



**2019**

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**Guidance for  
Freight Containers**

## **APPLICATION OF "Guidance for Freight Containers"**

1. Unless expressly specified otherwise, the requirements in this Guidance when the application for certification of containers is dated on or after 1 July 2019.
2. The amendments to the Guidance for 2018 edition and their effective date are as follows;

**Effective Date 1 July 2019**

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### **CHAPTER 2. CONSTRUCTION AND CERTIFICATION OF FREIGHT CONTAINERS**

Appendix 2-1 Approval Certificate for Manufacturing Process

- has been amended.

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# CHAPTER 1 GENERAL

## Section 1 General

### 101. Application

1. This Guidance is to apply to the procedure for application, tests, method of production unit inspections and certificates, etc. of freight containers (hereinafter referred to as "container")
2. At the request of container owner, the test and inspection for containers not specified in this Guidance may be carried out in accordance with the provisions of International Convention for Safe Containers, 1972 (hereinafter referred to as "**CSC Convention**"), the provisions of UIC Code 590, and 592-3, the provisions of the Customs Convention on the International Transport of Goods under cover of TIR Carnets 1975 (hereinafter referred to as "**TIR Convention**") and Customs Convention on Containers, 1972 under the authority granted by the contracting governments and with the domestic law and regulation.

## Section 2 Definitions

### 201. Definitions

The definitions of terms and symbols used in this Guidance, except otherwise specified, are to be in accordance with this section.

1. **Tare**(*T*) means the mass of the empty container including permanently affixed ancillary equipment.
2. **Maximum operating gross mass** or **rating** (*R*) means the maximum allowable sum of mass of the container and its cargo. An inertial force is indicated as  $R_g$  based on the gravitational forces derived from *R*.
3. **Maximum permissible payload** (*P*) means the difference between maximum operating gross mass or rating and tare. An inertial force is indicated as  $P_g$  based on the gravitational forces derived from *P*.
4. **Load** when used to describe a physical quantity to which unit may be ascribed, means mass.
5. **Loading**, for example, as in "Internal loading" means force.
6. **Standard acceleration of gravity** (*g*) equals  $9.8 \text{ m/s}^2$
7. **Overall external dimensions** mean the maximum external overall dimensions of the container including any permanent attachments, and are designated by *H*(height), *W*(width) and *L*(length) respectively.
8. **Internal dimensions** mean the minimum internal dimensions of the container such as height, width and length including any permanent attachments except corner fittings.
9. **Type approval inspection** means the test and inspection which are carried out, in advance, to affirm that containers are manufactured in accordance with the provisions of this Guidance, before approved as design type by the relevant Government.
10. **Prototype** means a container representative of those manufactured or to be manufactured in a design type-series.
11. **Design type-series container** means any container manufactured in accordance with the approved design type.
12. **Production unit inspection** means the test and inspection which are carried out to verify that the design type-series containers that have been produced are equal to the prototype containers.

## 202. Designation of containers

Designation of containers applied by the Guidance is given in **Table 1.1** according to the nominal dimensions.

**Table 1.1 Designation of Container according to the nominal Dimension**

Nominal length(ft)	Nominal height			
	9' 6"	8' 6"	8' 0"	< 8' 0"
45	1EEE	1EE	-	-
40	1AAA	1AA	1A	1AX
30	1BBB	1BB	1B	1BX
20	-	1CC	1C	1CX
10	-	-	1D	1DX
Note : All units have a nominal width of 8 ft				



# CHAPTER 2 CONSTRUCTION AND CERTIFICATION OF FREIGHT CONTAINERS

## Section 1 General

### 101. General

#### 1. Application

- (1) The requirements in this Chapter are to apply to the procedure for application, tests, method of production unit inspections and certificates, etc. of containers when type approval test and production unit inspection of containers are required to be carried out by the Society in accordance with the provisions of relevant rules of type approval for containers of CSC Convention.
- (2) Where deemed necessary by the Society or specially required by the Owner, the Society may carry out other tests and production unit inspection not provided in this Chapter.

#### 2. Extent of application

The requirements in this Chapter applies to the following containers, in general:

- (1) Of a permanent character and accordingly strong enough to be suitable for repeated use.
- (2) Specially designed to facilitate the transport of goods, by one or more modes of transport, without intermediate reloading.
- (3) Designed to be secured and/or readily handled, having corner fittings for these purpose.
- (4) Of such a size as the area enclosed by the four other bottom corners either at least 14 m<sup>2</sup> (150 ft<sup>2</sup>) or at least 7 m<sup>2</sup> (75 ft<sup>2</sup>) if it is fitted with top corner fittings.

#### 3. Equivalency

The relevant portions of this Chapter apply also to containers of special types not fully covered in this Chapter in association with additional requirements as may be considered appropriate in an individual case.

### 102. Containers for transport of dangerous goods

For specially designed containers for transport of dangerous goods or bulk liquid, the Society may comply with the relevant Government Regulations and International Standards related to the special condition on structure and safety of such containers.

### 103. Type approval under the provisions of International Convention, etc.

1. The Society will carry out tests, inspection and approval of containers in accordance with the provisions of CSC Convention under the authority granted by the contracting governments and with the domestic law and regulation.
2. The Society will carry out tests and approval of containers in accordance with the provisions of *UIC Code 590*, and *592-3* under the authority granted by Korean National Railway (KNR).
3. The tests, inspection and approval of containers according to above **Pars 1** and **2** are to be in accordance with the requirements in this Chapter and at the discretion of the Society.

### 104. Fees

Fees to be charged for the tests, inspection and production unit inspection of containers carried out by the Society are to be in accordance with fee regulations of the Society and fee regulation for statutory survey.



## Section 2 Approval of Manufacturing Process

### 201. Application

1. The manufacturers wishing to obtain the type approval are to obtain the approval of manufacturing process, in advance, in accordance with the requirements in this Section.
2. The manufacturers wishing to obtain the approval of manufacturing process are to maintain and demonstrate the efficient quality control arrangements to ensure that the production of series containers produced is in conformity with the prototype container approved by the Society.

### 202. Approval application

1. The manufacturer wishing to obtain the approval of manufacturing process is to submit a copy of the approval application form of the Society together with three copies of the required data and information to the Society.
2. **Data to be submitted**
  - (1) An outline, history of the works and organization
  - (2) An outline of containers intended to be built and the manufacturing process
  - (3) Main facilities for the production
  - (4) Facilities for testing
  - (5) Process of the quality control including the manufacturer's standards for inspection and the organized system of quality control internal audits and corrective actions.
  - (6) Marking method of manufacturer's serial numbers, etc.
  - (7) Major supplier of material of container
  - (8) Other data deemed necessary by the Society
3. Notwithstanding the requirements in **Par 1**, where the applicant is already approved by the Society and the attachments are entirely equal in content to the documents previously submitted to the Society, the documents may be partly exempted from submission.
4. Where a part of the manufacturing process is shared by other companies or other manufacturing plants, documents related to the manufacturing process showing the names and addresses of the other companies and plants together with the organization and method of inspection for purchasing semi-final products are to be included.

### 203. Document review

1. The Society examines the documents submitted and where deemed appropriate, the documents are approved and returned to the manufacturer.

#### 2. Review of quality control system

The manufacturers wishing to obtain the approval of manufacturing process are to be satisfied with the following requirements in accordance with the quality control system.

- (1) Line of responsibility of the quality control department, which is to be independent of production department, and responsibility of the person in charge and the responsible person of quality control system is to be clearly defined.
- (2) Arrangements for introducing approved design/ production changes and ensuring that they are acted upon at the appropriate production stage.
- (3) Arrangements to ensure that supplies and services from sub-suppliers meet with design requirements. Identifiable test data for materials and components are to be available.
- (4) Jigs suitable for maintaining dimensional accuracy during repeated use are to be provided at mainframe assembly points. Jig dimensions are to be periodically verified by the quality control department.
- (5) Arrangements to ensure a proper storage of stock materials and spare parts and approved fabrication procedures and qualified personnel are to be engaged in fabricating container components and in container assembling.
- (6) Rejection procedure and rejected component identification arrangements are to be clearly defined.

- (7) Records of inspection, tests and results of checks and corrections are to be complete and reliable for each container. The record of inspection is to contain the manufacturer's identification numbers, dates of delivery and names and addresses of purchasers.
- (8) All stages listed above (1) to (7) together with final dimensional examinations necessary must be under the responsibility of the quality control department.

## 204. Plant audit

### 1. Purpose

The Society will, where deemed appropriate upon review of documents and data submitted, carry out the plant audit in the presence of the Surveyor to verify that the manufacturer has a technical capability to continuously produce the proposed container of equal level in quality under the stable workmanship to the satisfaction of the Society.

### 2. Items to be audited

Plant audit is to apply to the following items in the presence of the Surveyor.

- (1) Status and capacity of production and testing facilities
- (2) Organization and system of production of quality control
- (3) Manufacturer's standard or criteria of quality control, flow of production and workmanship

### 3. Time for audit

The plant audit for approval is, in general, to be carried out so far as practicable during the construction of test containers for the type approval.

## 205. Approval test

1. The approval test is to be carried out in the presence of the surveyor in accordance with the test method described in each section of **Ch 2** or equivalent method thereof. However, the test may be partly or entirely omitted subject to the approval by the society in case any of the following (1) or (2) is relevant.
  - (1) In case where the manufacturer has been approved by other classification society or an inspection organization recognized by the society.
  - (2) In case of approval test for the lower grade products manufactured by the similar methods which have been approved by the Society.
2. In principle, the approval test is to be carried out at the manufacturing sites. However, it may be done at an outside of manufacturing sites subject to the society's approval.
3. The test containers used for the approval test are to be selected, as a rule, from the same conditions of products in the presence of the surveyor or during the examination of works as far as practicable.

### 4. Test records

After completion of the approval test, the manufacturer is to prepare a record of the approval test and is to submit three copies to the Society upon receiving confirmation by the surveyor.

## 206. Notification and announcement of approval

1. The Society shall issue an Approval Certificate for Manufacturing Process, where deemed appropriate by the Society on the basis of the submitted test reports and plant audit results after completion of the approval test.
2. The Society announces the manufacturers who have been granted the approval of manufacturing process in the "List of Approved Manufacturer & Type Approved Equipment" containing the types of products and the main conditions of approval.

**207. Changes in the manufacturing process**

1. When the alteration to the manufacturing facilities, manufacturing methods and/or quality control system has a significant effect on the property or quality of the containers, or when the works was moved, the manufacturer obtained the approval of manufacturing process is to submit the application of alteration to the Society together with the detailed documents of the alteration (where practicable, to be mentioned with comparison table form between new and old), and they are to be approved by the Society.
2. The Society may request an plant audit, where deemed necessary upon reviewing the contents of alteration.
3. For the insignificant alterations, the manufacturer is to give the contents of alteration to the Surveyor for confirmation at the appropriate time. In this case the Surveyor is to report the contents of alteration to the Head Office.

**208. Withdrawal of approval**

The Society may withdraw the approval of manufacturing process in case any of the following (1) through (4) is relevant.

- (1) When test records differ from the time of approval and do not satisfy the approval conditions.
- (2) When a request for withdrawal is made by the manufacturer.
- (3) When the container is manufactured without approval of the changes in the manufacturing process according to the requirements specified in **206**.
- (4) When considered inappropriate by the Society.

**209. Review of quality control system and manufacturing method**

The surveyor will keep the quality control arrangements and workmanship under continuous review.

## Section 3 Type Approval Inspection

### 301. Application

1. The requirements in this Section apply to the type approval tests carried out by the Society, before the container manufacturers obtain the type approval from the Government in accordance with the provisions of relevant rules of type approval for containers of CSC Convention.
2. The requirements in this Section apply also to the type approval tests carried out in accordance with the requirements in **Ch 2, 205**.

