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ISO RECOMMENDATION

R 1161

SPECIFICATION OF CORNER FITTINGS FOR SERIES 1 FREIGHT CONTAINERS

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January 1970

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BRIEF HISTORY

The ISO Recommendation R 1161, *Specification of corner fittings for series 1 freight containers,* was drawn up by Technical Committee ISO/TC 104, *Freight containers,* the Secretariat of which is held by the American National Standards Institute (ANSI).

Work on this question led to the adoption of a Draft ISO Recommendation.

In March 1968, this Draft ISO Recommendation (No. 1019) was circulated to all the ISO Member Bodies for enquiry. It received the necessary majority for approval. However, since technical modifications had been made in the Draft, ISO/TC 104 Secretariat submitted a second Draft ISO Recommendation No. 1019, in January 1969, to all ISO Member Bodies for enquiry. This second Draft was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Israel	Romania
Austria	Italy	South Africa, Rep. of
Belgium	Japan	Sweden
Brazil	Netherlands	Switzerland
Czechoslovakia	New Zealands	Thailand
Germany	Norway	Turkey
Greece	Peru	U.A.R.
Hungary	Poland	U.S.A.
India	Portugal	U.S.S.R.

Two Member Bodies opposed the approval of the second Draft :

France
United Kingdom

This second Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in January 1970, to accept it as an ISO RECOMMENDATION.

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SPECIFICATION OF CORNER FITTINGS FOR SERIES 1 FREIGHT CONTAINERS

INTRODUCTION

This ISO Recommendation on corner fittings represents the efforts of technical and operational personnel drawn from all phases of transportation industry. The drawings describe the fittings for the top and bottom corner 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 location, size and configuration of corner fitting apertures are specified. The faces of the corner fittings having apertures for the engagement of handling and securing devices have prescribed thickness and tolerances as shown in Figures 2, 3, 4 and 5 on pages 8 to 11. The thickness of the blank walls is not prescribed since they are not involved in the engagement of the handling and securing devices, as long as their inner surfaces do not protrude into the corner fitting cavity reserved for the engaging devices. Examples of handling and securing devices are shown in Annex A.

The purpose of this ISO Recommendation is to define those details of design vital to container interchange in automatic, semi-automatic and conventional systems. Examples of the use of corner fittings are shown in Annex B.

The criteria used in determining the design are given in Annex C.

NOTE. – The requirements of this ISO Recommendation do not preclude the provision of additional facilities for lifting either from the top or at the base of the freight container.

1. SCOPE

This ISO Recommendation establishes the basic dimensions and the functional and strength requirements of corner fittings for series 1 freight containers which conform to ISO Recommendation R 668, *Dimensions and ratings of freight containers.*

2. DIMENSIONS

The dimensions and tolerances of the corner fittings shall conform to the drawings, Figures 2, 3, 4 and 5, on pages 8 to 11. Each container will have two right-hand top corner fittings (on the right as the observer faces the container) and two left-hand top corner fittings which are the mirror opposite of the right-hand fittings (see Figure 1). When bottom corner fittings are required, a similar configuration would exist. The corner fitting drawings on pages 8 to 11 illustrate right-hand (RH) top and bottom corner fittings only; for the left-hand (LH) corner fittings the dimensions are simply transposed.

After assembly and installation of the corner fittings, the perpendicularity or trueness of the assembled fittings shall be determined by measuring the difference between dimensions D_1 and D_2, between D_3 and D_4 and between D_5 and D_6 illustrated in Figure 6, page 12. The maximum allowable differences, expressed as "K_1 max." and "K_2 max." in the table on page 13, shall not be exceeded.

3. STRENGTH REQUIREMENTS

The corner fittings shall be designed and constructed in such a manner and of such materials as to enable them to pass the operating and testing requirements which are covered in ISO Recommendation R 1496*, *Specification and testing of series 1 freight containers.*

* At present, Draft ISO Recommendation .

