

# SVENSK STANDARD

## SS-ISO 3874:2017



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### **Containrar serie 1 – Hantering och säkring (ISO 3874:2017, IDT)**

### **Series 1 freight containers – Handling and securing (ISO 3874:2017, IDT)**

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Den internationella standarden ISO 3874:2017 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 3874:2017.

Denna standard ersätter SS-ISO 3874, utgåva 3.

The International Standard ISO 3874:2017 has the status of a Swedish Standard. This document contains the official version of ISO 3874:2017.

This standard supersedes the Swedish Standard SS-ISO 3874, edition 3.

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# Contents

Page

|   |           |
|---|-----------|
| Foreword  | iv        |
| <b>1 Scope</b>  | <b>1</b>  |
| <b>2 Normative references</b>   | <b>1</b>  |
| <b>3 Terms and definitions</b>  | <b>1</b>  |
| <b>4 Basic requirements</b>   | <b>5</b>  |
| 4.1 General   | 5         |
| 4.2 Packing and emptying  | 5         |
| 4.3 Stowage and securing of cargo   | 6         |
| <b>5 Handling</b>   | <b>6</b>  |
| 5.1 Handling by specified lifting methods (see <a href="#">Clause 6</a> )   | 6         |
| 5.2 Handling by unspecified lifting methods   | 6         |
| <b>6 Specified lifting methods</b>  | <b>6</b>  |
| 6.1 General   | 6         |
| 6.2 Top lift spreaders  | 9         |
| 6.3 Top lift sling  | 12        |
| 6.4 Bottom lift sling   | 14        |
| 6.5 Side lift: Method 1   | 17        |
| 6.6 Side lift: Method 2   | 19        |
| 6.7 Side lift: Method 3   | 22        |
| 6.8 End lift: Method 1  | 24        |
| 6.9 End lift: Method 2  | 26        |
| 6.10 Fork lifts   | 28        |
| <b>7 Landing and supporting</b>   | <b>30</b> |
| <b>8 Stacking on the ground</b>   | <b>30</b> |
| <b>9 Securing during transport</b>  | <b>31</b> |
| 9.1 General   | 31        |
| 9.2 Securing on board a ship  | 32        |
| 9.2.1 Forces on board a ship  | 32        |
| 9.2.2 Effects on container  | 32        |
| 9.2.3 Ship design, stowage and securing of containers   | 34        |
| 9.2.4 Types of securing equipment   | 35        |
| 9.3 Securing of container for road and rail transport   | 39        |
| 9.3.1 General   | 39        |
| 9.3.2 Terminal trailer operation  | 40        |
| 9.3.3 Public road operation   | 40        |
| 9.3.4 Rail vehicle operation  | 43        |
| 9.3.5 Double stack rail car operations  | 43        |
| <b>Annex A (normative) Twistlocks for securing of containers — Function, dimensions, strength requirements and testing</b>  | <b>45</b> |
| <b>Annex B (normative) Stacking fittings for securing of containers — Function, dimensions, strength requirements and testing</b>   | <b>59</b> |
| <b>Annex C (normative) Lashing rod systems, including tensioning devices, for securing of containers — Function, dimensions, strength requirements and testing</b>              | <b>66</b> |
| <b>Annex D (informative) Container securing fittings</b>  | <b>71</b> |
| <b>Annex E (normative) Strength requirements of container securing fittings</b>   | <b>76</b> |
| <b>Annex F (informative) Guide on the choice of sizes for, and the positioning of, twistlock tie-down devices for securing series 1 freight containers to carrying vehicles</b> | <b>79</b> |
| <b>Bibliography</b>   | <b>92</b> |

## SS-ISO 3874:2017 (E)

### 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](http://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](http://www.iso.org/patents)).

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For an explanation on the voluntary nature of standards, 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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 104, *Freight containers*, SC 1, *General purpose containers*.