### 302. Approval application

1. The manufacturer wishing to obtain the type approval tests is to submit a copy of the approval application form of the Society together with three copies of the required data and information to the Society.
2. **Data to be submitted**
  - (1) Specifications
  - (2) Plans showing in detail the quality of materials to be used, scantlings and arrangements of structural members and their connections.
  - (3) Plans showing in detail the marking, manufacturer's name plate and safety approval plate.
  - (4) Type approval testing manual.
  - (5) In case of thermal containers, the following plans are to be added.
    - (a) Insulating construction (including kinds of material of insulation, data of heat transmission and details on method of insulating work).
    - (b) Ventilating devices and drainage.
  - (6) In case of tank containers, the following plans are to be added.
    - (a) Drawings of the tank showing full details and fitting details of valves, nozzles and other fittings.
    - (b) Arrangement and full details of the valves, nozzles and other fittings.
    - (c) Full details of the pressure relief devices.
  - (7) Other data deemed necessary by the Society.

### 303. Document review

The Society examines the documents submitted, and where deemed appropriate, the documents are approved and returned to the manufacturer.

### 304. Approval inspection

1. The prototype unit of each type of container proposed for type approval is required to undergo and pass the approval tests specified in **Sec 6 to 8**.
2. For specially designed containers constructed in accordance with other standards than those in this Section, the approval test requirements are to be complied with relevant international standards or equivalent thereto which are considered proper by the Society.
3. The Society may require further tests and inspection in addition to those specified in the Rules, when necessary

### 305. Prototype inspection certificate

The Society will issue a freight container prototype test certificate to the design type of container having satisfactorily undergone and passed the document review and type approval inspection in accordance with the requirements in **303**. and **304**.

### 306. Approval Inspection for the design type alterations

A type of container is assumed to include those built in accordance with the same basic design and specifications. However, the Society may consider it the same type as the original one even if minor alteration to the structural arrangements, variations in the fittings or variation of configuration and size of members are made in containers of the type already approved.

## Section 4 Production Unit Inspection

### 401. Application

The requirements in this Section are applied to production unit inspection of containers that have been approved by a design type. For containers of special types not fully covered in this Chapter, tests and inspections are to be carried out in accordance with the discretion of the Society .

### 402. Application of production unit inspection

The prototype container manufacturer having satisfactorily passed the type approval test of **Ch 2, 304.** is to submit a copy of the production unit inspection application form of the Society to obtain the production unit inspection of type-series container manufacture.

### 403. Kinds of production unit inspection

The kinds of production unit inspection for type series containers are given in **Table 2.1.**

**Table 2.1 Kinds of production unit inspection for type-series containers**

Kinds of container	Kinds of test	Frequency
General Cargo Container	<ul style="list-style-type: none"> <li>· Visual inspection</li> <li>· Dimensional inspection</li> <li>· Weather tightness test</li> </ul>	for each container
	<ul style="list-style-type: none"> <li>· Mass measurement</li> <li>· Top lifting</li> <li>· Floor strength</li> </ul>	for one container selected at random from every fifty containers
Thermal Container	<ul style="list-style-type: none"> <li>· Same as the General Cargo Container</li> </ul>	Same as the General Cargo Container
	<ul style="list-style-type: none"> <li>· Airtightness tes.</li> <li>· Operation test for refrigerating unit or heating appiiance</li> </ul>	for each container
	<ul style="list-style-type: none"> <li>· Thermal test</li> <li>· Performance test of refrigerating unit</li> </ul>	for one container selected at random from every fifty containers
Tank Container	<ul style="list-style-type: none"> <li>· Same as the General Cargo Container</li> </ul>	Same as the General Cargo Container
	<ul style="list-style-type: none"> <li>· Pressure test</li> </ul>	for each container

### 404. Production unit inspection procedure

1. The surveyor may properly modify kinds and their production unit inspection specified in **403.** in accordance with the requirements in each Section of this Chapter.
2. The surveyor may properly modify kinds and their frequencies specified in **403.** depending on the test results previously obtained. The foregoing test results and inspections carried out by the manufacturer may be accepted where they have been executed to the satisfaction of the Society.

### 405. Review of documents

The manufacturer is required to keep the record of production unit inspection, quality control and maker's checks to be complete and reliable for each container and submitted for a review of the Society when requested.

### 406. Certificates

The Society will issue a container production certificate to the type-series container having satisfactorily undergone production unit inspection in accordance with the requirements in **404.**

## Section 5 Certificate and Identification

### 501. Application

1. The requirements in this Section are applied to the certification and identification of containers which are undergone and passed the prototype test or production unit inspection by the Society.
2. Identification of containers, otherwise specified in this chapter, is to be complied with the requirements of *ISO 6346* (coding, identification and marking)
3. Identification of containers for transport of dangerous goods is to be complied with the relevant Government regulations and *IMDG Code* (international maritime dangerous goods code), etc. in addition to the requirements in this chapter.

### 502. Certificates

1. Approval certificate for manufacturing process (form no. AC-1) shown in **appendix 2-1** will be issued to the manufacturers which have been examined and approved by the Society.
2. The Society will issue freight container prototype test certificate (form no. CTC-2) shown in **appendix 2-2** to the prototype container which is satisfactorily passed the type approval test of the Society.
3. The Society will issue a container production certificate (form no. CTC-3) shown in **appendix 2-3** to the type-series containers having satisfactorily carried out production unit inspection of the Society.

### 503. Marking

#### 1. Marking items

For each container which satisfactorily carried out production unit inspection by the Society, the manufacturer, at least, is to indicate the following markings.

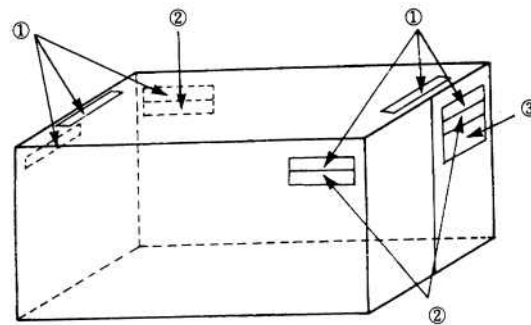
- (1) General cargo containers and thermal containers without refrigerating units
  - (a) Owner's mark, serial number and check digit
  - (b) Size and type code
  - (c) Rating
  - (d) Tare
- (2) Thermal containers with refrigerating units
  - (a) Items prescribed in (1).
  - (b) Type of refrigerating unit, date of manufacture, and kind of refrigerant.
  - (c) Output, revolution, rated voltage, frequency and serial number of phases of the electric motor for refrigerant compressor.
  - (d) Type of electric source (classification of electric source, I, II or III prescribed in the ISO 1496-2)
  - (e) Full load current and total starting current
  - (f) Minimum internal temperature and ambient temperature (when the condenser is of aircooled)
- (3) Tank containers
  - (a) Items prescribed in (1).
  - (b) Maximum allowable working pressure
  - (c) Total capacity
  - (d) Ullage
  - (e) Test pressure
  - (f) Date of original hydro test
  - (g) Next due date of hydro test
- (4) All maximum operating gross mass markings on the container are to be made consistent with the maximum operating gross mass information on the safety approval plate.
- (5) Where the containers are provided with cargo hanging arrangements, the maximum service load is to be marked at easily visual position on the internal wall of the containers.

## 2. Warning marks

The containers which have larger dimensions or greater maximum operating gross mass than those specified in **Ch 2, 603**, may have warning marks to draw the operator's or carrier's attention.

## 3. Marking locations

- (1) The marking items prescribed in **Par 1 (1)** to the containers are to be made as specified in **Fig 2.1**.
- (2) The marking items, otherwise specified in (1), are to be properly attached to the containers at easily visible position on door of container.



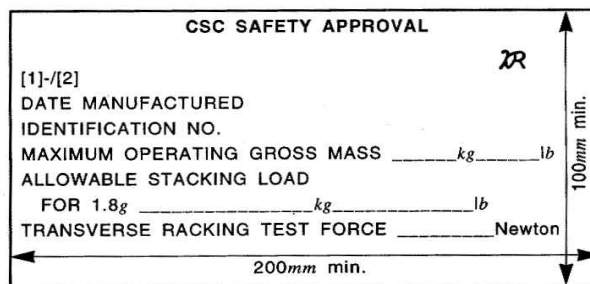
**NOTES:**

- (1) Owner's mark, serial number and check digit
- (2) Size and type code
- (3) Rating and tare (*kg* and *lb*)

**Fig 2.1 Marking Locations**

## 504. Safety approval plate

1. Each container which constructed in accordance with the approved design type and satisfactorily passed production unit inspection of the Society is to be affixed the safety approval plate for CSC Convention shown in **Fig 2.2** with the Society's inspection stamp.



**NOTES:**

- (1) On line 1, [1] is Country of approval indicated by the distinguishing code and [2] is Approval Reference.
- (2) The Plate is to permanent, non-corrosive and fire proof and is to be permanently affixed to the container.
- (3) The word "CSC SAFETY APPROVAL" is to a minimum letter height of 8mm and other words and numbers a minimum height of 5mm. They are to be stamped into, embossed on or indicated on plate surface in any other permanent and legible way.
- (4) End and Side Wall Strength to be indicated on plate only if these walls are designed to withstand a force of less or greater than 0.4Pg and 0.6Pg respectively.
- (5) If Plate is used for the purpose of showing maintenance dates a blank space is to be reserved at the bottom.
- (6) One door off stacking strength to be indicated on plate only if the container is approved for one door off operation. The marking shall show: ALLOWABLE STACKING LOAD ONE DOOR OFF FOR 1.8g(...kg...lbs). This marking shall be displayed immediately near the stacking test value.
- (7) One door off racking strength to be indicated on plate only if the container is approved for one door off operation. The marking shall show: TRANSVERSE RACKING TEST FORCE(...newtons). This marking shall be displayed immediately near the racking test value.

**Fig 2.2 Safety Approval Plate**

2. Inspection stamp of this Society is as specified in **Fig 2.3**.



**Fig 2.3** Inspection Stamp

### 505. Emblem

Each container which satisfactorily carried out production unit inspection by the Society is to be affixed the emblem of the Korean Register of Shipping shown in **Fig 2.4** at easily visible position of door in addition to the inspection stamp prescribed in **203**.



**Fig 2.4** Emblem (2018)

### 506. Manufacturer's name plate

1. Each container which satisfactorily carried out production unit inspection by the Society is to be affixed the manufacturer's name plate stamped into followings at easily visible position of door.
  - (1) General cargo containers and thermal containers
    - (a) Name of manufacturer
    - (b) Manufacturer's model No. approved
    - (c) Date of manufacturing
    - (d) Manufacturer's serial number
    - (e) Other items deemed necessary by the Society
  - (2) Tank containers
    - (a) Items prescribed in (1)
    - (b) Test pressure
    - (c) Date of hydrostatic test
2. The above-mentioned markings are to be durable and in a color contrasting with that of the container. The markings are not to be altered without approval of the Society.
3. At the request of container owner, supplementary notes may be added to the marking plate subject to the agreement of the Society.



## Section 6 General Cargo Containers

### 601. Application

The requirements in this Section apply to general cargo containers of closed type and open top type.

### 602. Materials and workmanship

#### 1. Materials

- (1) Steel plates used in construction of containers are to have good weldability, and higher strength and low alloy steel plate is to be identified their chemical and mechanical properties by the steel maker's mill sheet, etc.
- (2) Materials such as aluminium, FRP, etc. are to be complied with the specifications, and their chemical and mechanical properties are to be ascertained through the test reports, mill sheets, etc. which are issued by the manufacturer.
- (3) Corner fittings are to have not only the dimensions which comply with the requirements of this chapter and *ISO 1161* but the quality not lower than the grade of RSC 480-W of **Pt 2, Ch 1, 501.** of the Rules or equivalent thereto, and to be passed material test by the Society. However, the Society may consider omission of material test if the manufacturer can submit the test report which is considered proper by the Society.
- (4) Where woods are used in a floor, those are to be free from defect and properly dried and preserved. Container manufacturer is to submit the details to the kinds of woods and method of preservation.
- (5) Welding materials are to be of one which type approved by the Society in accordance with the requirements of **Pt 2, Ch 2, Sec 6** of the Rules for Classification of Steel Ships and to be well controlled in accordance with the manufacturer's recommendations.
- (6) Caulking materials filled in the joints are to be of acceptable type by the Society.