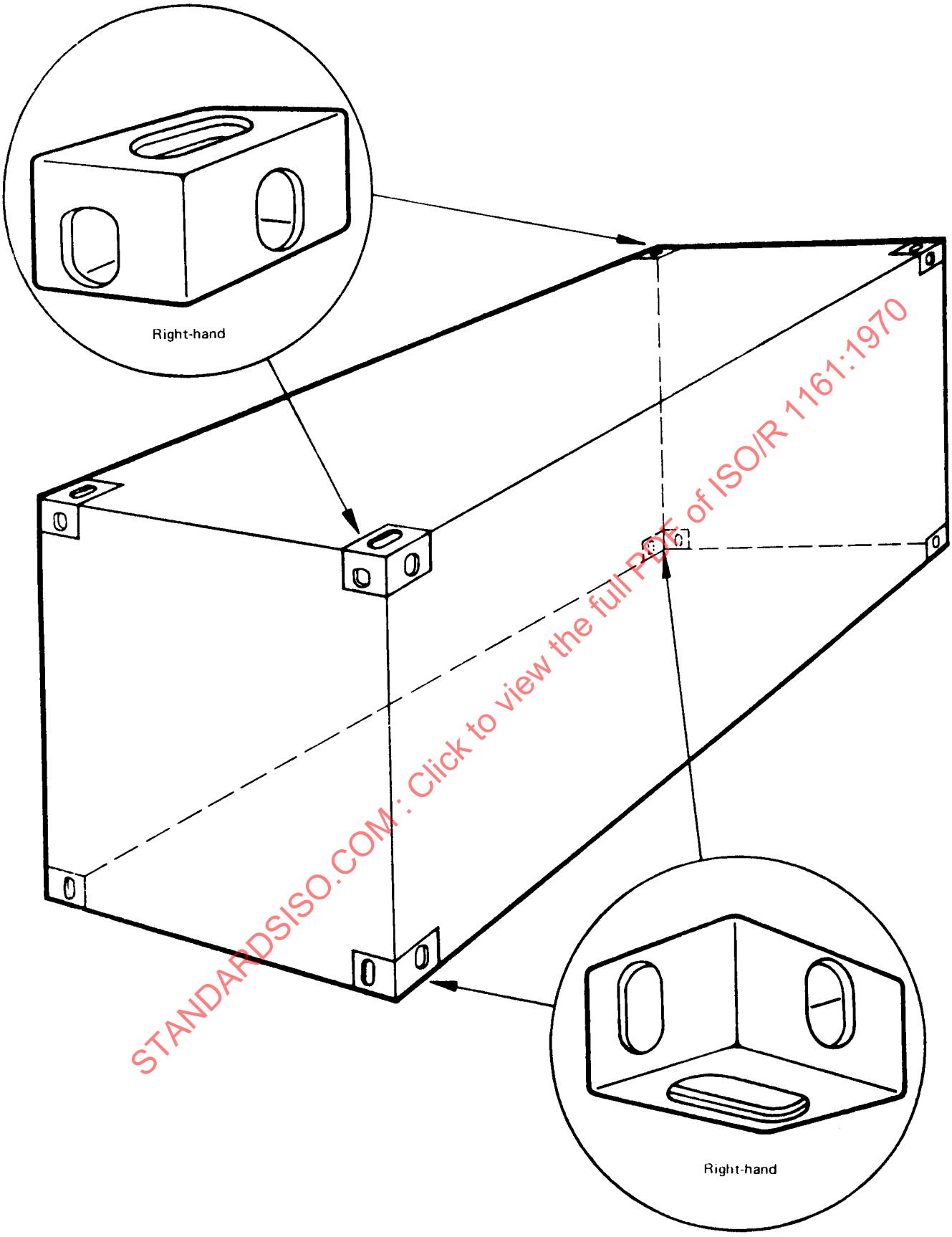
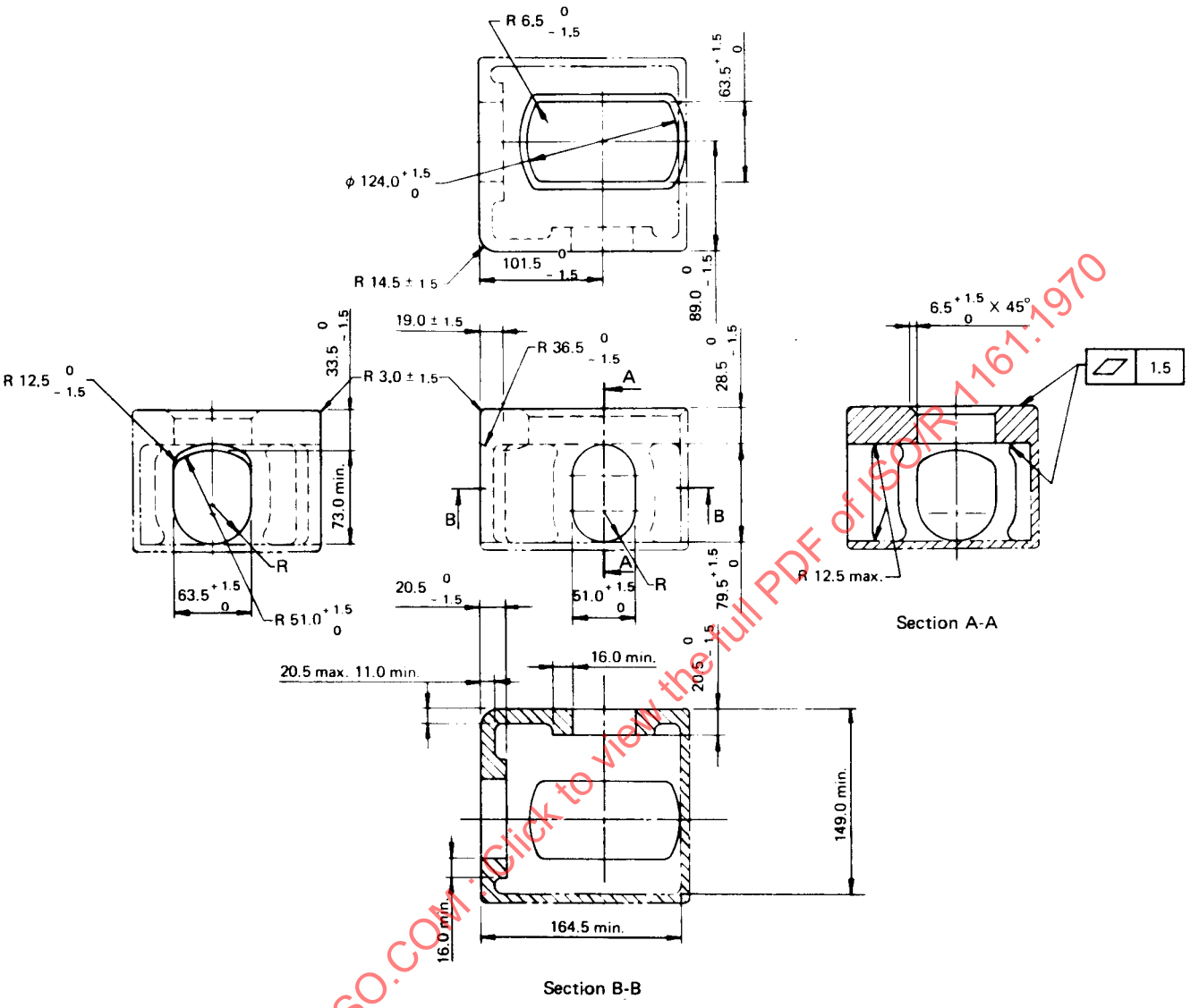