This sixth edition cancels and replaces the fifth edition (ISO 3874:1997), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the terminology has been aligned to match those that are used in the CTU Code and the “load distribution” guidance figure has been removed in [Clause 4](#);
- [Clause 9](#) and the associated figures have been updated to reflect the current practice and equipment used;
- [Annex A](#) has been updated to include securing devices in the current common usage including, fully automatic twistlocks, midlocks, multi-purpose twistlocks, and automatic container locks;
- the dimensions for all locks have been reviewed and revised, where appropriate, to reflect current practice;
- the dimensions for locks not previously included have been added;
- the strength requirement for all locks has been reviewed and revised to reflect current practice and maximum vessel sizes;
- the test requirements have been reviewed and revised as above to match ISO 17905 and class requirements;
- the old Annex B has been removed, reflecting lack of common usage;
- Annex C, now [Annex B](#), has been updated, as well as strength and test requirements, to reflect the current practice and equipment used;

**SS-ISO 3874:2017 (E)**

- Annex D, now [Annex C](#), has been updated, as well as strength and test requirements, to reflect the current practice and equipment used;
- [Annex D](#) types and requirements have been added in accordance with ISO 17905;
- [Annex E](#) has been added in accordance with ISO 17905;
- ISO 1161:1984, Annex C, included as [Annex E](#), has been updated to include ISO 1161:1984/Amd. 1:2007 45 ft containers.

It also incorporates the Amendments ISO 3874:1997/Amd. 1:2000, ISO 3874:1997/Amd. 2:2002, ISO 3874:1997/Amd. 3:2005 and ISO 3874:1997/Amd. 4:2007.





# Series 1 freight containers — Handling and securing

## 1 Scope

This document specifies the methods of handling and securing series 1 freight containers built and tested to comply with ISO 1496 (all parts).

Methods of handling and securing are described for both loaded and empty containers. The conditions for lifting different types of loaded and empty containers are laid down in [Clause 6](#).

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 668, *Series 1 freight containers — Classification, dimensions and ratings*

ISO 830, *Freight containers — Vocabulary*

ISO 1496 (all parts), *Series 1 freight containers — Specification and testing*

ISO 1161, *Series 1 freight containers — Corner and intermediate fittings — Specification*

IMO/ILO/UNECE *Code of Practice for Packing of Cargo Transport Units*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 830 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1 General

#### 3.1.1

##### **empty container**

container in the tare condition

#### 3.1.2

##### **packed container**

container in a condition other than the tare condition

#### 3.1.3

##### **asymmetry of the centre of gravity**

longitudinal and/or lateral horizontal differences between the centre of gravity of any container [*empty* (3.1.1) or *packed* (3.1.2), with or without fittings and appliances] and the geometric centre of the diagonals of the centres of the four bottom corner fittings

#### 3.1.4

##### **mobile centre of gravity**

centre of gravity of a container packed with liquid, bulk, hanging or similar cargo which is liable to move under dynamic conditions

## SS-ISO 3874:2017 (E)

### 3.1.5

#### **securing device**

device used to secure containers

Note 1 to entry: Securing devices can be divided into three types, namely securing fittings, lashing fittings and buttress fittings, each type divided into fixed fittings and portable fittings and defined as follows:

- **portable fittings** — securing devices not welded to the hull;
- **fixed fittings** — securing devices welded to the hull;
- **securing fittings** — securing devices used between the containers and between the container and the deck, hatch cover as well as bilge, to prevent the container from longitudinal, traverse and vertical movements relative to the hull during the transportation,
- **lashing fittings** — securing devices used to lash the container on the hatch cover, deck or lashing bridge,
- **buttress fittings** — securing devices used to eliminate the clearance between the container and the longitudinal bulkhead and transfer the transverse force to the longitudinal bulkhead.