#### 2. Workmanship

- (1) Material processing such as bending, pressing, etc. are to be carried out by means of avoiding any defects such as crack.
- (2) At the time of approval of manufacturing process, welding for type-series containers is to be carried out in accordance with the procedures approved by the Society and by the welding operators qualified as 1G(F), 2G(H) or 3G(V) of grade 1 by the Society in accordance with the requirements of **Pt 2, Ch 2, Sec 5** of the Rules for Classification of Steel Ships or processing the equivalent qualification.
- (3) For the fabrication of main frame, total dimension of containers is to be maintained dimensional accuracy within the permissible tolerance by using suitable jigs.
- (4) Floorings are to be provided without unacceptable gap or off-set of woods.

### 603. Dimensions and ratings

#### 1. External dimensions and ratings

- (1) External dimensions and their permissible tolerances as well as the rating of the container or each designation are shown in **Table 2.2** and **Fig 2.5**.
- (2) No part of the container is to project beyond the overall external dimensions.

#### 2. Internal dimensions

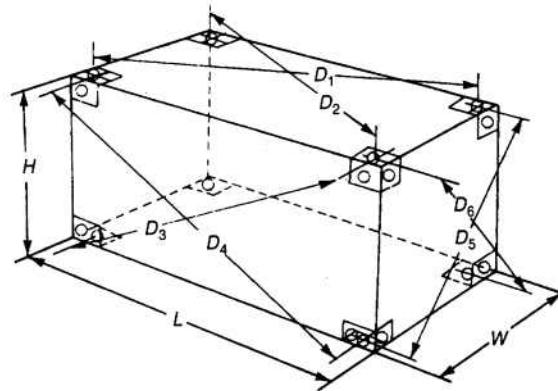
- (1) Closed, vented containers are to comply with the requirements for minimum internal length, width and height given in **Table 2.3**. However, where a top corner fitting projects into the internal space, that part of corner fitting projecting into the container is not to be considered as reducing the size of the container.
- (2) Containers having partial openings in the sides, are to comply with the requirements for minimum internal length and height given in **Table 2.3**.
- (3) Containers having an opening roof, are to comply with the requirements for minimum internal length and width given in **Table 2.3**.
- (4) Containers having openings in the sides and/or roof, are to comply with the requirements for minimum internal length given in **Table 2.3**.

Table 2.2 External Dimensions, Permissible Tolerances and Ratings of containers

Designation	Height (mm) H		Width (mm) W		Length (mm) L		K <sub>1</sub> (mm) Max.	K <sub>2</sub> (mm) Max.	Rating R (kg)
	Dimension	Tolerance	Dimension	Tolerance	Dimension	Tolerance			
1EEE	2896	0 -5	2438	0 -5	13716	0 -10	19	10	30480
1EE	2591	0 -5			12192	0 -10	19	10	30480
1AAA	2896	0 -5			9125	0 -10	16	10	30480
1AA	2591	0 -5			6058	0 -6	13	10	30480
1A	2438	0 -5			2991	0 -6	10	10	10160
1AX	<2438	0 -5							
1BBB	2896	0 -5							
1BB	2591	0 -5							
1B	2438	0 -5							
1BX	<2438	0 -5							
1CC	2591	0 -5							
1C	2438	0 -5							
1CX	<2438	0 -5							
1D	2438	0 -5							
1DX	≤2438	0 -5							

## NOTES :

- (1) All dimensions in table apply when measured at the temperature of 20 °C. Measurement taken at other temperatures is to be adjusted accordingly.
- (3) The values of  $K_1$  and  $K_2$  are given in **Fig 2.5**.



NOTES:

- (1)  $K_1 = |D_1 - D_2|$  or  $|D_3 - D_4|$
- (2)  $K_2 = |D_5 - D_6|$
- (3)  $D_1, D_2, D_3, D_4, D_5$  and  $D_6$  are the distances between centres of apertures of diagonally opposite corner fittings.

Fig 2.5 Dimensions and Permissible Tolerances

Table 2.3 Minimum Internal Dimensions and Door Opening's Dimensions of Containers

Designation	Internal Height (mm)	Internal Width (mm)	Internal Length (mm)	Door Opening	
				Width (mm)	Height (mm)
1EEE	2655	2330	13542	2286	2566
1EE	2350				2261
1AAA	2655		11998		2566
1AA	2350				2261
1A	2197		2134		
1BBB	2655		8931		2566
1BB	2350				2261
1B	2197		2134		
1CC	2350		5867		2261
1C	2197				2134
1D	2197		2802		2134

604. Design Conditions

1. Design load

Containers are to be required to have ample strength to bear the load or force specified in **Table 2.4** and not to generate permanent deformation or abnormality which will render it unsuitable for use. Each structural member of the container is to be so designed as to be capable of withstanding the following conditions.

- (1) *Stacking*: Superimposed mass 213,360 kg.
- (2) *Lifting*: vertical lifting from all four top corners, and lifting from all four bottom corners by means of suitable slings.
- (3) *Transportation*: Restraint and lashing in transit under dynamic loading resulting from road or railway operations or the ship motions.
- (4) *Loading and unloading*: Concentrated loading due to the cargo handling apparatus, etc. during loading and unloading operation.

Table 2.4 Loads and forces to be applied

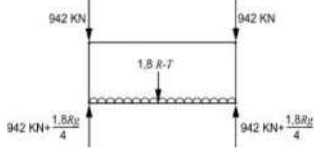
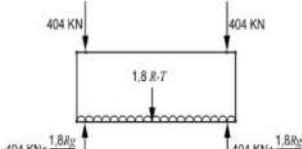
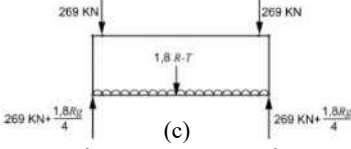
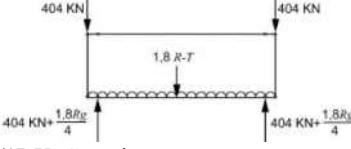
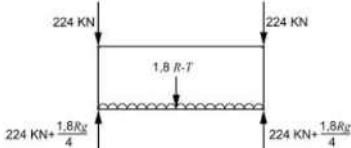
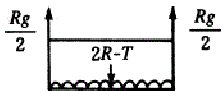
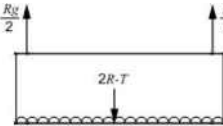
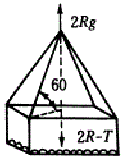
Item	Where Applied	Direction	Notes
Stacking	Top corner fittings Off-set : - 38 mm longitudinally - 25.4 mm laterally	Vertically downwards All containers other than 1 D/1DX containers  <p>Applicable to 1EE and 1EEE containers only</p> <p>(a)</p>  <p>(b)</p>  <p>(c)</p>  <p>1 D/1DX Containers</p> 	Concentrated eccentrically applied load 3,767 kN (942 kN per top corner fitting)  Stacking at 40' position and supported in 40' position (404 kN per top corner fitting)  Stacking at 40' position and supported in 45' position (269 kN per top corner fitting)  Stacking at 45' position and supported in 40' position (404 kN per top corner fitting)  896 kN (224 kN per top corner fitting)
Top Lifting	Top corner fittings	Vertically upwards for all containers other than 1 D/1DX containers  <p>Applicable to 1EE and 1EEE containers only</p>  <p>60° to the horizontal for 1 D/1DX containers</p> 	2 R  The lifting forces shall be applied additionally from the 40' position

Table 2.4 Loads and forces to be applied (continued)

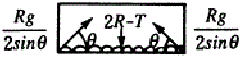
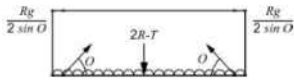
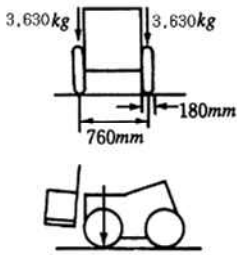
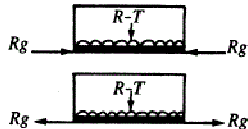
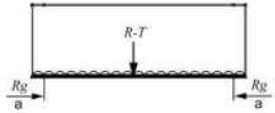
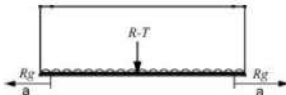
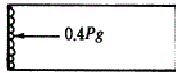
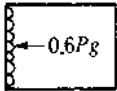
Item	Where Applied	Direction	Notes
Bottom Lifting	Bottom corner fittings (spacing between the line of action of the lifting force and the other face of the corner fitting is not further than 38 mm)	<p><math>\theta</math> : Angle to the horizontal</p>  <p>Applicable to 1EE and 1EEE containers only</p>  <p>The <math>\theta</math> is to apply the requirements of the bottom lifting in <b>Table 2.5</b> in accordance with kinds and designation of containers</p>	<p>2 R</p> <p>The lifting forces shall be applied additionally from the 40' position</p>
Floor Strength	Floor	<p>Vertically downwards</p> 	<p>per an axle: 7,260 kg                      per a wheel: 3,630 kg                      wheel width: 180 mm                      contact area per a wheel: 142 cm<sup>2</sup>                      wheel centers: 760 mm</p>
Longitudinal Restraint	Bottom corner fittings	<p>Longitudinal</p>  <p>Applicable to 1EE and 1EEE containers only</p> <p>(a)</p>  <p>(b)</p> 	<p>Concentrated force 2 R (2 R/2 per one side)</p>
End Wall	End wall	<p>Outwards normal to the end</p> 	<p>0.4 Pg</p>
Side Wall	Side Wall	<p>Outwards normal to the end</p> 	<p>0.6 Pg</p>

Table 2.4 Loads and forces to be applied (continued)

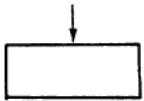
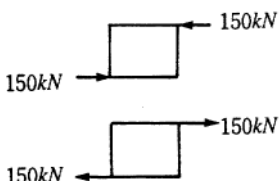
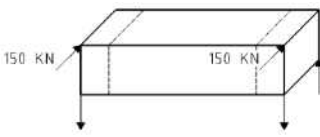
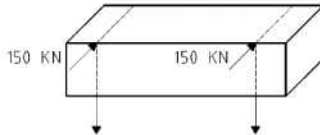
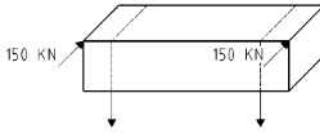
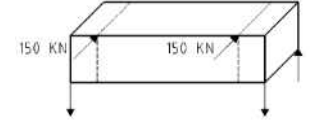
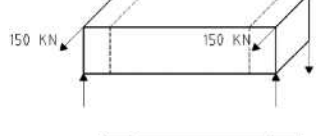
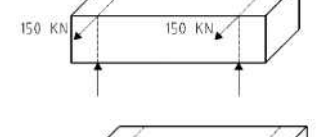
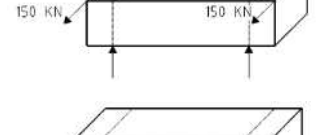
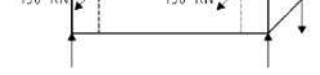
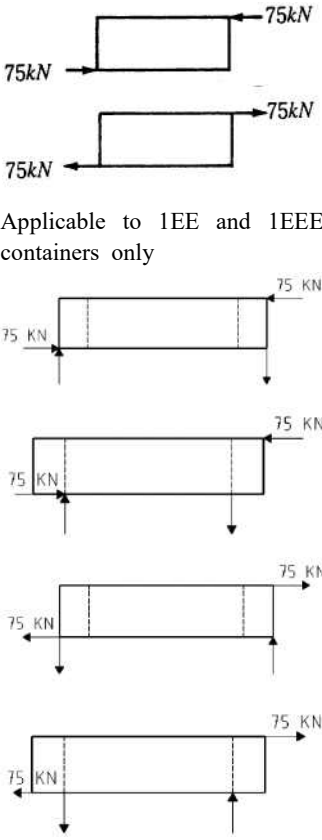
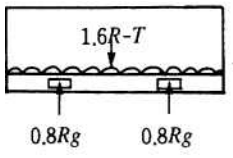
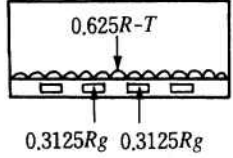
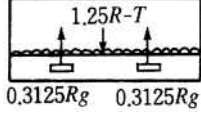
Item	Where Applied	Direction	Notes
Roof Panel	Roof panel (An area of 600 mm × 300 mm located at the weakest area)	Downwards normal to the roof 300kg 	300 kg
Transverse Racking (All containers other than 1D/1DX containers)	Top corner fittings	Transverse  150kN 150kN Applicable to 1EE and 1EEE containers only  150 KN 150 KN  150 KN 150 KN  150 KN 150 KN  150 KN 150 KN  150 KN 150 KN  150 KN 150 KN  150 KN 150 KN  150 KN 150 KN	Concentrated force 150 kN per top corner fitting  (a) Pushing at 45' position and supported in 45' position (b) Pushing at 40' position and supported in 40' position (c) Pushing at 45' position and supported in 40' position (d) Pushing at 40' position and supported in 45' position (e) Pulling at 45' position and supported in 45' position (f) Pulling at 40' position and supported in 40' position (g) Pulling at 45' position and supported in 40' position (h) Pulling at 40' position and supported in 45' position