FIG. 1 – **Diagrammatic sketch showing corner fitting locations**



NOTES

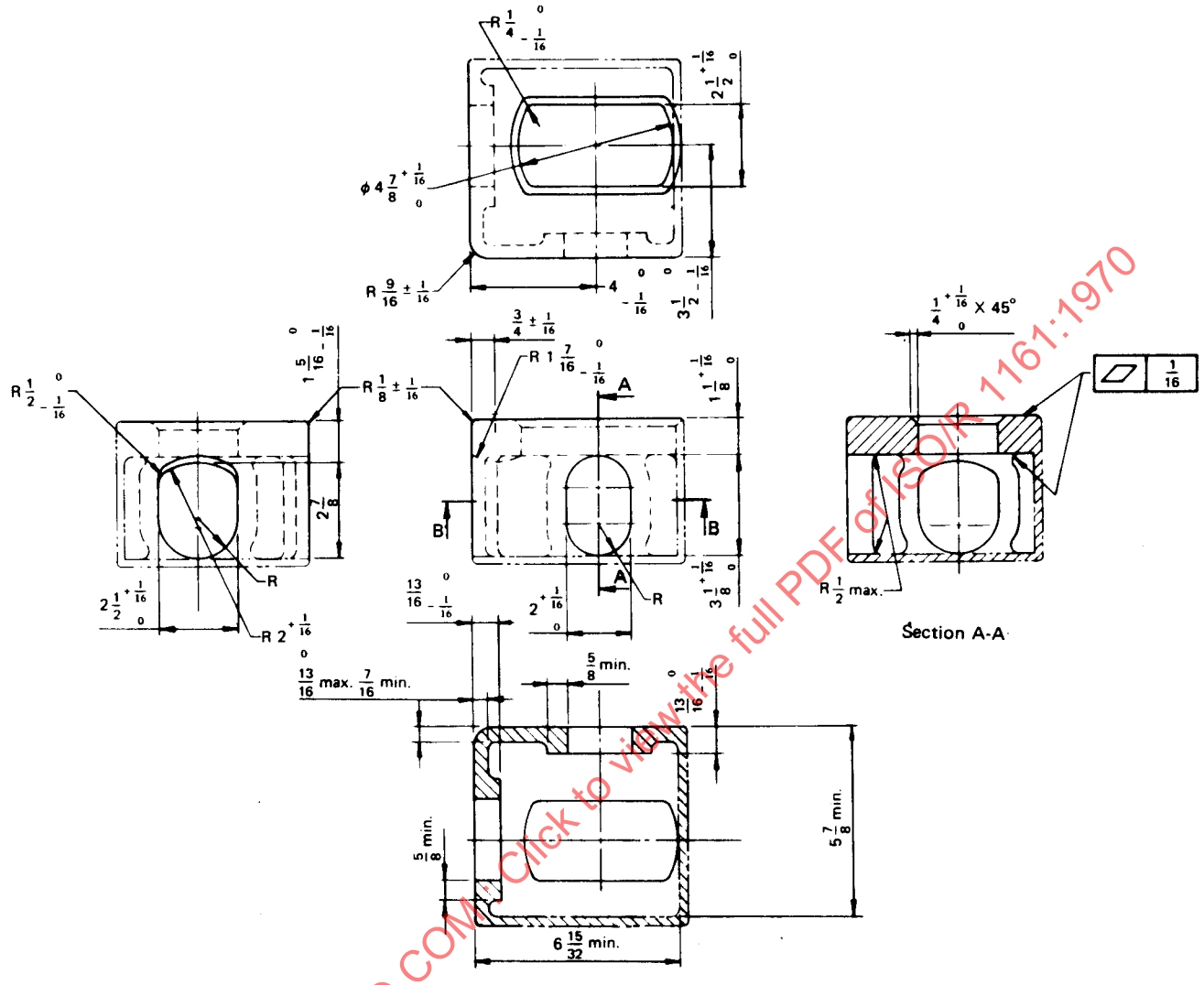
1. Solid and dotted lines (— and - - -) show surfaces and contours which must be physically duplicated in the fitting.

2. Phantom lines (— - - — - -) show optional walls, which may be used to develop a box-shaped fitting.

3. Outside and inside corner radii where sharp corners are shown must be 3 mm maximum except as noted.

4. Four fittings are required per container : two right-hand and two left-hand.

FIG. 2 – **Top corner fitting – Dimensions in millimetres**



NOTES

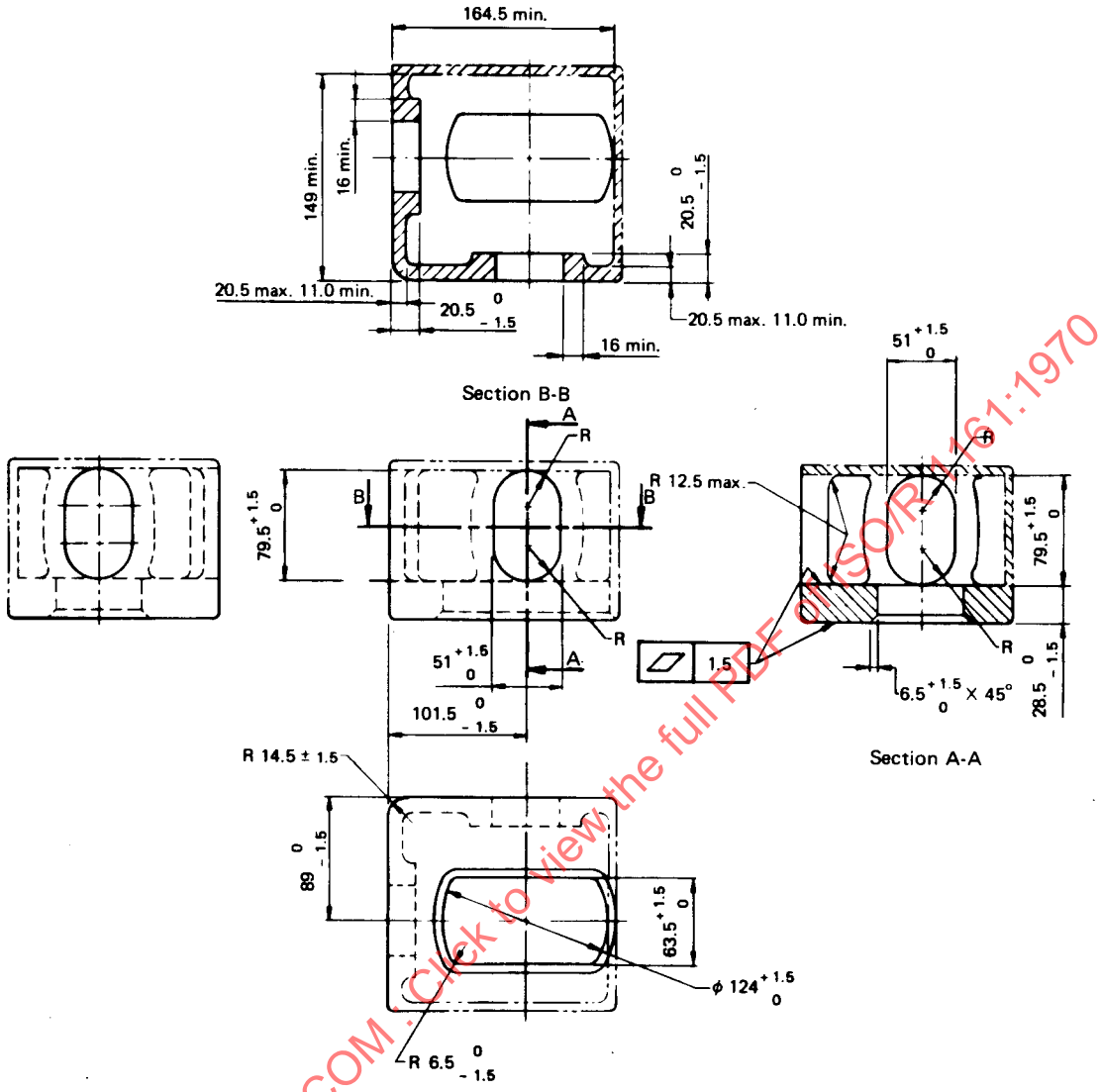
1. Solid and dotted lines (—— and – – –) show surfaces and contours which must be physically duplicated in the fitting.