## 3.2 Twist locks

### 3.2.1

#### **collar**

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

### 3.2.2

#### **cone**

part of a twistlock that fits into the top or bottom aperture of a corner fitting or a securing socket and restrains connected containers from vertical movements

### 3.2.3

#### **eyehole**

(if so fitted) hole in a cone to identify the orientation of the twistlock according to the manufacturer's specifications

Note 1 to entry: Some manufacturers use "lightening holes", which should not be confused with eyeholes

### 3.2.4

#### **handle tail**

(if so fitted) bent up part of the handle to identify the orientation of the twistlock in a stack of containers

### 3.2.5

#### **fixed base**

rigid part of a *collar* ([3.2.1](#)) which allows the manual pre-locking of the bottom part of a twistlock

### 3.2.6

#### **triggering device**

manually operated device which sets a twistlock

### 3.2.7

#### **intermediate plate**

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

### 3.2.8

#### **single twistlock**

twistlock fitted with either top *cone* ([3.2.2](#)) or bottom cone and the function is achieved by the cone twisting

### 3.2.9

#### **double twistlock**

twistlock fitted with both top *cone* (3.2.2) and bottom cone and the function is achieved by both cones twisting

### 3.2.10

#### **single lock**

locking function of a twistlock in either the top *cone* (3.2.2) or bottom cone, where the cone does not twist

### 3.2.11

#### **double lock**

locking function of a twistlock in both the top *cone* (3.2.2) and bottom cone, where neither cone twists

### 3.2.12

#### **single-function twistlock**

twistlock of asymmetrical design complying with the standard orientation

Note 1 to entry: It can be used only in one of the two following alternatives:

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

### 3.2.13

#### **dual-function twistlock**

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

### 3.2.14

#### **single purpose twistlock**

twistlock that is only used for locking

### 3.2.15

#### **multi-purpose twistlock**

twistlock that fulfils the function of a twistlock and have additional functionality which can include lifting capability

### 3.2.16

#### **multi-purpose automatic twistlock**

##### **MAT**

twistlock that fulfils the function of a *FAT* (3.2.20) and will have additional functionality which can include lifting capability

### 3.2.17

#### **midlock**

locking device that does not require any locking or unlocking operation when containers are loaded or discharged

Note 1 to entry: Midlocks are used in conjunction with *semi-automatic twistlocks* (3.2.19) as long as they are compatible: One end of container is fitted with midlocks whilst the other end has semi-automatic twistlocks.

Note 2 to entry: A midlock opens only when the container is lifted and the semi-automatic twistlocks at the other end of the container are free to open.

Note 3 to entry: Midlocks are typically used in the middle position for 20 ft containers stowed in a 40 ft bay.

### 3.2.18

#### **manual twistlock**

twistlock that requires manual locking and unlocking

## SS-ISO 3874:2017 (E)

### 3.2.19

#### **semi-automatic twistlock**

##### **SAT**

twistlock that locks automatically and requires manual unlocking

### 3.2.20

#### **fully automatic twistlock**

##### **FAT**

twistlock that locks and unlocks automatically

### 3.2.21

#### **automatic container lock**

automatic twistlock that has no rotating parts

## 3.3 Stacking fittings

### 3.3.1

#### **cone**

part of a stacking fitting which fits into the top or bottom aperture of a corner fitting or a securing socket and restrains connected containers from horizontal movements

### 3.3.2

#### **intermediate plate**

part of a stacking fitting that is subject to the compression force between stacked containers and holds the *cones* ([3.3.1](#)) in place

### 3.3.3

#### **single stacking cone**

stacking fitting fitted with one top *cone* ([3.3.1](#)) and one bottom cone

### 3.3.4

#### **double stacking cones**

stacking fitting fitted with two top *cones* ([3.3.1](#)) and two bottom cones

Note 1 to entry: Only for underdeck use.

### 3.3.5

#### **flangeless hanging stackers**

stacking fittings for use in hold cell guides for 20 ft containers in mixed stowage

Note 1 to entry: These are placed between 20 ft containers and between 20 ft with 40 ft on top, one per container end.