Table 2.4 Loads and forces to be applied (continued)

Item	Where Applied	Direction	Notes
Longitudinal Racking (All containers other than 1D/1DX containers)	Top corner fittings	Longitudinal  <p>Applicable to 1EE and 1EEE containers only</p>	Concentrated force 75 kN per top corner fitting  (a) Compression at 45' position and supported in 45' position (b) Compression at 45' position and supported in 40' position (c) Tension at 45' position and supported in 45' position (d) Tension at 45' position and supported in 40' position
Fork-lift pocket (where fork-lift pocket is fitted as 1CC, 1C, 1CX and 1DX containers)	Fork-lift pocket (Width 200 mm, the part form side to 1,828 ± 3 mm)	Vertically upwards 	Distributed load 0.8 R per fork-lift pocket
Fork-lift pocket (where fork-lift pocket is fitted for empty as 1CC, 1C and 1CX containers)	Fork-lift pocket	Vertically upwards 	Distributed load 0.3125 R per fork-lift pocket
Grappler arm	Grappler lifting position	Vertically upwards 	Distributed load 1.25 R/4 per grappler lifting position

2. Corner fittings

(1) All containers shall be equipped with corner fittings at the top and bottom corner, the dimensions of which are given in Figs 2.6 and 2.7. IEEE and IEE units shall also have fittings in 40' position, as shown in Fig 2.8, the dimensions of which are given in Figs 2.9 and 2.10.

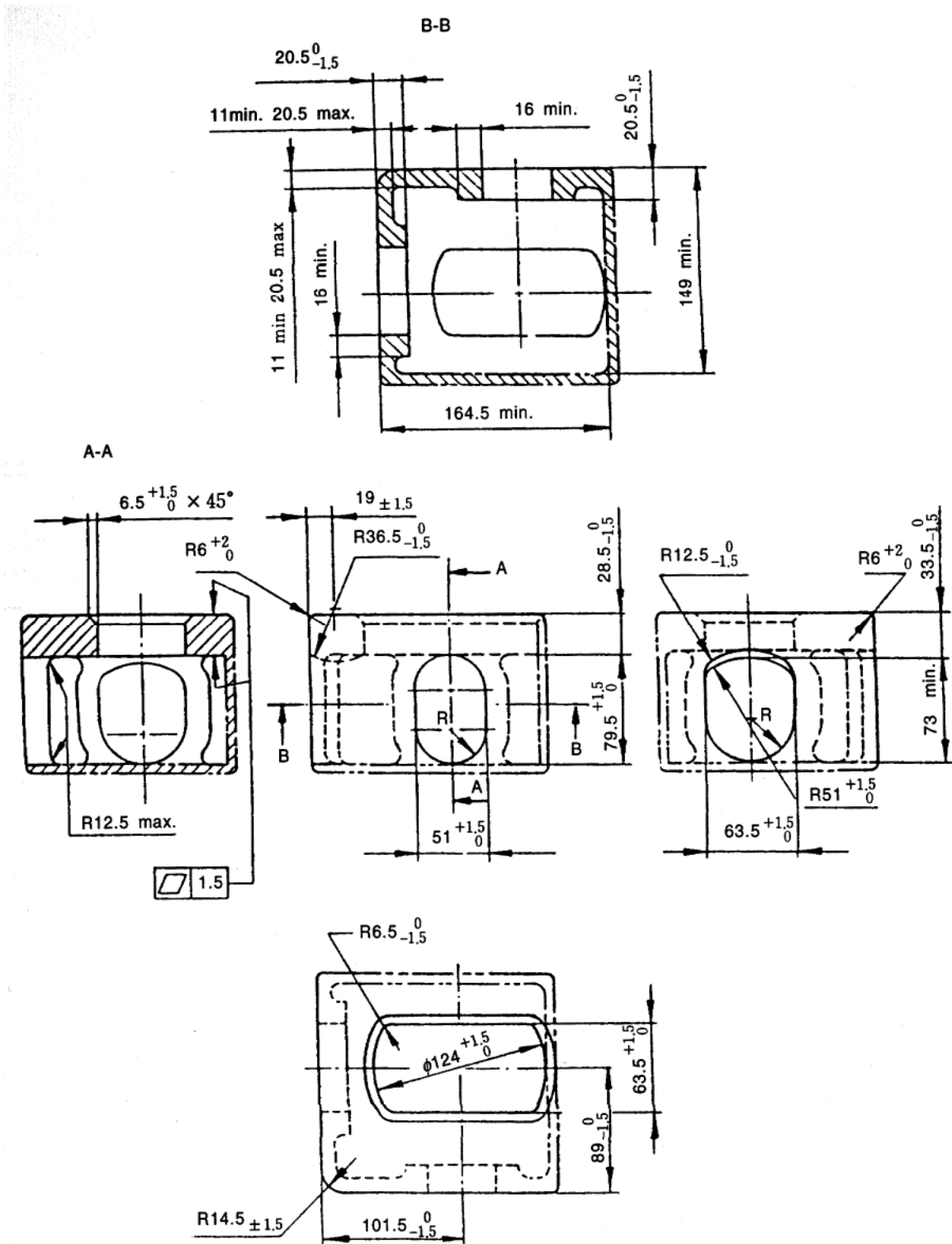
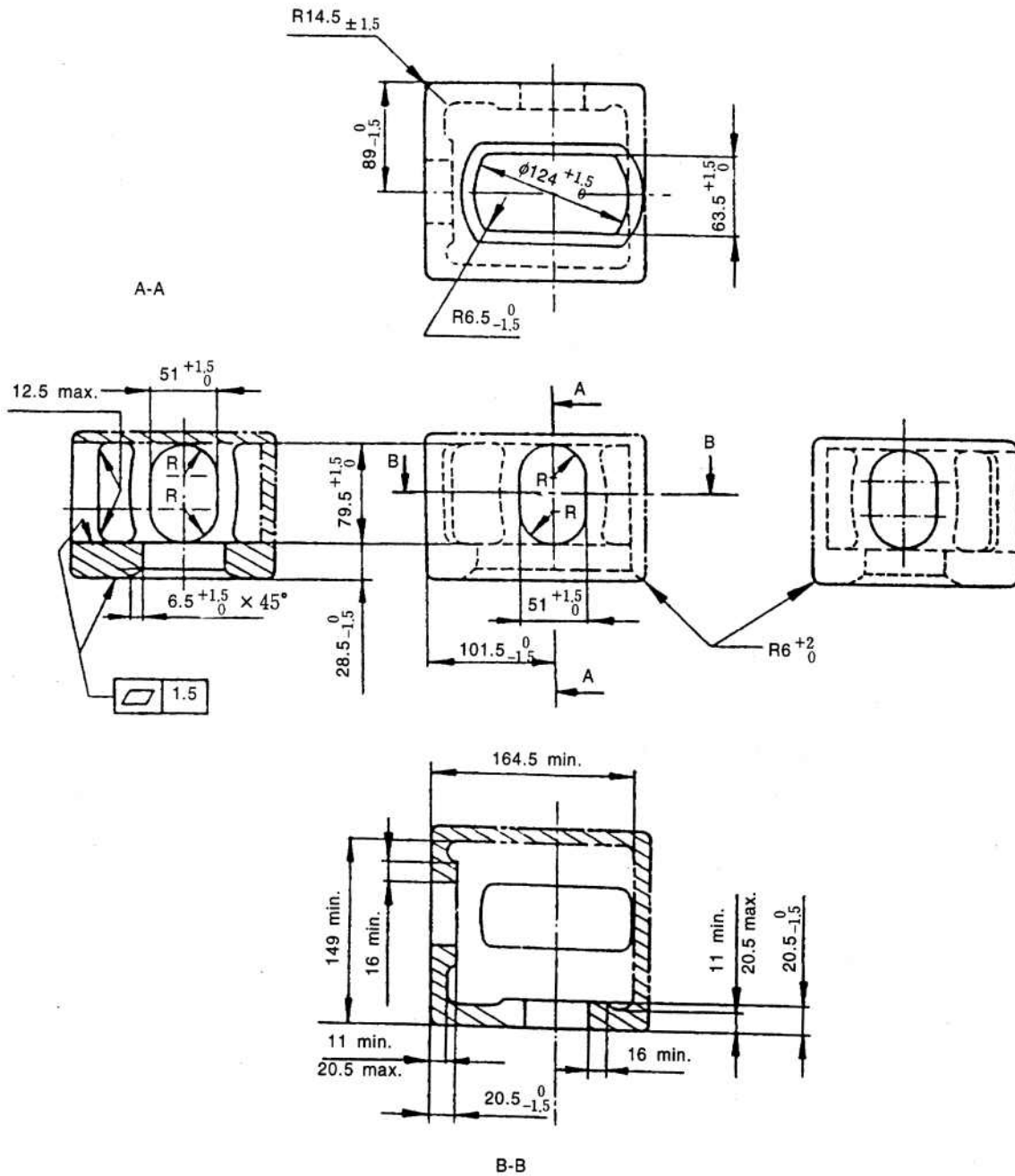


Fig 2.6 Top Corner Fitting (Dimensions : mm)





NOTE:

- (1) Solid and broken lines (— and ----) show surfaces and contours which are to be physically duplicated in the fitting.
- (2) Phantom lines (---) show optional walls, which may be used to develop a box shaped fitting.
- (3) Scantlings indicated by \* are not to be more than the thickness of the adjacent part surrounding a hole at the side or end.
- (4) Notes (1) to (3) above are to also be applied to the **Fig 2.6**.