2. Phantom lines (—— · · —— · ·) show optional walls, which may be used to develop a box-shaped fitting.

3. Outside and inside corner radii where sharp corners are shown must be $\frac{1}{8}$ in maximum except as noted.

4. Four fittings are required per container : two right-hand and two left-hand.

FIG. 3 – **Top corner fitting – Dimensions in inches**



NOTES

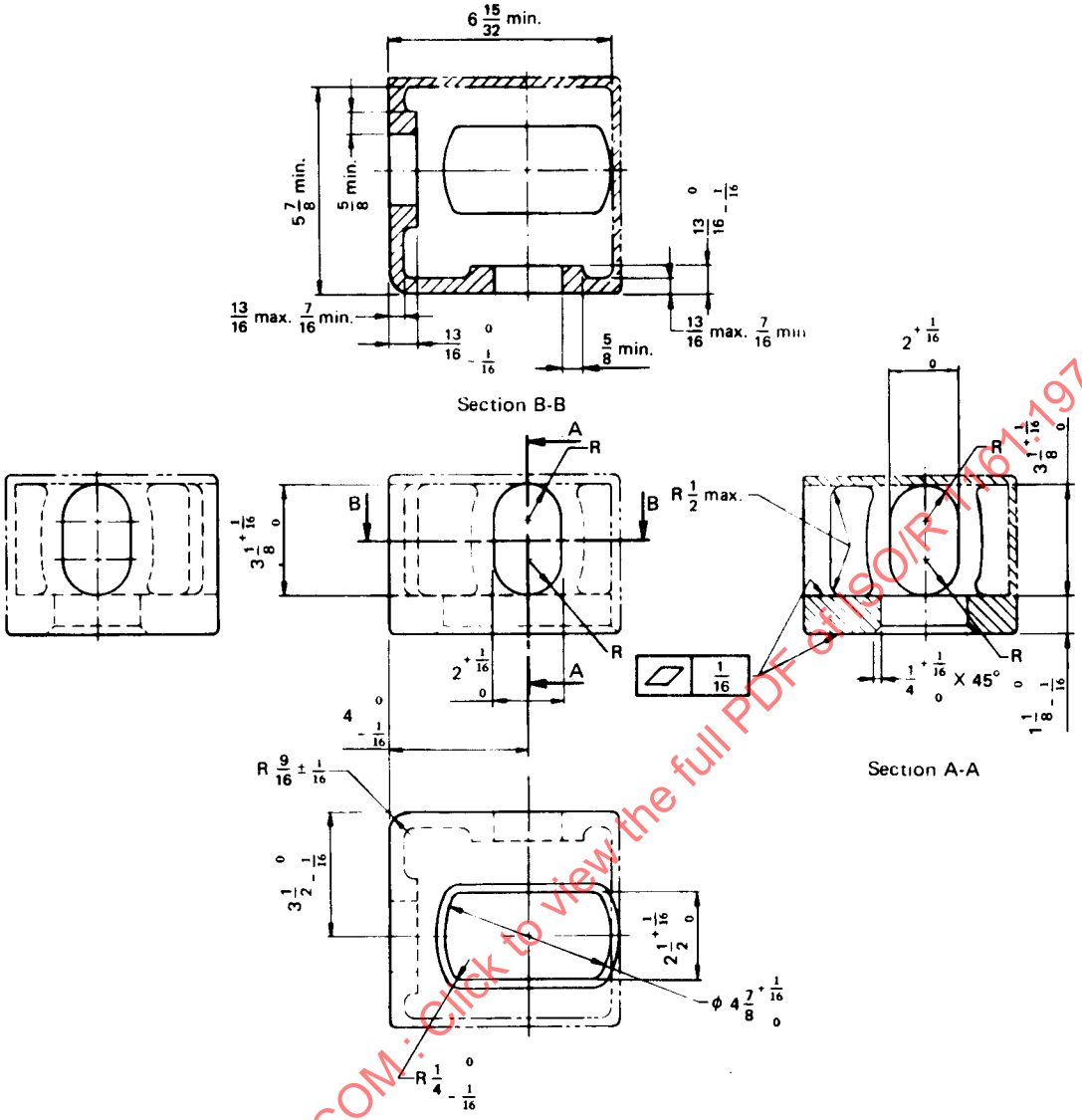
1. Solid and dotted lines (—— and – – –) show surfaces and contours which must be physically duplicated in the fitting.

