1AX, 1EEE and 1EE containers. The calculated design loads are listed in the following subclauses.

WARNING — Recognizing that there are containers that have ratings in excess of those specified in ISO 668, special arrangements for certification of corner or intermediate fittings for such containers may be required.

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5.1.2 Stacking

	Design loads
Top corner fitting [superimposed load offset 25,4 mm (1 in) laterally and 38 mm (1 1/2 in longitudinally]	942 kN
Top Intermediate fitting [superimposed load offset 25,4 mm (1 in) laterally and 38 mm (1 1/2 in longitudinally]	423 kN
Bottom corner fitting (resting on flat support)	1200 kN
Bottom intermediate fitting (resting on flat support)	560 kN
Bottom corner fitting offset 25,4 mm (1 in) laterally and 38 mm (1 1/2 in) longitudinally (to reflect the situation in cell guides)	942 kN

5.1.3 Lifting

	Design loads
Top corner or intermediate fitting [twistlock (see also Clause 6), hook or shackle]	195 kN
Bottom corner or intermediate fitting sling at 30° to horizontal	390 kN

NOTE Lifting from the bottom corner or intermediate fitting:

a) the line of action of the sling is assumed to be parallel to and not more than 38 mm (1 1/2 in) from the outer face of the corner fitting;

b) the load values quoted are for slings at the angles stated, but it is recognized that slings may be used at any angle between the angle stated and the vertical.

5.1.4 Longitudinal restraint

	Design loads
Bottom corner or intermediate fittings (two fittings carrying load)	300 kN ($2\,g \times 1\,R$)

5.1.5 Vertical restraint

	Design loads
Top and bottom corner fittings or intermediate top and bottom fittings	250 kN

5.1.6 Lashing and securing

The force, or resultant of any combination of forces, imparted on the aperture in the end or the side of a bottom corner or bottom intermediate fitting as a result of the use of a lashing or a securing device, or a combination of such devices, is assumed not to exceed the value indicated by the point on the "envelope" shown in Figure 5 which is appropriate to the angle at which the force, or resultant force, is applied. It is further assumed that the force or resultant force lies in a plane parallel to and no more than 38 mm (1 1/2 in) from the face of the corner or intermediate fitting.

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