**Fig 2.7 Bottom Corner Fitting (Dimensions : mm)**

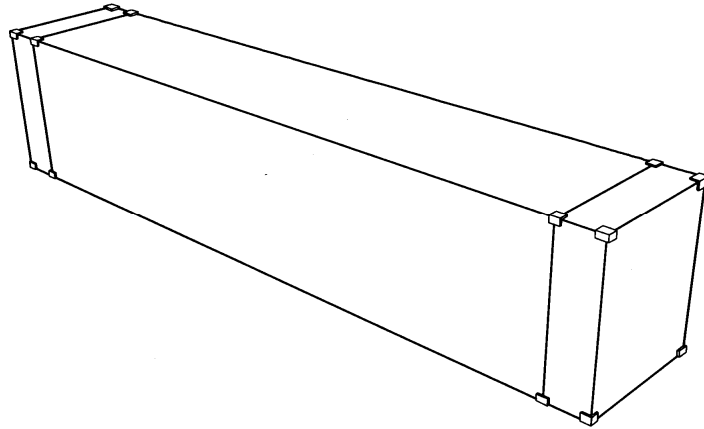


Fig 2.8 45 foot container with corner and intermediate fittings

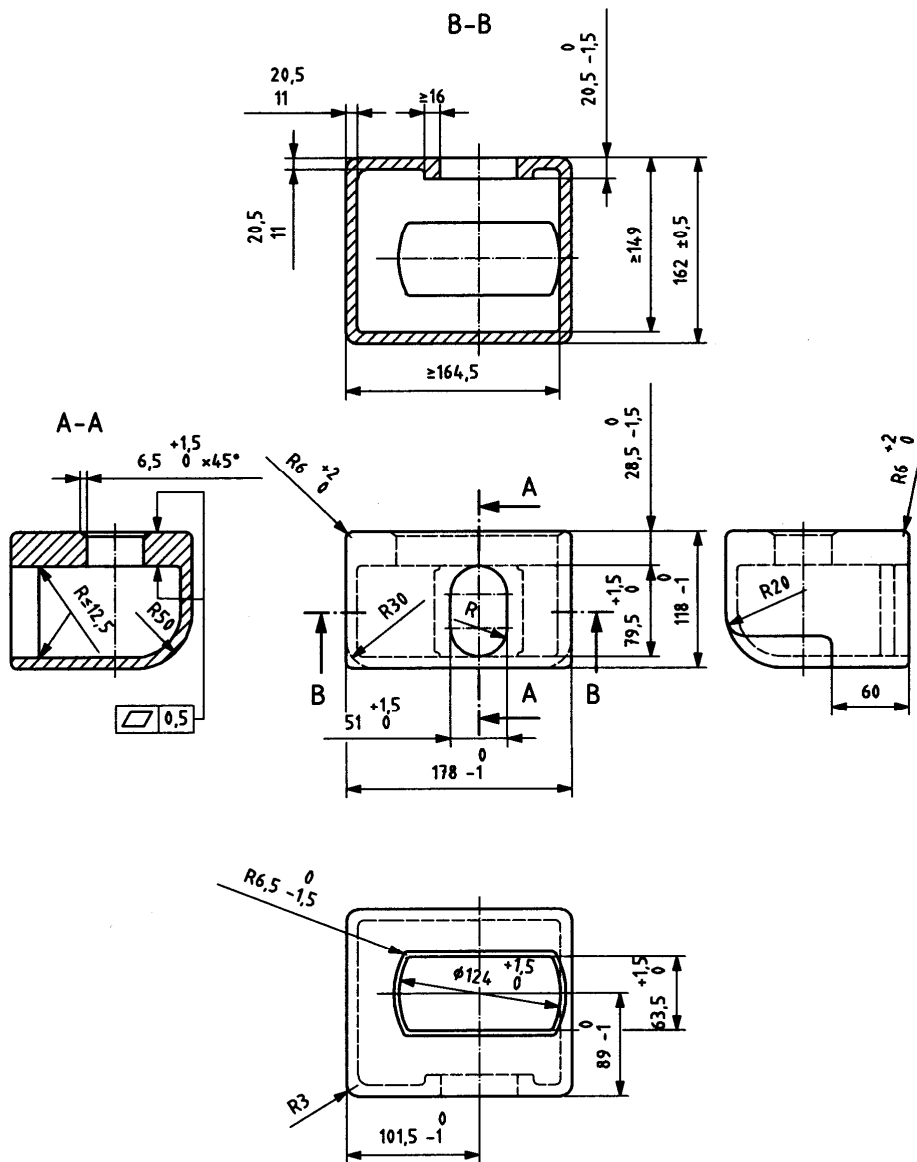


Fig 2.9 Top intermediate fitting (Dimensions : mm)

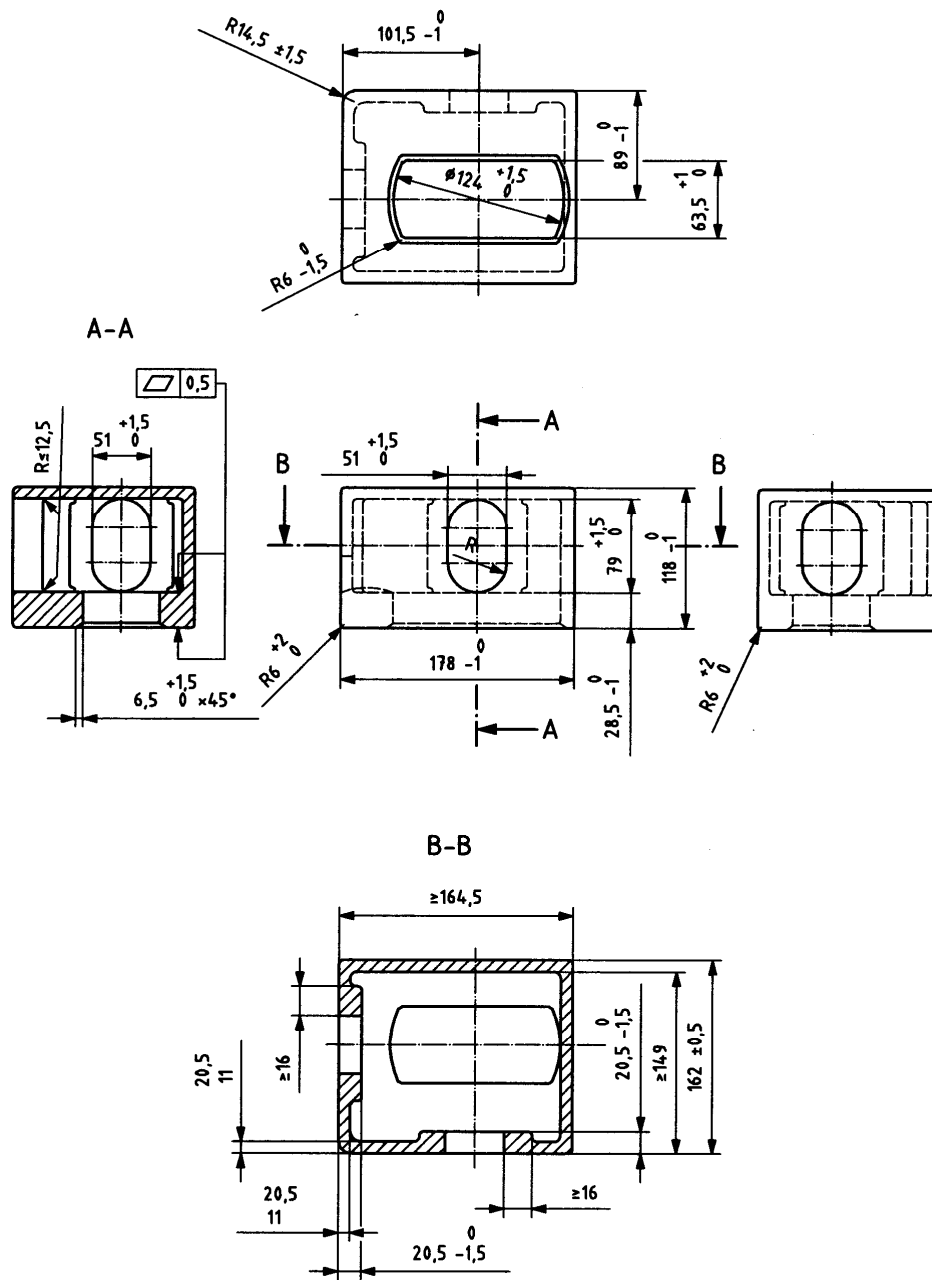
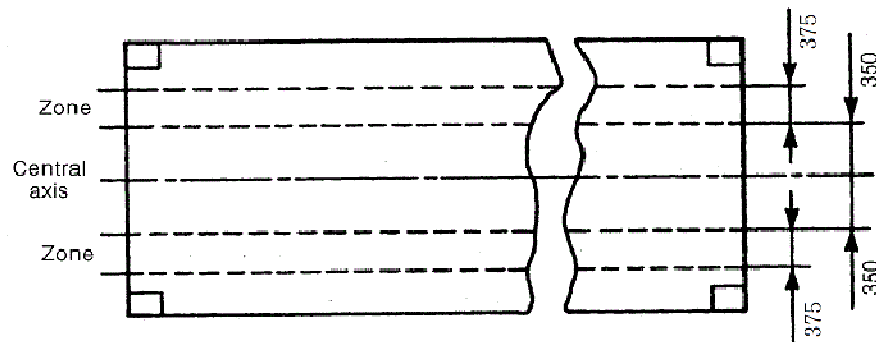


Fig 2.10 Bottom intermediate fitting (Dimensions : mm)

- (2) Where dimensions are not specified for inner and outer edges of apertures, these edges are to be given a radius of  $3 \text{ } ^0_{-1,5}$  mm.
- (3) Where corner fitting or intermediate fitting has an optional inner side wall shown in **Figs 2.6 through 2.10** as phantom line (---) and is made to the minimum dimension of 149 mm, the junction of the mandatory horizontal face to the optional inner side wall may be provided with a radius not exceeding 5.5 mm. If a greater radius is required, the 149 mm dimensions are to be increased accordingly.
- (4) The upper faces of the top corner fittings are to protrude above the top of the container by a minimum of 6 mm.

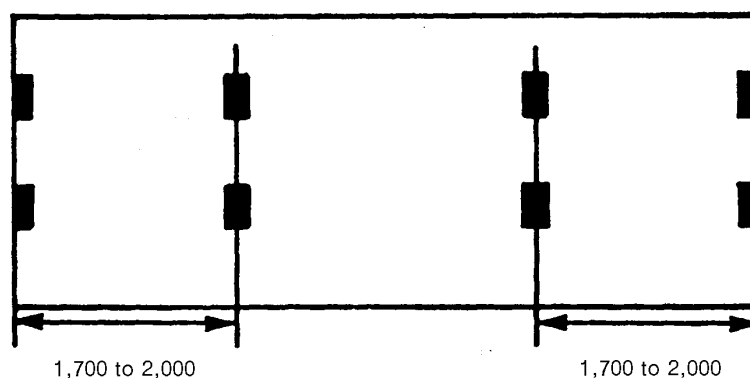
### 3. Base structure

- (1) All containers are to be capable of being supported by their bottom corner fittings only.
- (2) The lower faces of the load transfer areas including those of the end transverse members, are to be one plane located  $12.5^{+5}_{-1.5}$  mm above the plane of the bottom faces of the lower corner fittings of the containers.
- (3) Containers are to be designed so that no part of the base structures is to deflect more than 6 mm below the bottom faces of the bottom corner fittings under a uniformly distributed load equal to 1.8 R-T.
- (4) The base structures of the containers are not to protrude below the corner fittings under a uniformly distributed load equal to the maximum payload.
- (5) All containers, other than 1 D, are to have end transverse member and sufficient intermediate load transfer areas of sufficient strength to permit vertical load transfer to or from the longitudinal members are assumed to lie within the two 375 mm wide zone defined by the broken lines in **Fig 2.11** with longitudinal dimension over 25 mm. Container are to also be capable of being supported on load transfer areas only in their base structure.



**Fig 2.11 Load Transfer Areas in Base Structures (Dimensions : mm)**

- (6) Containers other than 1 D, having all their intermediate transverse members spaced at 1000 mm apart or less are given in **Fig 2.12** through **2.16**. The maximum load to be transferred at the load transfer zone is not to exceed 2 R.