2. Phantom lines (—— – – —— –) show optional walls, which may be used to develop a box-shaped fitting.

3. Outside and inside corner radii where sharp corners are shown must be 3 mm maximum except as noted.

4. Four fittings are required per container : two right-hand and two left-hand.

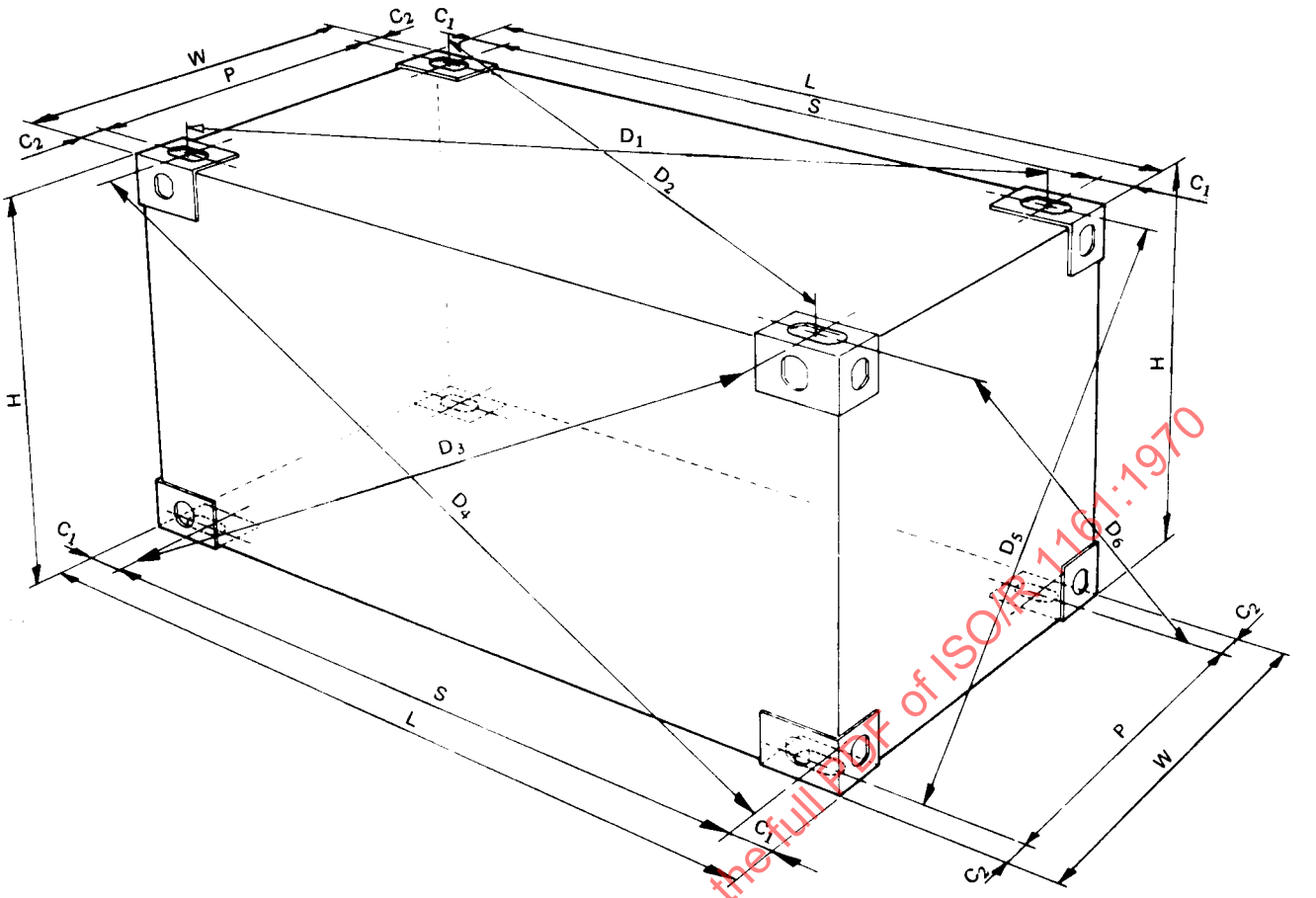
FIG. 4 – **Bottom corner fitting – Dimensions in millimetres**



NOTES

1. Solid and dotted lines (—— and - - -) show surfaces and contours which must be physically duplicated in the fitting.
2. Phantom lines (—— - - ——) show optional walls, which may be used to develop a box-shaped fitting.
3. Outside and inside corner radii where sharp corners are shown must be $\frac{1}{8}$ in maximum except as noted.
4. Four fittings are required per container : two right-hand and two left-hand.

FIG. 5 – **Bottom corner fitting – Dimensions in inches**



S = Length between centres of apertures in corner fittings

P = Width between centres of apertures in corner fittings

C_1 = Corner fitting measurement $101.5\ ^{0}_{-1.5}$ mm $\left(4\ ^{0}_{-1/16}\ \text{in}\right)$

C_2 = Corner fitting measurement $89\ ^{0}_{-1.5}$ mm $\left(3\tfrac{1}{2}\ ^{0}_{-1/16}\ \text{in}\right)$

L = External length of the container

W = External width of the container

D = Distance between centres of apertures, or projected reference points therefrom, of diagonally opposite corner fittings, resulting in six measurements : D_1, D_2, D_3, D_4, D_5 and D_6

K_1 = Difference between D_1 and D_2 or between D_3 and D_4 ; i.e. $K_1 = |D_1 - D_2|$ or $K_1 = |D_3 - D_4|$

K_2 = Difference between D_5 and D_6 ; i.e. $K_2 = |D_5 - D_6|$

H = Overall height

FIG. 6 – **Assembled corner fittings – Diagonal tolerances**
(see Table opposite page)

TABLE – **Dimensions and tolerances in millimetres and in feet and inches**

Freight container designation	Length (external)				*S*			*P*			K_1 max.		K_2 max.	
	mm	ft	–	in	mm	ft	– in	mm	ft	in	mm	in	mm	in
1A	12 190 $^{+2}_{-8}$	40	0	$^{0}_{-3/8}$	11 985	39	3 $\frac{7}{8}$	2 259	7	4 $\frac{31}{32}$	19	$\frac{3}{4}$	10	$\frac{3}{8}$
1B	9 125 $^{0}_{-10}$	29	11 $\frac{1}{4}$	$^{0}_{-3/8}$	8 918	29	3 $\frac{1}{8}$	2 259	7	4 $\frac{31}{32}$	16	$\frac{5}{8}$	10	$\frac{3}{8}$
1C	6 055 $^{+3}_{-3}$	19	10 $\frac{1}{2}$	$^{0}_{-1/4}$	5 853	19	2 $\frac{7}{16}$	2 259	7	4 $\frac{31}{32}$	13	$\frac{1}{2}$	10	$\frac{3}{8}$
1D	2 990 $^{+1}_{-4}$	9	9 $\frac{3}{4}$	$^{0}_{-3/16}$	2 787	9	1 $\frac{23}{32}$	2 259	7	4 $\frac{31}{32}$	10	$\frac{3}{8}$	10	$\frac{3}{8}$