### 3.3.6

#### **flanged hanging stackers**

hanging stacker fitted with a flange

Note 1 to entry: This means that 4 pieces per container shall be used (see [B.2.3](#)).

## 3.4 Lashing rods

### 3.4.1

#### **lashing rod**

rod with a top which fits into a corner fitting and a bottom part which fits into a *tensioning device* ([3.4.4](#))

Note 1 to entry: An example of a tensioning device is a turnbuckle.

Note 2 to entry: Lashing rods may be used for internal or external lashing systems and are not interchangeable between systems. See [Figure C.1](#).

### 3.4.2

#### **plug hook**

fixed part of a *lashing rod* (3.4.1) which fits into a corner fitting

Note 1 to entry: See [Figure C.3](#).

### 3.4.3

#### **hinge hook**

articulated part of a *lashing rod* (3.4.1) which fits into a corner fitting

Note 1 to entry: See [Figure C.2](#).

### 3.4.4

#### **tensioning device**

device in which one end fits into the bottom part of a *lashing rod* (3.4.1) and the other end fits onto the means of transport

EXAMPLE Into a pad eye.

Note 1 to entry: See [Figure C.4](#).

## 4 Basic requirements

### 4.1 General

**4.1.1** Users of this document should use caution regarding conditions which may place loads on the containers or on the handling or securing devices. These include deterioration of the container or devices, loosening and over-tightening of devices, slackness of cargo within containers, eccentric loading and excessive environmental conditions such as high wind, ice, wave action, etc.

NOTE Slackness is a general term which includes shifting of cartons, shifting and settlement of bulk cargoes, liquids having a free surface, etc.

**4.1.2** The container and any equipment which may be used in its operation shall be adequately maintained.

**4.1.3** Doors, lids, closures, removable or foldable parts and any loose or portable equipment shall be properly secured.

**4.1.4** All personnel engaged in handling and securing operations shall have received proper instructions, especially with regard to safety matters.

**4.1.5** It is necessary to know whether the container is empty or packed; unless otherwise ascertained, a container shall be treated as packed.

**4.1.6** Strong winds and other environmental conditions can have an effect on handling equipment and additional care shall be taken when operating in such conditions.

### 4.2 Packing and emptying

**4.2.1** When a cargo is packed and secured where necessary, this shall be carried out in accordance with good and recommended practices so that the cargo does not impose on the container forces in excess of those for which it has been designed and so that the fundamental requirements specified in [4.2.2](#) to [4.2.4](#) are complied with.

## SS-ISO 3874:2017 (E)

**4.2.2** The equipment used for packing and emptying the container shall only impose loads which are not in excess of those for which the container was designed.

**4.2.3** The total mass of all items packed into the container, including dunnage, securing equipment and similar equipment, shall not exceed the maximum permitted payload, i.e. the maximum permissible operating gross mass minus the tare.

**4.2.4** The cargo shall be distributed throughout the container to ensure that the centre of gravity is kept as central and as low as possible

- to avoid excessive tilting,
- to avoid overstressing either the container or the handling equipment,
- to avoid unacceptable vehicle axle loading,
- to avoid lack of vehicle stability, and
- to avoid unacceptable load concentrations.

Asymmetry of the centre of gravity for the packed container varies with the distribution of load within the container; designers of containers and handling equipment should take this fact into account (see [4.3](#)).

### 4.3 Stowage and securing of cargo

The cargo shall be packed and secured in accordance with the guidance given in the IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units.

NOTE For CTU Code, see [Clause 2](#).

## 5 Handling

### 5.1 Handling by specified lifting methods (see [Clause 6](#))

**5.1.1** Care shall be taken to ensure that the equipment used is suitable for the load and is safely attached to the container and that the container is free to be handled.

**5.1.2** In the case of a single-point lift, special attention should be paid to the risk of the container tilting owing to asymmetry of the centre of gravity.