**Fig 2.12 Load transfer Areas in Base Structure for ICC, 1C or 1CX Containers (Dimensions : mm)**

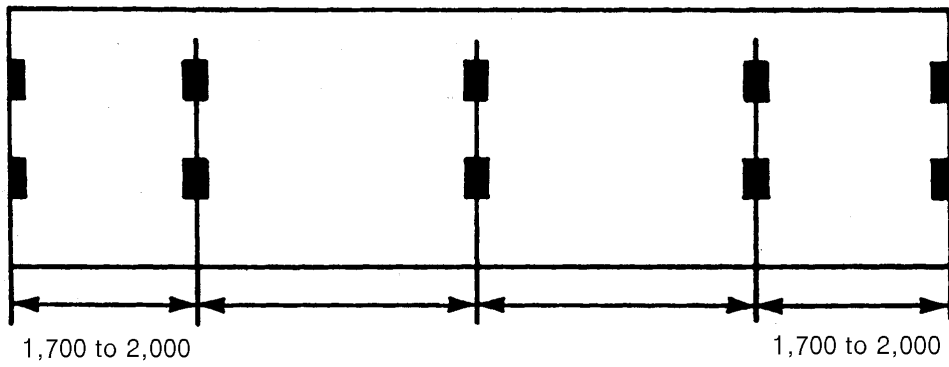


Fig 2.13 Load transfer Area in Base Structure for 1BBB, 1BB, 1B or 1BX Containers (Dimensions : mm)

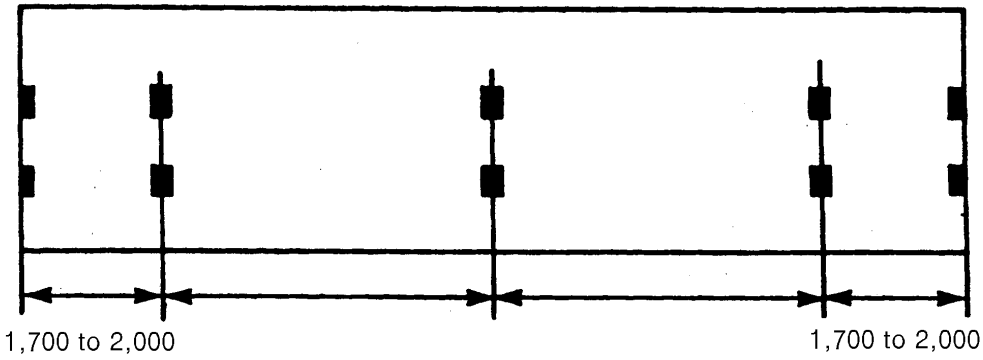


Fig 2.14 Load transfer Area in Base Structure for 1AA, 1A or 1AX Containers without Gooseneck Tunnel (Dimensions : mm)

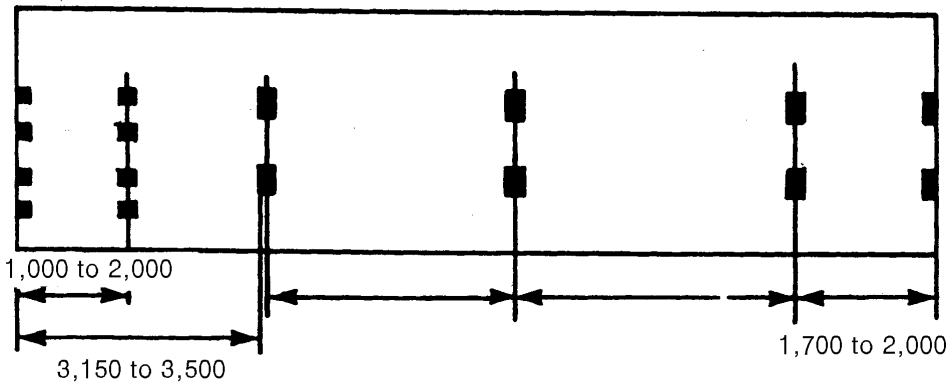


Fig 2.15 Load transfer Area in Base Structure for IAAA, 1AA, 1A or 1AX Containers with Gooseneck Tunnel (Dimensions : mm)

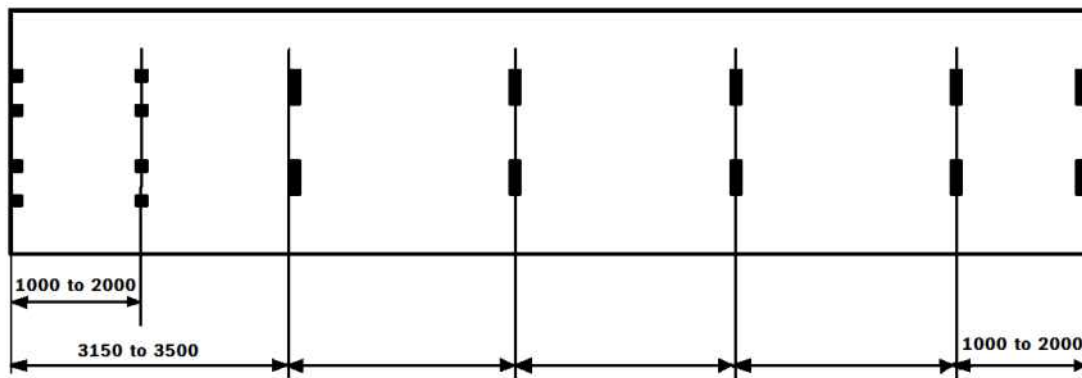


Fig 2.16 Load transfer Area in Base Structure for 1EEE,1EE, 1AAA, 1AA, 1A or 1AX Containers with Gooseneck Tunnel-Requirements if 7pairs of load transfer areas are to be fitted (Dimensions : mm)

**4. End structure**

For all containers other than 1 D and 1 DX, the side way deflection of the top of container with respect to the bottom of the container at that time when it is under transverse racking force of 150 kN is not to cause the sum of the changes in length of the two diagonals in each end wall to exceed 60 mm.

**5. Side structure**

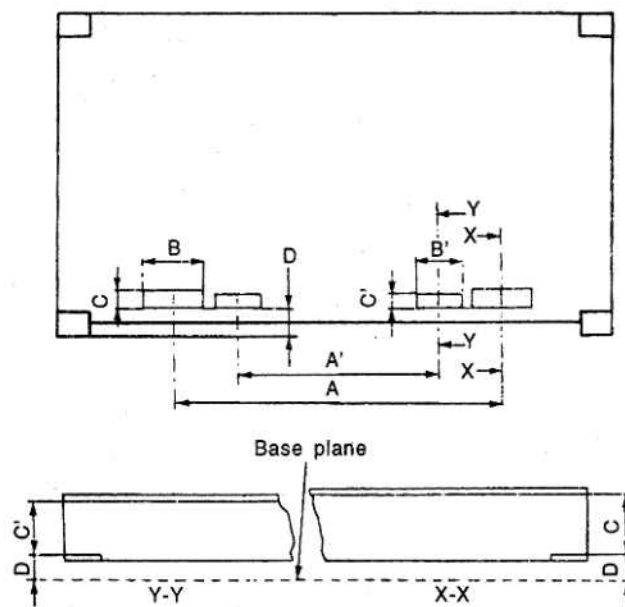
For all containers other than 1 D, the longitudinal deflection of the top of the container with respect to the bottom of the container at the time when it is under longitudinal racking force of 75 kN is not to exceed 25 mm.

**6. Door openings**

- (1) All door openings are to be as large as possible, minimum dimensions of door openings are given in **Table 2.3**.
- (2) Doors are to be equipped with securing devices which is capable of being sealed up.
- (3) All doors are to be capable of being clasped properly when opened.

**7. Fork-lift pockets**

- (1) Containers 1 CC, 1 C, 1 CX 1 D and 1 DX may be provided with fork-lift pocket, and fork-lift pocket may be provided on containers 1 CC, 1 C and 1 CX for empty handling only.
- (2) The positions, dimensions and allowable tolerances of fork-lift pocket are to be in accordance with **Fig 2.17**, and are to pass completely through the base structure of the container.

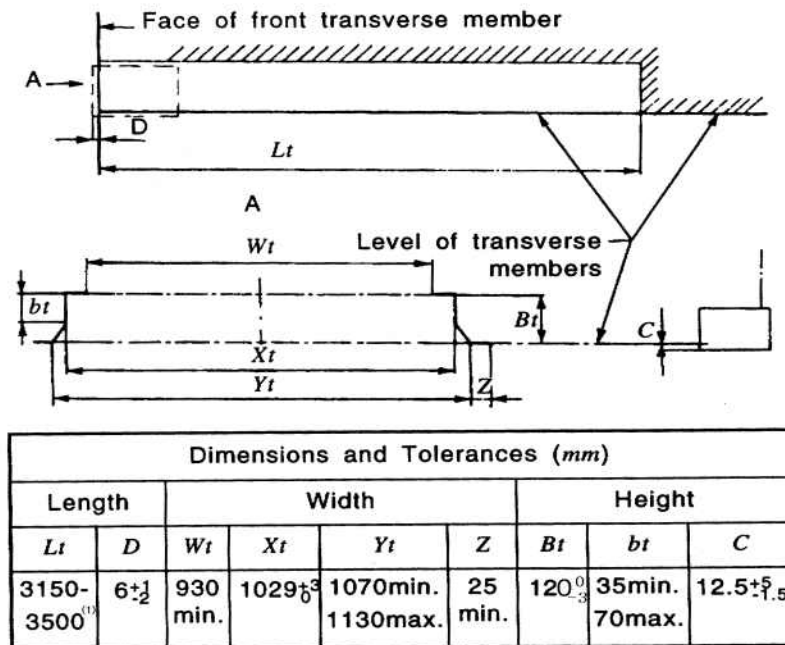


Container	Dimensions and Tolerances (mm)						
	Fork-lift pockets for loaded and unloaded containers				Fork-lift pockets for unloaded containers		
	A	B	C	D	A'	B'	C'
1CC	2,050	355	115	20	900	305	102
1CX	± 50	min.	min.	min.	± 50	min.	min.
1C							
1D	900	305	102	20			
1DX	± 50	min.	min.	min.			

**Fig 2.17** Positions, Dimensions and Tolerances of Forklift Pocket

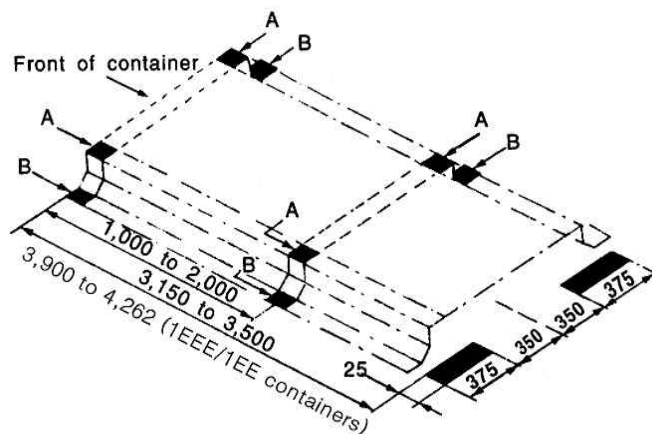
8. Gooseneck tunnels

- (1) Containers 1EEE, 1EE, 1AAA, 1AA 1A and 1AX may be provided gooseneck tunnels. In this case, dimensions and allowable tolerances of gooseneck tunnels are to be in accordance with Fig 2.18.
- (2) Load transfer area is to be designed in base structure of gooseneck tunnels in accordance with Fig 2.19.



Note (1) for 1EEE/1EE containers, length to be 4,000 mm

Fig 2.18 Positions, Dimensions, Tolerances of Gooseneck Tunnels



NOTES:

- (1) Each load transfer area at the gooseneck tunnel has paired set, A and B, and the sum of the two components, A +B, are to be equal to or greater than 1,250mm<sup>2</sup>.
- (2) Where continuous tunnel side members are provided, the load transfer areas shown in Figure between 3,150mm and 3,500mm from the end of the container may be omitted.

Fig 2.19 Load Transfer Area in the Base Structure of the Gooseneck Tunnel



## 9. Grappler arms

- (1) Containers may be provided with the features for handling at the base by means of grappler arms or similar devices. The dimensional requirements are specified in **Fig 2.20**.
- (2) Grappler arm contact area to be flat, and level with corner and lip clean and square.
- (3) Where stops are provided at ends of pockets they are to be sloped as indicated in **Fig 2.20**.
- (4) External wall of grappler arm including rivet or bolt heads is not to be more than  $12 \begin{smallmatrix} 0 \\ -2 \end{smallmatrix}$  mm from the inside of the lip.