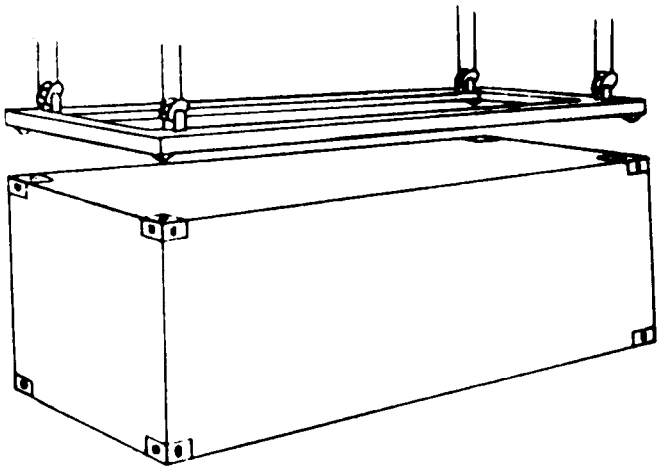
Width (external) – Containers 1A, 1B, 1C, 1D : 2 435 $^{+3}_{-2}$ mm (8 ft 0 $^{0}_{-3/16}$ in)

Height (external) – Containers 1A, 1B, 1C, 1D : 2 435 $^{+3}_{-2}$ mm (8 ft 0 $^{0}_{-3/16}$ in)

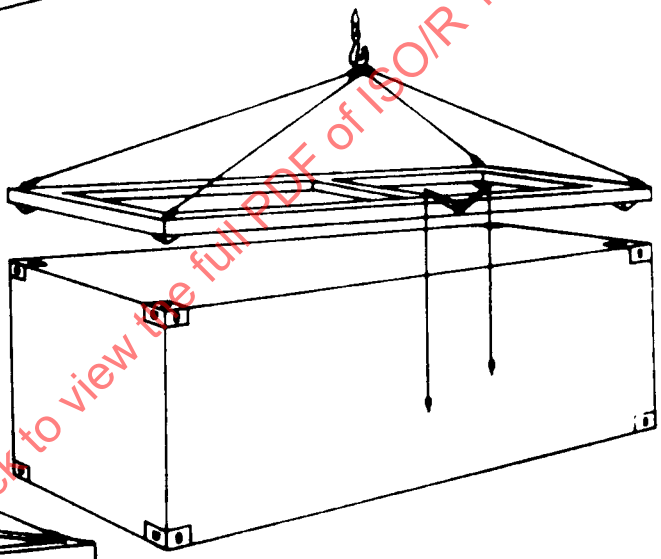
NOTE. – Attention of manufacturers is drawn to the vital importance of accurately maintaining the reference dimensions of *S* and *P*. The tolerances to be applied to *S* and *P* are governed by the tolerances shown for the overall length and width in this ISO Recommendation and in ISO Recommendation R 668.

ANNEX A

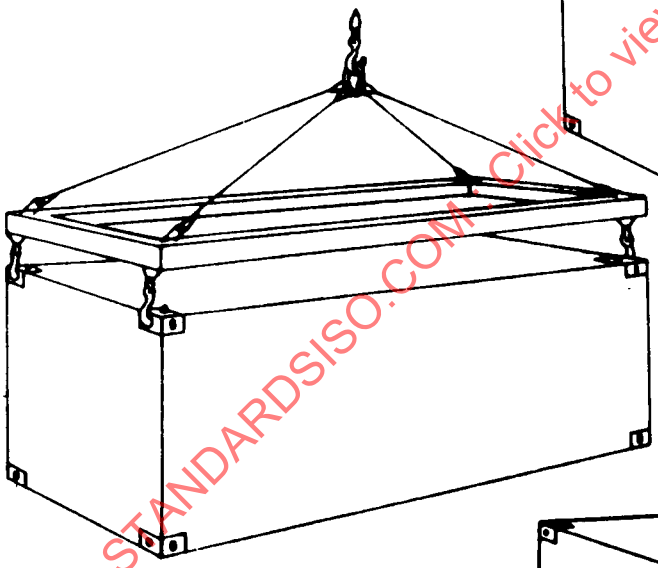
TYPICAL HANDLING AND SECURING DEVICES



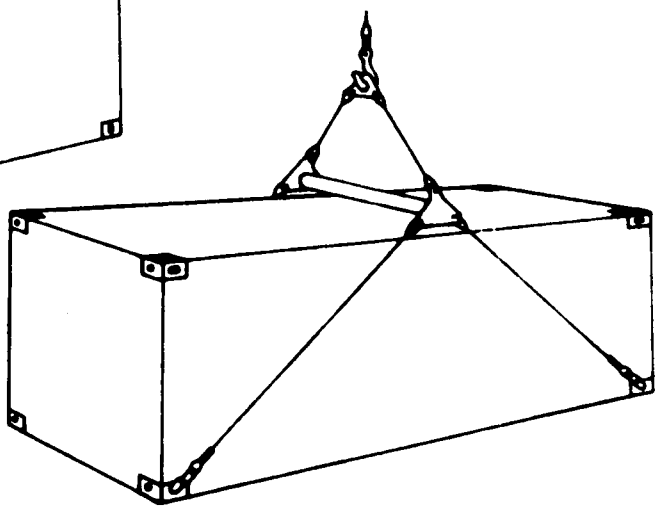
(*a*) *Top lift automatic by means of spreader twist locks*



(*b*) *Top lift semi-automatic by means of spreader twist locks*

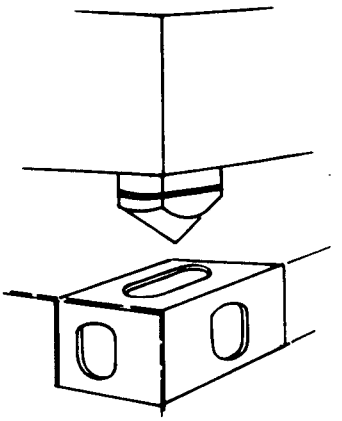


(*c*) *Top lift manual by means of hooks or clevis*

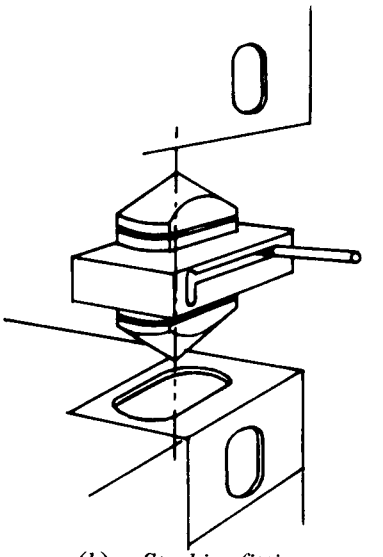


(*d*) *Bottom lift by means of slings*

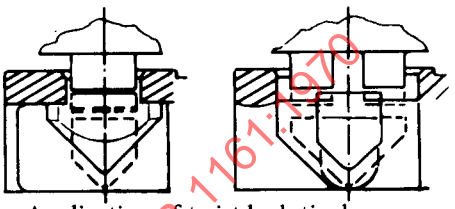
FIG. A.1 – **Examples of methods of lifting containers by corner fittings**



