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Series 1 freight containers — Handling and securing

AMENDMENT 1:

Twistlocks, latchlocks, stacking fittings and lashing rod systems for securing of containers

Conteneurs de la série 1 — Manutention et fixation

AMENDEMENT 1:

*Verrous tournants, verrous à loquet, dispositifs de gerbage et systèmes de
barres de saisissage pour la fixation des conteneurs*



Reference number
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this Amendment may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

Amendment 1 to International Standard ISO 3874:1997 was prepared by Technical Committee ISO/TC 104, *Freight containers*, Subcommittee SC 1, *General purpose containers*.

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Series 1 freight containers — Handling and securing

AMENDMENT 1:

Twistlocks, latchlocks, stacking fittings and lashing rod systems for securing of containers

Page iii, Foreword

Replace the last sentence with the following:

“Annexes A to D form a normative part of this International Standard. Annex E is for information only.”

Page 29, annex A, Bibliography

Change this annex to annex E.

Add the following annexes A to D before the bibliography.

[ISO 3874:1997/Amd 1:2000](https://standards.iteh.ai/catalog/standards/sist/dde40767-be34-493a-a573-13c359511c5e/iso-3874-1997-amd-1-2000)

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Annex A (normative)

Twistlocks for securing of containers — Function, dimensions, strength requirements and testing

A.1 General

Twistlocks locate and secure containers

- either to each other within a stack (they are then acting through the corner fittings),
- or to the transport modes (they are then acting through the bottom corner fittings and the securing sockets of the carrying vehicle).

Twistlocks are also used to connect and lift empty containers.

A.2 Definitions

For the purposes of this annex, the following definitions apply to twistlocks.

A.2.1

collar

part of a twistlock which fits into the top or bottom apertures of a corner fitting and restrains connected containers from horizontal movements

A.2.2

eyehole

hole in the top cone of a twistlock to identify the proper orientation of the twistlock

A.2.3

handle tail

upbent part of the handle to identify the proper orientation of the twistlock in a stack of containers

A.2.4

fixed base

rigid part of a collar which allows manual pre-locking of the bottom part of a twistlock

A.2.5

triggering device

manually operated device which sets a twistlock

A.2.6

intermediate plate

part of a twistlock that carries the compression force between stacked containers

A.2.7

single-purpose twistlock

twistlock of asymmetrical design complying with the standard orientation

NOTE It can be used only in one of the two following alternatives:

- only in the top corner fitting of the container on which another container will be stacked (alternative A);
- only in the bottom corner fitting of a container which is going to be stacked on top of another container (alternative B).

A.2.8**double twistlock**

twistlock fitted with both top cone and bottom cone

A.2.9**dual-purpose twistlock**

twistlock that, having the same orientation, can be pre-locked either in a top corner fitting or in a bottom corner fitting

A.2.10**single lock**

locking function of a twistlock in either the top cone or bottom cone

A.2.11**double lock**

locking function of a twistlock in both the top cone and bottom cone

A.3 Types and description of securing twistlocks**A.3.1 Manual twistlocks****A.3.1.1 Manual twistlock with a fixed base and a single lock, two positions**

A manual twistlock with a fixed base consists of the following:

- a top cone with an eyehole which can be rotated in relation to a fixed base;
- an intermediate plate with collars and a fixed base;
- a handle with a tail pointing upwards, attached to the shaft, moving in the horizontal plane and having two stop positions, one end fully closed and one end fully open; see Figure A.1.

**Key**

- 1 Unlocked
- 2 Locked

a) Fully open position

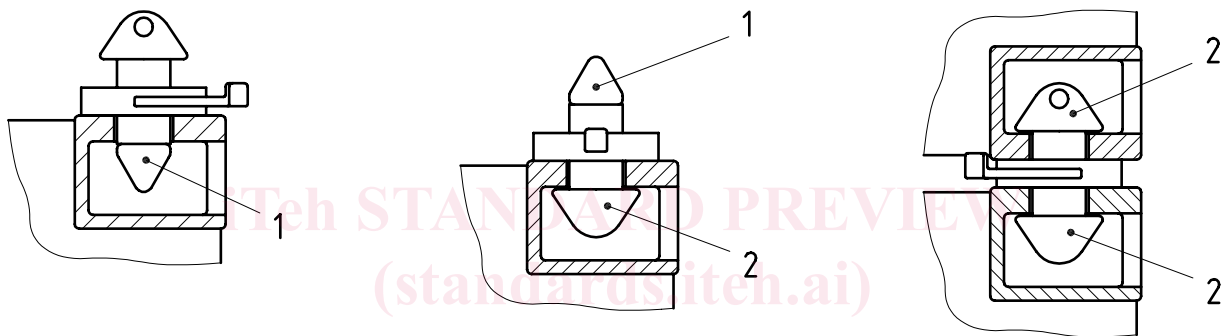
b) Fully closed position

Figure A.1 — Manual twistlock with a fixed base and a single lock, two positions

A.3.1.2 Manual twistlock, with double locks, three positions

A manual twistlock with double locks, three positions, consists of the following:

- a) a top cone with an eyehole and a bottom cone rigidly connected together by a shaft;
- b) an intermediate plate with collars;
- c) a handle with a tail pointing upwards, attached to the shaft, moving in the horizontal plane and having three positions; see Figure A.2:
 - **first position:** bottom cone fully open in order to engage the twistlock to the top corner fitting;
 - **second position:** top cone fully open and bottom cone closed in order to secure the twistlock to the top corner fitting and engage the twistlock to the bottom corner fitting of the next container;
 - **third position:** both top and bottom cones fully closed.



Key

- 1 Unlocked
- 2 Locked

a) First position

b) Second position

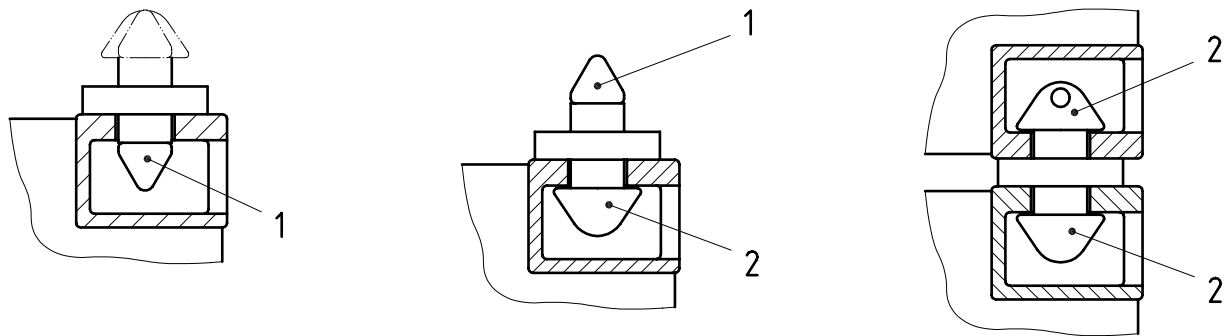
c) Third position

Figure A.2 — Manual twistlock with double locks, three positions, premounted to the top corner fitting

A.3.2 Semi-automatic twistlock

A semi-automatic twistlock can be of both single purpose and dual purpose. It consists of the following:

- a top cone with an eyehole and a bottom cone, rigidly connected by a mechanism;
- an intermediate plate with collars;
- an internal mechanism automatically closing the cones either when a container is landed either onto the twistlock (see Figure A.3), or when the bottom cone fits into the top corner fitting of a container (see Figure A.4);
- a device for unlocking the twistlock.



Key

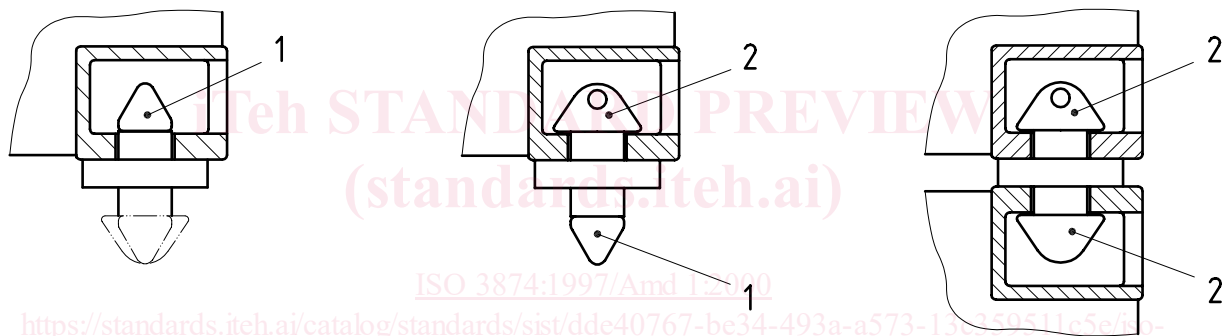
- 1 Unlocked
- 2 Locked

a) First position

b) Second position

c) Third position

Figure A.3 — Semi-automatic twistlock, fitted to the upper corner fitting



Key

- 1 Unlocked
- 2 Locked

a) First position

b) Second position

c) Third position

Figure A.4 — Semi-automatic twistlock, fitted to the bottom corner fitting

A.4 Functional requirements and dimensions of twistlocks

A.4.1 General requirements

The top cone and bottom cone shall restrain connected containers against vertical movements.