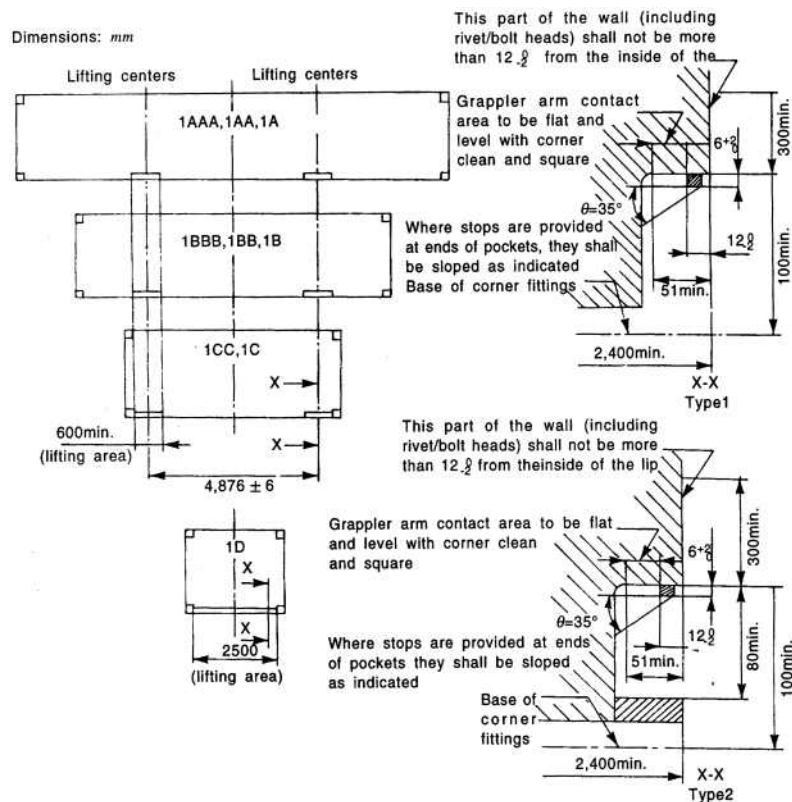


Fig 2.20 Dimensions of Grappler Arm Lifting Areas

## 605. Type Approval Inspection

### 1. General

- (1) The items of type approval test are to comply with the followings:
  - (a) Visual inspection
  - (b) Dimensional inspection
  - (c) Mass measurement
  - (d) Strength tests
  - (e) Weathertightness test
- (2) Measuring instruments to be used for the test and inspection of the container are to be duly calibrated.
- (3) Alternative test procedures to those specified in preceding (1) will be accepted if considered to be equivalent by the Society.
- (4) Test procedures for specific purpose container may be properly modified and omitted.

### 2. Visual inspection

- (1) Visual inspection is to be carried out at a proper stage and period during production and/or after completion in order to ascertain that the constructions, materials and workmanship of the container are in compliance with the requirements of this Section without any visual defects in each component of the container.
- (2) In the visual inspection, it is to be ascertained that the door can be smoothly operated and secured.

### 3. Dimensional inspection

Dimensional inspection is to be carried out after the completion of all the works in order to ascertain that the container meets the dimensional requirements of this Section

### 4. Mass measurement

Mass measurement is to be carried out after the completion of all the works in order to determine the tare mass of the container.

### 5. Strength tests

- (1) Strength tests are to be carried out as specified in **Table 2.5** after the completion of all the works.
- (2) In the strength tests, measurements are to be taken as required in **Table 2.5**. Additional measurements may be required, where deemed necessary by the Society.
- (3) During the strength tests, deformations which generated on each part of container based on their designation are not to be over the requirements specified in **604**. On completion of the tests, the container is to show neither permanent deformation nor abnormality which will render it unsuitable for use.

Table 2.5 Test Procedures and Measurements of Type Approval

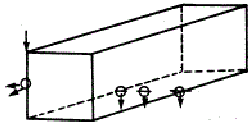
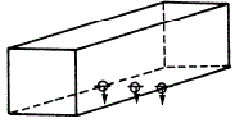
Item	Procedures and Measurements
Stacking	<p>Procedure: Internal load: 1.8 <i>R-T</i> uniformly distributed over the base.</p> <ol style="list-style-type: none"> <li>(1) Applied forces: With the container in the normal position supported at the base corner fittings, compressive forces equivalent to 942 kN are to be applied to each corner post through rigidly held dummy corner fittings arranged to simulate an overstowed container base. The test is to be repeated to cover for all positions of offset namely 38 mm longitudinally and 25.4 mm laterally.</li> <li>(2) For 1EEE and 1EE containers, the stacking forces shall be applied vertically from the 1EEE/1EE position and separately from the 1AAA/1AA/1A position according to the requirements specified in <b>Table 2.4</b>, stacking test (a), (b) and (c).</li> <li>(3) For a 1D/1DX container, compressive forces equivalent to 224 kN are to be applied to each corner post.</li> </ol> <div style="text-align: center;">  </div> <p>Measurement:</p> <ol style="list-style-type: none"> <li>(1) Deflections at lowest point of both side rails and at the longitudinal centre line of the base which may be taken before the application of axial loads.</li> <li>(2) Deflections in two directions at midheight, or other point of maximum deflection of the corner posts, and permanent set remaining on removal of the load.</li> </ol>
Top Lifting	<p>Procedure: Internal load : 2 <i>R-T</i> uniformly distributed over the base.</p> <ol style="list-style-type: none"> <li>(1) Applied forces: With the container in the normal position, lifting forces are to be applied gradually to the top corner fittings, vertically to containers other than 1D/1DX container</li> <li>(2) For 1EEE and 1EE containers, the lifting forces shall be applied vertically from the 1EEE/1EE position and separately from the 1AAA/1AA/1A position</li> <li>(3) at 30° to the vertical in the case of 1D/1DX containers.</li> <li>(4) The container shall be supported for 5 min. and then lowered to the ground.</li> </ol> <div style="text-align: center;">  </div> <p>Measurements:</p> <ol style="list-style-type: none"> <li>(1) While loaded and supported by the four bottom corner fittings before lifting clear, the deflection at lowest points of both side rails and at the longitudinal centre line of the base.</li> <li>(2) Permanent set remaining on removal of the load</li> </ol>

Table 2.5 Test Procedures and Measurements of Type Approval (continued)

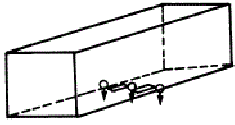
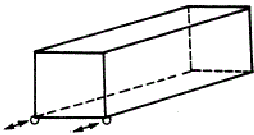
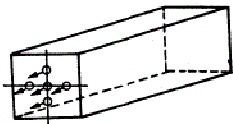
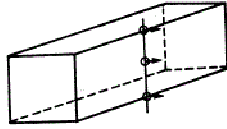
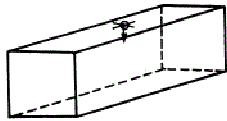
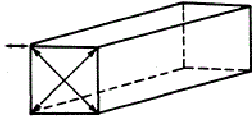
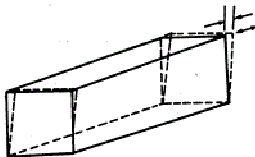
Item	Procedures and Measurements											
Bottom Lifting	<p>Procedure: Internal load: 2 <i>R-T</i> uniformly distributed over the base.</p> <p>(1) Applied forces: With the container in the normal position, lifting forces are to be applied gradually through the bottom corner fitting side apertures as follows:</p> <table border="1" data-bbox="592 443 1217 636"> <thead> <tr> <th>Designation</th> <th>Angle</th> </tr> </thead> <tbody> <tr> <td>1EEE, 1EE</td> <td rowspan="2">30°</td> </tr> <tr> <td>1AAA, 1AA, 1A</td> </tr> <tr> <td>1BBB, 1BB, 1B, 1BX</td> <td>37°</td> </tr> <tr> <td>1CC, 1C, 1CX</td> <td>45°</td> </tr> <tr> <td>1D, 1DX</td> <td>60°</td> </tr> </tbody> </table> <p>(2) For 1EEE and 1EE containers, the lifting forces shall be applied from the 1EEE/1EE position and separately from the 1AAA/1AA/1A position</p> <p>(3) In each case, the line of action of the lifting force and the outer face of the corner fitting or intermediate fitting shall be no farther apart than 38mm. The container shall be supported for 5 min. and then lowered to the ground.</p> <p>Measurements: Same as measurements of the top lifting</p>	Designation	Angle	1EEE, 1EE	30°	1AAA, 1AA, 1A	1BBB, 1BB, 1B, 1BX	37°	1CC, 1C, 1CX	45°	1D, 1DX	60°
Designation	Angle											
1EEE, 1EE	30°											
1AAA, 1AA, 1A												
1BBB, 1BB, 1B, 1BX	37°											
1CC, 1C, 1CX	45°											
1D, 1DX	60°											
Floor Strength	<p>Procedure: Internal load: Nil.</p> <p>Applied forces: With the container supported at the bottom corner fittings, a vehicle equipped with 180 mm wide tyres at 760 mm centres each having a contact area of 142 cm<sup>2</sup> loaded to an axle mass of 7,260 kg is to be maneuvered over the entire floor area.</p>  <p>Measurements: Deflection of the base.</p>											
Longitudinal Restraint	<p>Procedure: Internal load: <i>R-T</i> uniformly distributed over the base.</p> <p>Applied forces: With the container in the normal position, anchored by locking devices through the bottom apertures in the bottom corner fittings at one end, forces equivalent to <math>R_g</math> are to be applied to each side rail through the bottom apertures in the bottom corner fittings at the other end first in compression then in tension. For 1EEE and 1EE containers, the forces shall be applied from the 1AAA/1AA/1A position</p>  <p>Measurements: The change in length of both bottom side rails during and after the test (in each direction)</p>											
End Wall	<p>Procedure: Internal loading and application: 0.4 <math>P_g</math> uniformly distributed over the wall under test in such a way as to allow free deflection of the end wall.</p>  <p>Measurements: Deflection and permanent set at the centre and at least two other locations.</p>											

Table 2.5 Test Procedures and Measurements of Type Approval (continued)

Item	Procedures and Measurements
Side Wall	<p>Procedure: Internal loading and application: <math>0.6 P_g</math> uniformly distributed over the wall under test in such a way as to allow free deflection of the side wall and its top and bottom side rails. Each side is to be tested separately but only one side need to be tested when both are similar in construction.</p>  <p>Measurements: Deflection and permanent set at the centre of side wall and the centre of the top and bottom side rails.</p>
Roof Panel	<p>Procedure: Internal load: Nil. Applied load: 300 kg uniformly distributed over a 600 mm × 300 mm area at the weakest section of the roof.</p>  <p>Measurements: Maximum deflection and permanent set of section under test.</p>
Transverse Racking	<p>Procedure Internal load: Nil. Applied forces: The test is to be carried out to all containers other than 1D/1DX containers. With the container in the normal position anchored by locking devices through the apertures in the bottom corner fittings, transverse racking forces of 150 kN are to be applied separately or simultaneously to each top corner fitting on one side. Lateral restraint is to be taken up by the anchor devices diagonally opposite to the applied forces. The force(s) is to be applied first towards then away from the container. For 1EEE and 1EE containers, the forces shall be applied according to the requirements specified in <b>Table 2.4</b>, transverse racking test (a) through (h).</p>  <p>Measurements: Difference in diagonals before, during and after testing.</p>
Longitudinal Racking	<p>Procedure: Internal load: Nil. Applied forces: The test is to be carried out to all containers other than 1D/1DX containers. With the container in the normal position anchored by locking devices through the apertures in the bottom corner fittings, longitudinal racking forces 75 kN are to be applied separately or simultaneously to each top corner fitting on one end. Longitudinal restraint is to be taken up by the anchor devices diagonally opposite to the applied forces. The force(s) is to be applied first towards then away from the container. For 1EEE and 1EE containers, the forces shall be applied according to the requirements specified in <b>Table 2.4</b>, longitudinal racking test (a) through (d).</p>  <p>Measurements: Longitudinal displacement of top side rails.</p>