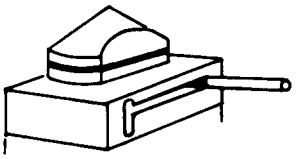
(*a*) *Spreader twist lock*



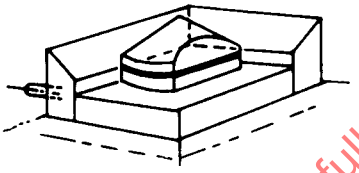
(*b*) *Stacking fitting*



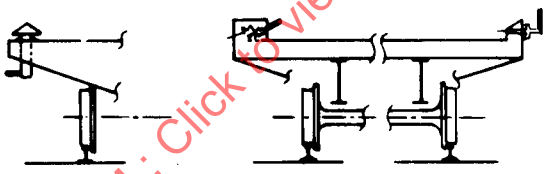
Application of twist lock tie-down fitting (shown inverted with respect to drawing (*c*)) and stacking fitting.



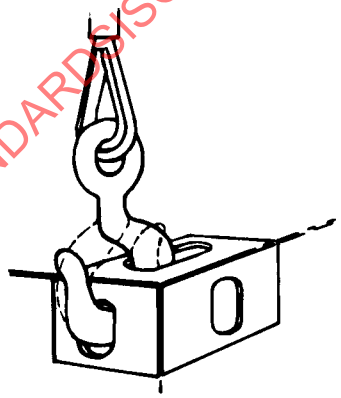
(*c*) *Tie-down fitting*



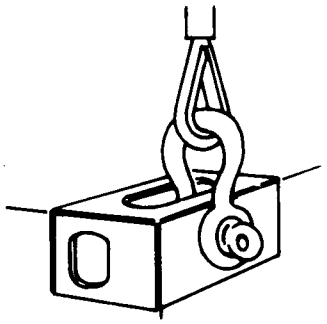
(*d*) *Tie-down with corner guidance*



(*e*) *Flush tie-down mounting* (*f*) *Bolster with throw-bolt lock from front or side*



(*g*) *Hook engagement*



(*h*) *Clevis engagement*

FIG. A.2 – **Examples of corner fitting engaging, lifting and securing devices**

ANNEX B

TYPICAL HANDLING AND SECURING METHODS

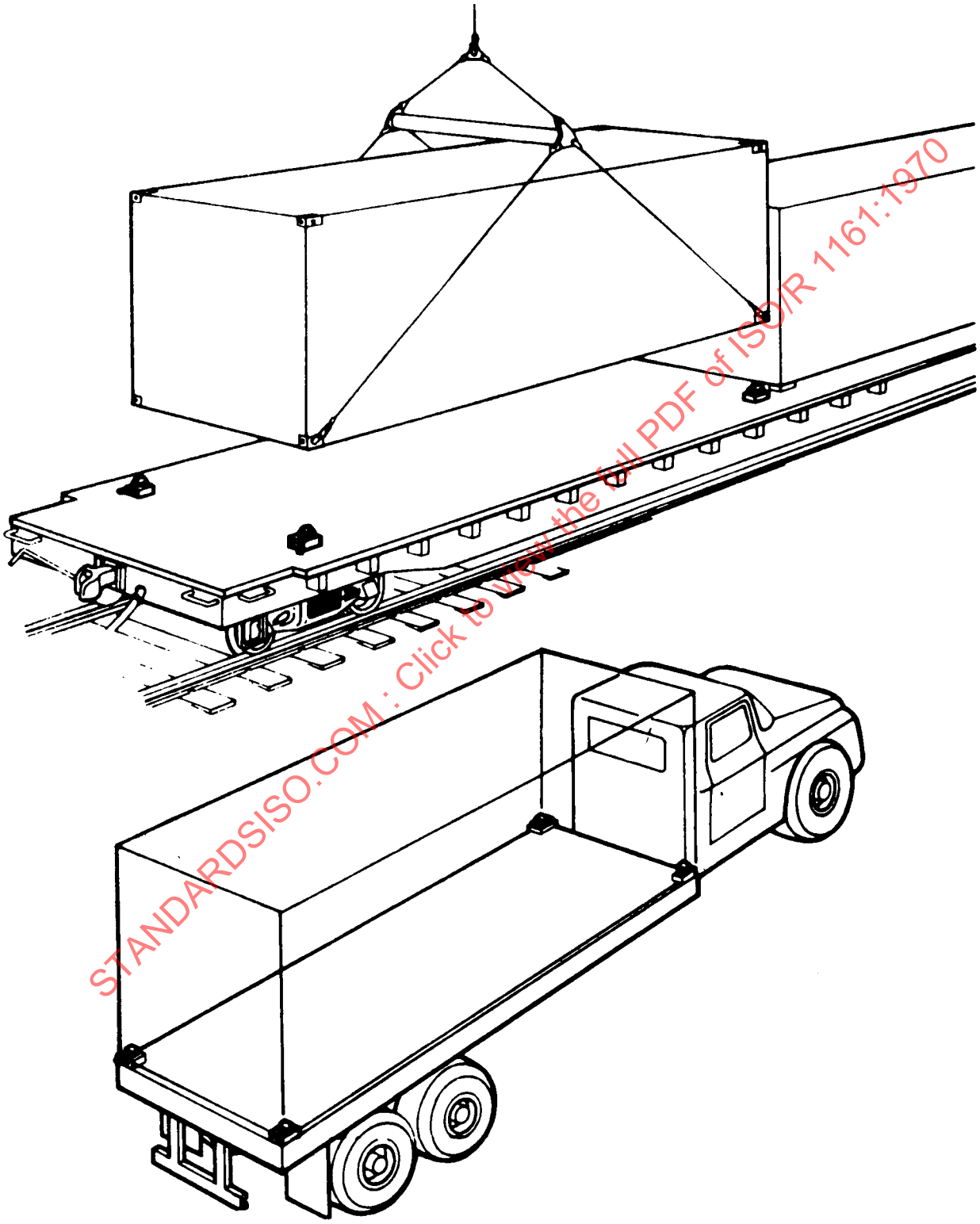
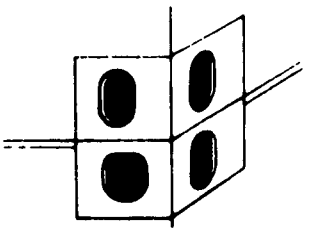
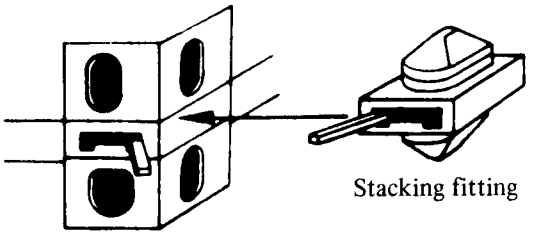