The collar shall restrain connected containers against horizontal movements.

The eyehole in the top cone shall identify the top cone and facilitate the handling of the twistlock.

The tail of the handle, on a manual twistlock, shall identify the correct orientation of the twistlock in a container stack.

A.4.2 Manual twistlocks

A manual twistlock shall be oriented so that the cone with an eyehole is pointing upwards.

The handles shall always work in the horizontal plane and shall be fitted with a tail which shall be pointing upwards.

The unified direction of handle locking shall be clockwise, seen from above, to ensure safe locking.

All manual twistlocks, also those with three defined positions, shall have a positive locking mechanism which ensures that the twistlock will not be dislodged from the corner fitting during loading, unloading and transport of containers.

A.4.3 Semi-automatic twistlocks

A semi-automatic twistlock shall be oriented so that the cone with an eyehole is pointing upwards.

A semi-automatic twistlock shall be fitted with a means of identifying clearly the closing of both cones.

For semi-automatic twistlocks fitted with a handle, working in a horizontal plane, the handle shall be fitted with a tail pointing upwards and the closing of the cones shall be indicated by the handle in its leftmost position.

For semi-automatic twistlocks fitted with a pull wire, the closing of the cones shall be indicated by the full retraction of the wire.

For semi-automatic twistlocks fitted with other triggering devices, the closing of the cones shall be shown by an indicator designed to ensure consistency with the requirements expressed above.

A semi-automatic twistlock shall have a positive locking mechanism which ensures that the twistlock will not be dislodged from the corner fitting during loading and unloading of containers.

A.5 Dimensions

A.5.1 Top cone and bottom cone

The top cone and the bottom cone shall be designed so that, in fully locked position, the load carrying area is larger than 800 mm². The top cone and bottom cone shall not protrude into the part of the corner fitting cavity defined in Figure A.5, which is required for other lashing equipment.

A.5.2 Intermediate plate

The thickness of the intermediate plate shall be $30 \begin{smallmatrix} 0 \\ -5 \end{smallmatrix}$ mm. See Figure A.6.

The load carrying area (flange surface bearing area) of the intermediate plate shall be at least 4 500 mm². The twistlock shall be so designed as to have the maximum load transfer area towards the walls of the corner fittings.

A.5.3 Handle

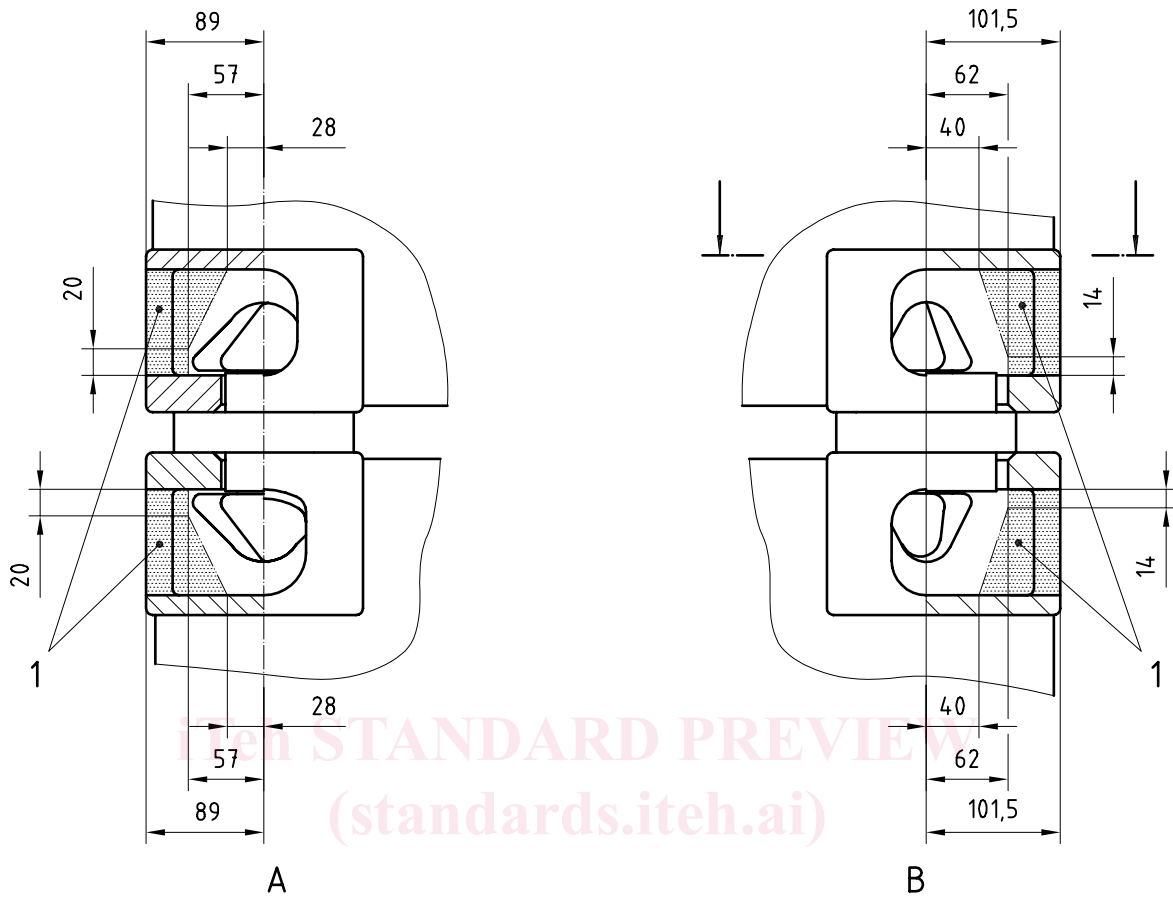
The length of the handle, measured from the centreline of the locks to the end, shall be a maximum of 160 mm.

