

Marine 10' 40' freight containers — Corner and intermediate fittings — Specifications

ISO 1161:2016(E)

Le specifiche per il container

Le norme ISO 1161, ISO 1496 definiscono le specifiche costruttive per il container, dispositivo per il trasporto intermodale delle merci senza rottura di carico. Per garantire la possibilità di trasbordo da un veicolo stradale porta container ad un carro ferroviario, oppure ad una nave, consentendo l'impilamento, il container deve rispettare specifici requisiti dimensionali e di interfaccia.

I container sono provvisti dei cosiddetti blocchi girevoli, detti twistlock, che consentono di collegare in modo rapido e sicuro il container al veicolo. La norma ISO 1161, "Series 1 freight containers - Corner and intermediate fittings - Specifications", stabilisce le dimensioni di base ed i requisiti di funzionalità e resistenza per i blocchi girevoli dei container conformi alla norma ISO 1496.

I twistlock possono essere di vario tipo, retrattili o non retrattili, ad azionamento manuale o automatico. Sono poi stabiliti i requisiti per quanto riguarda il materiale e le caratteristiche di resistenza meccanica.

Resistenza strutturale

La norma ISO 1496, "General cargo containers for general purpose", stabilisce invece i requisiti costruttivi e di prestazione dei container. Per i container destinati ad uso generico, detti "general purpose freight containers", la norma stabilisce la seguente resistenza strutturale per le pareti:

Pareti di fondo (anteriore e posteriore): devono poter sostenere il 40% del peso massimo del carico "P", se distribuito uniformemente sulla parete

Pareti laterali: devono poter sostenere il 60% del peso massimo del carico "P", se distribuito uniformemente sulle pareti

con $P = (\text{massa lorda} - \text{tara}) \times 9.81$

Ad esempio, un container con portata pari a 30.480 kg, garantisce i seguenti valori di resistenza:

Pareti di fondo (anteriore e posteriore): Resistenza = $30.480 \times 9.81 \times 0,4 = 119.603 \text{ N} = 11.960 \text{ daN}$

Pareti laterali: Resistenza = $30.480 \times 9.81 \times 0,6 = 179.405 \text{ N} = 17.940 \text{ daN}$

Nel caso si utilizzi il bloccaggio come modalità di fissaggio del carico

sfruttando le pareti del container, si deve verificare che i valori di resistenza ottenuti sopra siano superiori alla capacità di bloccaggio

richiesta calcolata secondo la norma EN 12195-1. Diversamente si devono

utilizzare strumenti di fissaggio ausiliari, ad esempio ricorrendo all'uso di cinghie per realizzare un fissaggio del carico per ancoraggio.

1 Strength requirements, Requisiti robustezza

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.

2 Design requirements Requisiti generali

2.1 Loading

2.1.1 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

ISO 1161:2016(E) Normativa ISO internazionale

those specified in ISO 668, special arrangements for certification of corner or intermediate fittings for such containers may be required.

2.1.2 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

2.1.3 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.

2.1.4 Longitudinal restraint

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

2.1.5 Vertical restraint

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