**5.1.3** Care shall be taken when lifting a container whose centre of gravity is mobile or asymmetric, e.g. a tank container, a bulk container, a container with a liquid bulk bag, a container with hanging cargo or a thermal container with a refrigerating unit.

### 5.2 Handling by unspecified lifting methods

Containers may be handled by methods other than those specified in [Clause 6](#) but only after careful evaluation of the equipment by means of which the container is to be handled and of the methods of operation envisaged, with respect to international container standards.

## 6 Specified lifting methods

### 6.1 General

**6.1.1** The lifting methods specified in [6.2](#) to [6.10](#) are summarized in [Table 1](#).

**6.1.2** The headings “Allowed” and “Not allowed” used in [Tables 3 to 5](#) and [Tables 7 to 12](#) refer to the specified lifting methods applied to differing types and sizes of containers and take into account the stresses on containers of differing types of design, their loads, where applicable, and the safety of the operation. There could be exceptions in cases when combinations of container types, sizes, loads, designs and operating conditions could not be taken into account in [Tables 3 to 5](#) and [Tables 7 to 12](#). Such situations should be carefully evaluated by those competent to do so in order to decide whether a safe and satisfactory operation can be ensured. An explanation of the size designations referred to in [Tables 3 to 12](#) is given in [Table 2](#).

SS-ISO 3874:2017 (E)

Table 1 — Summary of specified lifting methods

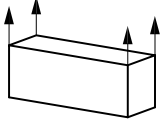
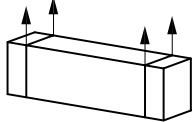
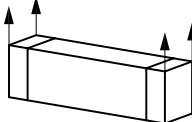
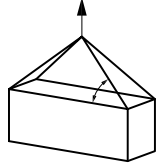
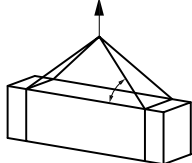
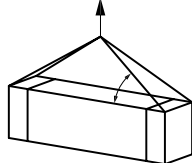
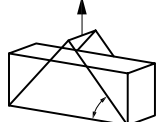
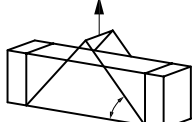
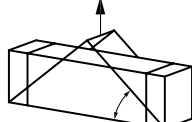
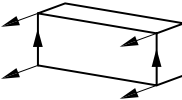
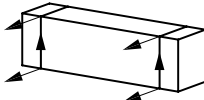
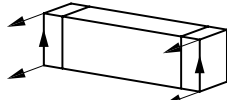
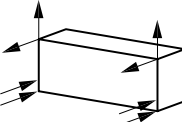
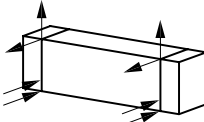
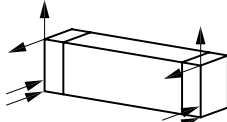
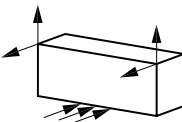
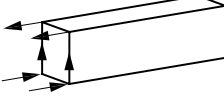
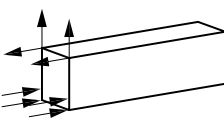

| Subclause | Description         | Container types A, B, C and D   | Container type E at 40 ft position   | Container type E at 45 ft position  |
|-----------|---------------------|---|--|---|
| 6.2       | Top lift spreader   |    |    |    |
| 6.3       | Top lift sling      |    |    |    |
| 6.4       | Bottom lift sling   |    |    |    |
| 6.5       | Side lift: Method 1 |   |   |   |
| 6.6       | Side lift: Method 2 |  |  |  |
| 6.7       | Side lift: Method 3 |  | Not applicable to type E (45 ft) containers  | Not applicable to type E (45 ft) containers   |
| 6.8       | End lift: Method 1  |  | Not applicable to type E (45 ft) containers  | Not applicable to type E (45 ft) containers   |
| 6.9       | End lift: Method 2  |  | Not applicable to type E (45 ft) containers  | Not applicable to type E (45 ft) containers   |
| 6.10      | Fork-lift           |  | Not applicable to type E (45 ft) containers  | Not applicable to type E (45 ft) containers   |