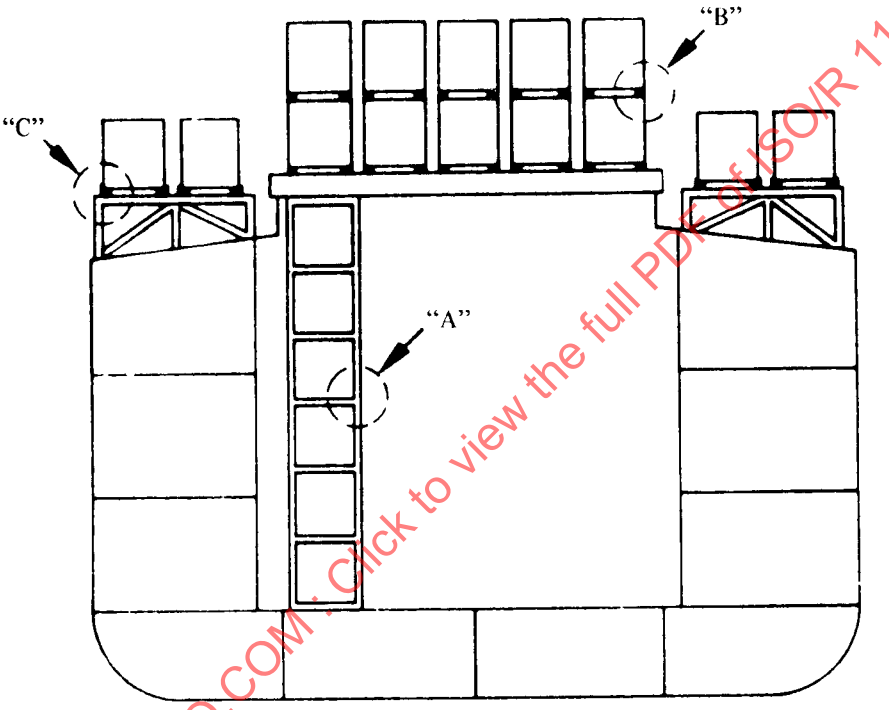
FIG. B.1 – Example of use of corner fittings in railway and road vehicle applications



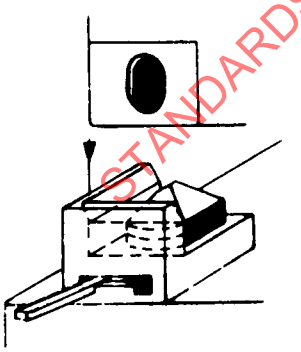
View "A"
Horizontal restraint
provided by ship's cell



View "B"
Stacking fitting provides
horizontal and vertical restraint



Example of container ship cross-section



View "C"
Example of deck securing fitting which provides
gathering plus both horizontal and vertical restraint

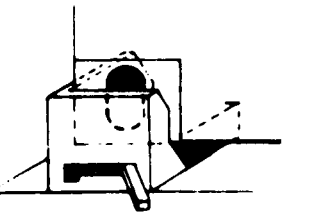


FIG. B.2 **Examples of use of corner fittings on ships**
(In vertical container cells and on deck)

ANNEX C

CORNER FITTING DESIGN CRITERIA

The following design criteria were used in establishing the dimensional design of corner fitting specified in this ISO Recommendation.

C.1 GENERAL CONSIDERATIONS

The designer of corner fittings should consider

(*a*) the tensile strength of the material to be used;

(*b*) the loads which the fittings will have to withstand;

(*c*) the dimensions of the fittings.

A knowledge of any two of these factors allows the third factor to be deduced.

C.2 DEFINITION OF LOADS

Corner fittings for series 1 freight containers should withstand the loads calculated for the 1A container, as listed in the following clauses.

C.2.1 Stacking

	Design load service conditions	*Design load test conditions*
Top corner fitting (Superimposed load offset 25.4 mm (1 in) laterally and 38 mm (1 $\frac{1}{2}$ in) longitudinally)	680 kN (69 000 kgf or 68 tonf)	680 kN (69 000 kgf or 68 tonf)
Bottom corner fitting (resting on flat support)	810 kN (82 000 kgf or 81 tonf)	810 kN (82 000 kgf or 81 tonf)
Bottom corner fitting (of No. 5 container offset 25.4 mm (1 in) laterally and 38 mm (1 $\frac{1}{2}$ in) longitudinally with respect to No. 6 container)	680 kN (69 000 kgf or 68 tonf)	680 kN (69 000 kgf or 68 tonf)

NOTE. – It is considered unnecessary to increase the test load above the operational load in view of the low probability of the operational load being encountered.

C.2.2 Lifting

Top corner fitting (twist lock, hook or shackle)	75 kN (7 600 kgf or 7.5 tonf)	150 kN (15 200 kgf or 15 tonf)
Bottom corner fitting : sling at 30° to horizontal	150 kN (15 200 kgf or 15 tonf)	300 kN (30 400 kgf or 30 tonf)

NOTES

Bottom corner fitting lifting

1. The line of action of the sling load is assumed to be parallel to and not more than 38 mm (1 $\frac{1}{2}$ in) from the outer face of the corner fitting.
2. 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.