The bent-up tail of the handle shall have a length of 25 mm ± 2 mm. See Figure A.7.

A.5.4 Collars

In order to fit into corner fitting apertures in accordance with ISO 1161, the collar shall have the dimensions shown in Figure A.8.

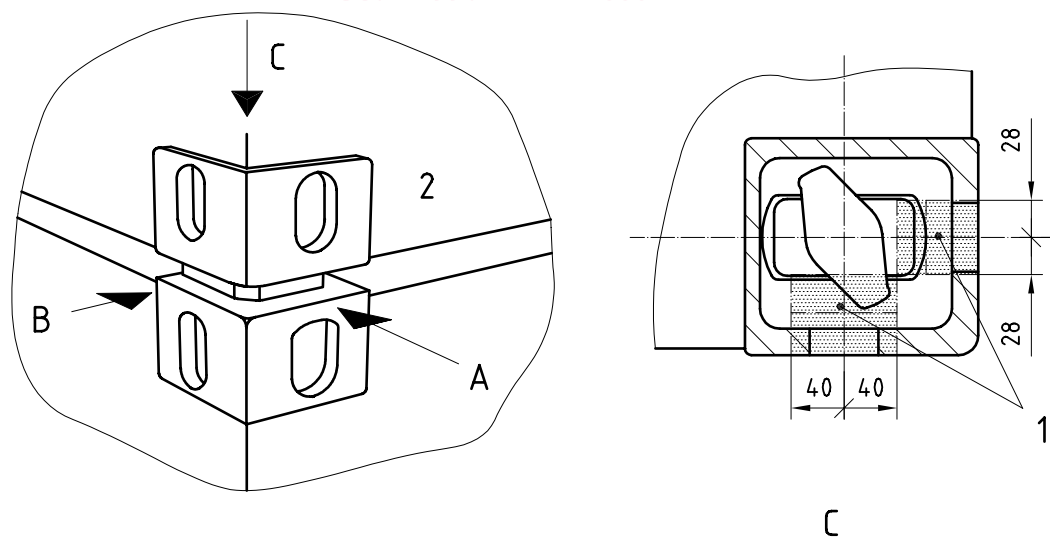
Dimensions in millimetres



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Key

- 1) Restricted area
- 2) Container end

Figure A.5 — Restricted part of corner fitting cavity

Dimensions in millimetres

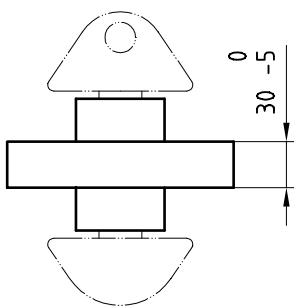


Figure A.6 — Intermediate plate

Dimensions in millimetres

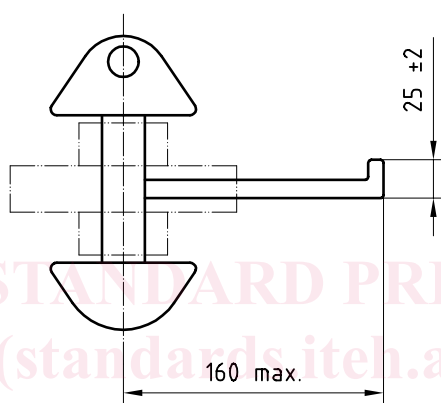


Figure A.7 — Length of the handle

Dimensions in millimetres

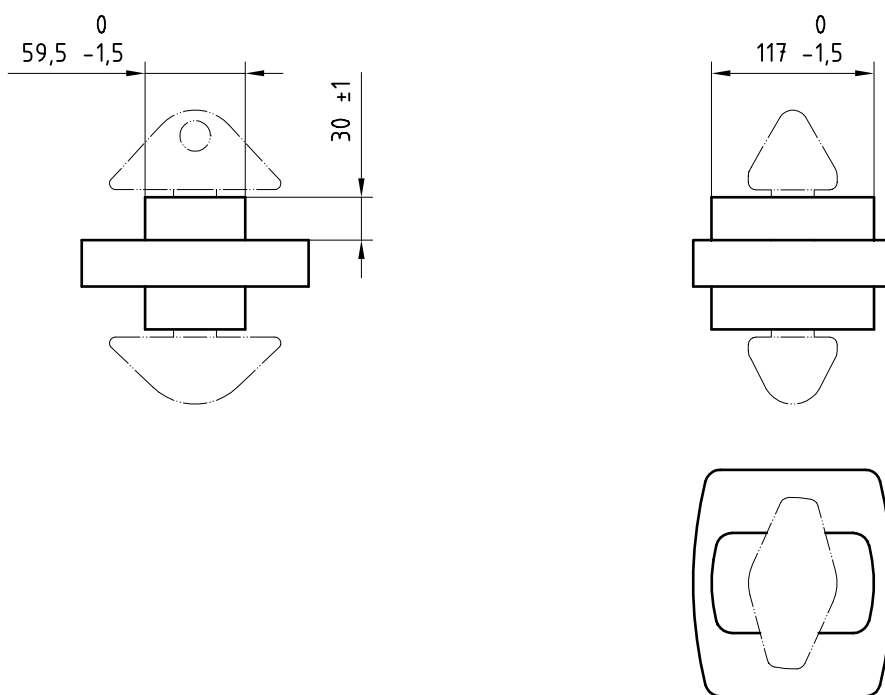
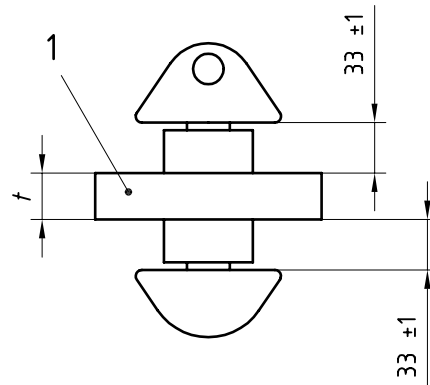


Figure A.8 — Dimensions of collars

A.5.5 Distance between top lock and bottom locks

The distance between the top and bottom locks shall be the actual thickness of the intermediate plate plus two times (33 ± 1) mm. See Figure A.9.

Dimensions in millimetres



Key

- 1 Intermediate plate
- t is the thickness of the intermediate plate.

Figure A.9 — Distance between top and bottom locks

A.6 Material and design performance

The performance and reliability of twistlocks are functions of design and choice of material. Moving parts, especially springs holding the handle in position shall be designed so that their function does not cease because of stress, corrosion and dirt. For safety reasons it is also important that there are distinct stop positions.

A.7 Strength requirements

A.7.1 Tensile strength

Twistlocks shall withstand a tensile force of 150 kN without any permanent deformation. To verify the tensile strength requirement, test the twistlocks in accordance with A.8.1. The force shall act between the locking cones or the top locking cone and the fixed base.

Twistlocks used for lifting shall withstand a tensile force of at least 178 kN without any permanent deformation.

The tensile force shall be applied by means of two corner fittings or two equivalent devices in accordance with ISO 1161.

A.7.2 Compression strength

A.7.2.1 Compression strength of intermediate plate

The intermediate plate of the twistlock shall withstand a compression force of 850 kN without any permanent deformation or other abnormalities which would render it unsuitable for use. To verify the compression strength requirement, test the twistlock in accordance with A.8.2.1. The function of the twistlock shall not be affected by the test. The compression force shall be applied in a testing machine by two steel plates with holes equivalent to those in corner fittings in accordance with ISO 1161.