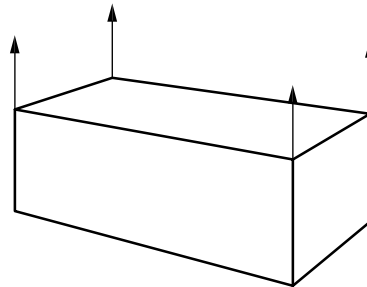
Table 2 — Size designations referred to in Tables 3 to 12

| Nominal length |    | External height           |                          |                          |                          |
|----------------|----|---------------------------|--------------------------|--------------------------|--------------------------|
| m              | Ft | <2 438 mm<br>(8 ft, 0 in) | 2 438 mm<br>(8 ft, 0 in) | 2 591 mm<br>(8 ft, 6 in) | 2 896 mm<br>(9 ft, 6 in) |
| 13 716         | 45 | —                         | —                        | 1EE                      | 1EEE                     |
| 12             | 40 | 1AX                       | 1A                       | 1AA                      | 1AAA                     |
| 9              | 30 | 1BX                       | 1B                       | 1BB                      | 1BBB                     |
| 6              | 20 | 1CX                       | 1C                       | 1CC                      | —                        |
| 3              | 10 | 1DX                       | 1D                       | —                        | —                        |

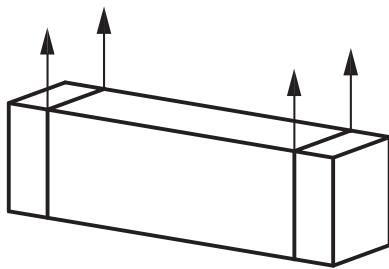
NOTE All units have a nominal width of 2 438 mm (8 ft 0 in).

## 6.2 Top lift spreaders

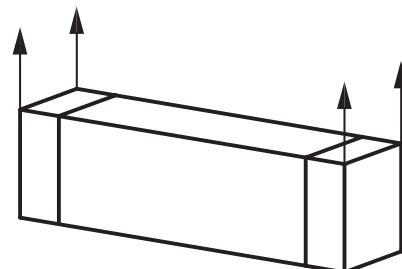
6.2.1 See Figure 1.



a) Lifting containers other than type E



b) Lifting type E containers — 40 ft position



c) Lifting type E containers — 45 ft position

Figure 1 — Lifting by means of a top lift spreader

6.2.2 The container is lifted by means of a spreader designed to lift containers by the top apertures of the four top corner fittings, the lifting forces being applied vertically.

6.2.3 Lifting devices shall be properly engaged. Gathering devices should only impinge on corner fittings and corner posts.

6.2.4 The applicability of top lift spreaders is given in Table 3.

## SS-ISO 3874:2017 (E)

**6.2.5** Folding platform-based containers (codes PL and PC; see ISO 6346), when empty and in the folded condition, may be handled in interlocked piles. The total mass of the pile shall not exceed the maximum gross mass (rating) according to ISO 668.

**6.2.6** The vertical tandem coupling of containers that are specifically designed as in [6.2.5](#) for lifting purposes, using twistlocks or other loose gear, is acceptable if forces of not greater than 75 kN act vertically through each corner fitting, and the twistlocks or other loose gear are certified for lifting. Twistlocks or other loose gear shall be periodically examined.

NOTE 1 The value of 75 kN prescribes the minimum structural capability of the lock/corner fitting combination. The 75 kN value includes an arbitrary constant wind load of 26 kN (corresponding wind speed of 100 km/h), regardless of the size of the containers. As an example, the balance of the 75 kN value equates to two 1 AAA containers with a combined tare of 22 kN and a maximum payload of 27 kN. A practical upper limit of three vertically-coupled containers is also envisaged.

NOTE 2 The certification process envisaged is to use a safety factor of at least four based on the ultimate tensile strength of the material.