**Table 2.5 Test Procedures and Measurements of Type Approval (continued)**

Item	Procedures and Measurements	
Fork-lift pocket	<p>Procedure: Internal load: 1.6 <i>R-T</i> (for empty container, 0.625 <i>R-T</i>) uniformly distributed over the base. Applied forces: The test is to be carried out to 1CC, 1C, 1CX, 1D and 1DX containers where fork-lift pocket is fitted. The container is to be supported for 5 minutes by two bars 200 mm wide inserted in the fork pockets to a depth of 1,828 ±3 mm</p> <p>Measurements: Undue local distortion during the test and any permanent distortion on removal of the load.</p>	
Grappler arm	<p>Procedure: Internal load: 1.25 <i>R-T</i> uniformly distributed over the base. Applied forces: The test is to be carried out to containers where grappler arm is fitted. The container is to be supported for 5 minutes by pads at the four grappler arms intended to be used.</p> <p>Measurements: Undue local distortion during the test and any permanent distortion.</p>	
Weathertightness	<p>Procedure: All surfaces of the container are to a water test from a 12.5 mm nozzle, with a water pressure of 1 bar at the nozzle, second at a distance of 1.5 m from the surface under test.</p> <p>Observation: The interior of the container is to remain dry.</p>	
One door off Operation	Stacking	<p>Procedure: Refer to Stacking of this Table. The loads are applied to design condition of manufacturers.</p> <p>Measurements: Refer to Stacking of this Table.</p>
	Transverse Racking	<p>Procedure: Refer to Transverse Racking of this Table. The loads are applied to design condition of manufacturers.</p> <p>Measurements: Refer to Transverse Racking of this Table.</p>

## 6. Weathertightness test

Weathertightness test is to be carried out as specified in **Table 2.5** after all strength tests have been completed or at a reasonable stage during production. On completion of the test, the container is to be free from penetration of water.

### 606. Production Unit Inspection for Type-Series Containers

The kinds of tests and inspections for production unit inspections of type-series containers are to be in accordance with the requirements in **Ch 2, 403.** and to be carried out in accordance with the requirements of **605.** of this Section.

## Section 7 Thermal Containers

### 701. Application

1. The requirements in this Section apply to the type approval and production unit inspection of containers which are built with insulated walls, doors, floor and roof so as to retard the rate of heat transmission between inside and outside of the container. (hereinafter referred to as "thermal container")
2. At the request of container owner, type approval, approval of manufacturing process and tests and inspections in respect of refrigerating units and/or heat-producing appliances intended for thermal containers may be carried out by the Society.

### 702. Materials and workmanship

Requirements for materials and workmanship of thermal containers are as follows in addition to the requirements prescribed in **Ch 2, 602.**

- (1) Proper choice of materials intended for thermal containers and refrigerating units or heating appliances are to be made so as to produce no harmful effects on cargoes. No damage is to be caused on the materials by carrying out the tests prescribed in **705. 4** and **5.**
- (2) The quality of insulating materials is to be accepted by the Society.
- (3) Insulating work is to be carried out with a scrupulous care.

### 703. Dimensions and ratings

#### 1. External dimensions and ratings

External dimensions, permissible tolerances and ratings for containers are to comply with the requirements in **Ch 2, 603. 1.**

#### 2. Internal length

The minimum internal dimensions of thermal containers are specified in **Table 2.6**

**Table 2.6 Minimum Internal Dimensions of Thermal Containers**

Designation	Internal <sup>(1)</sup> Breadth (mm)	Internal <sup>(1)</sup> Height (mm)	Internal Length (mm)
1AAA	2,511	2,218	11,502
1AA	2,206		
1A	2,053		
1BBB	2,511		8,435
1BB	2,206		
1B	2,053		
1CC	2,206		5,368
1C	2,053		
1D	2,053		
1EEE	2,511		13,026
1EE	2,206		

NOTES:

- (1) The structure without tunnel recess adds 40 mm to internal breadth of this table.
- (2) Dimensions of door opening are to be as close as practicable to the internal dimensions of thermal containers.

## 704. Design conditions

### 1. Application

The design conditions to construction and capacity of thermal containers are to comply with the requirements in this Section, in addition to those of **Ch 2, 604**.

### 2. General

- (1) The coefficient of heat transfer (hereinafter referred to as "K") of thermal containers is to be not more than  $0.4 \text{ W/m}^2\text{°C}$ .
- (2) The maximum heat leakage ( $U_{max}$ ) and inside and outside design temperatures of thermal containers are specified in **Table 2.7**.

**Table 2.7 Maximum Heat Leakage and Design Temperature of Thermal Containers**

Maximum heat leakage $U_{max}$ (W/K)								Design temperature (°C)	
1AAA	1AA, 1A	1BBB	1BB, 1B	1CC, 1C	1D	1EE	1EEE	Inside	Outside
42	40	33	31	22	13	44	46	+16 -18	+45 -20

- (3) Electrical aspects are to be in accordance with *KS A ISO 1496-2* so far as applicable,

### 3. Insulating construction

- (1) The walls, doors, floors and roof of the thermal containers are to be insulated in such a manner as to balance, as far as is practicable, the heat transfer through each of them, although the roof insulation may be increased to compensate for solar radiation.
- (2) The structure and the insulation of container are not to be functionally affected by cleaning methods, for example steam cleaning and detergents normally used.

### 4. Airtightness

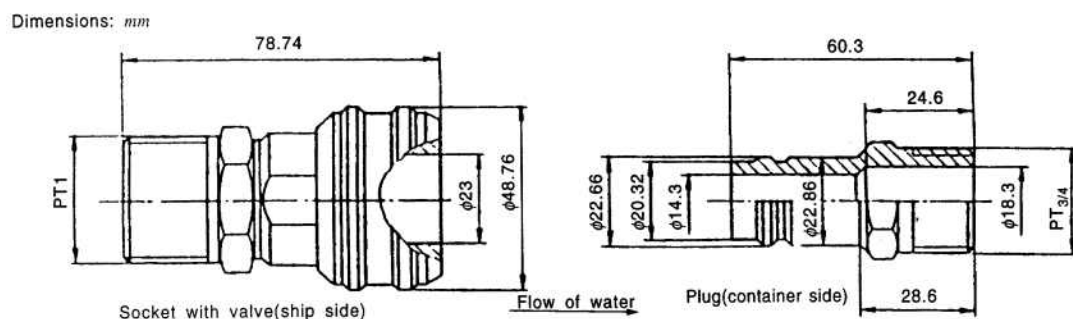
Thermal containers are to be of airtight construction and to be complied with the requirements in **705. 3**.

### 5. Refrigerating appliances

- (1) Refrigerating units are to comply with following requirements and to have a sufficient capacity taking into consideration the service condition of containers.
  - (a) Refrigerating units are to have a capacity to run without a hitch and to be capable of efficiently maintaining the specified minimum inside temperature under the test prescribed in **705. 5 (1) (f)**.
  - (b) Refrigerating units are also to be capable of efficiently maintaining the specified minimum temperature for a period of at least 4 hours under the test prescribed in **705. 5. (1) (g)**
- (2) Where the containers using of cooling water to refrigerating units, the design temperature of cooling water for refrigerating units is to be  $36 \text{ °C}$ , and the structure is to be so designed as to prevent from freezing of water.

### 6. Cooling water connections

- (1) For appliances requiring water connections, the in-let and outlet interface are to conform to **Fig 2.21** and **2.22** and operating and bursting pressure are to be 1 MPa and 4 MPa respectively.



**Fig 2.21 Cooling Water Connection–Inlet Side**



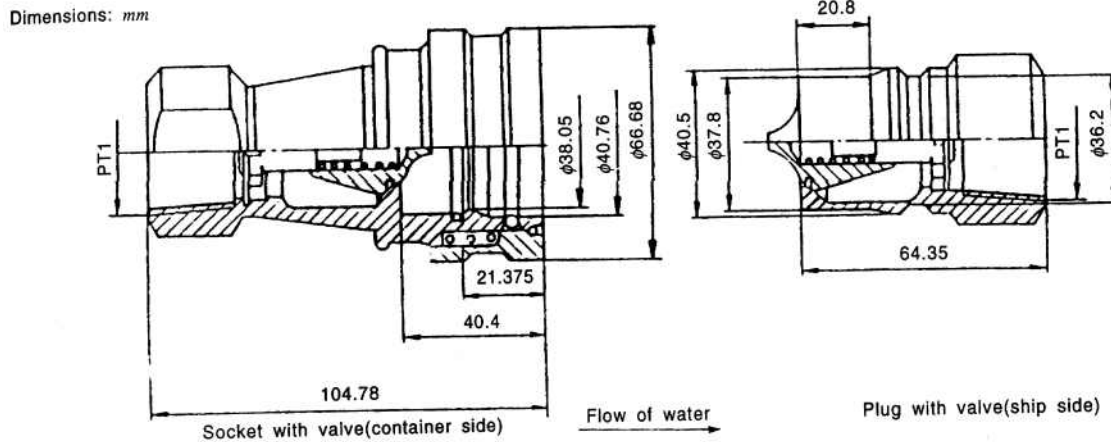


Fig 2.22 Cooling Water Connection–Outlet Side

(2) The water inlet and outlet connections are to be located at the machinery end of the container that, to an observer facing that end, they appear in the lower right-hand quarter.

7. Air inlets and outlets

- (1) Where 1 AA, 1 CC and 1 C containers are designed for ducted air systems and for use with externally located removable equipment, the air inlet and outlet openings are to conform to the Fig 2.23 through Fig 2.25 respectively.
- (2) Bosses are to be not less than 550 mm diameter or square for 1 AA containers and 457 mm diameter or square for 1 CC and 1 C containers.
- (3).Holes may have a mould draw taper but no part of the bore of the hole may have a diameter less than 350 mm in 1 AA containers and 254 mm in 1 CC and 1 C containers.
- (4) Faces of bosses are to be plane to a tolerances of 0.25 mm and are to be parallel to a base plane determined by front faces of the front corner fittings and recessed 3 to 4.8 mm from this plane.
- (5) Closure devices that the captive to the container are to be provided for closing off the air circulation openings when the container is not connected to a cold air supply and closure devices are to be capable of being sealed for customs requirements.

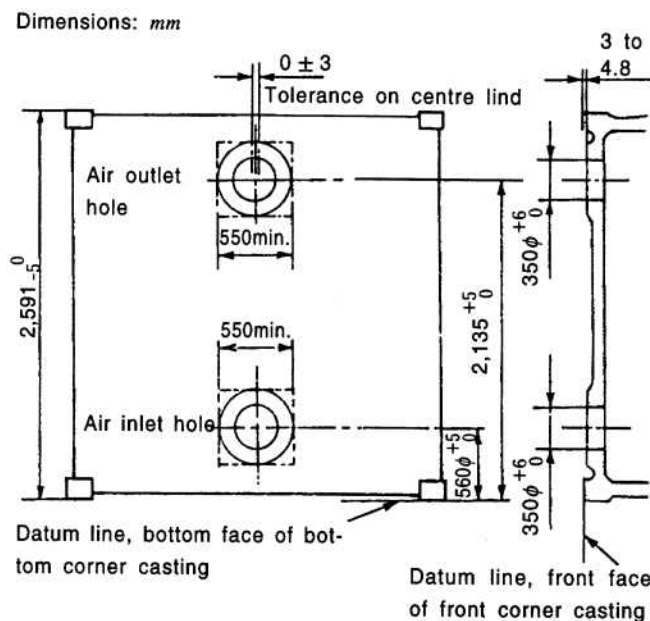


Fig 2.23 Air apertures in end wall of 1AA thermal containers

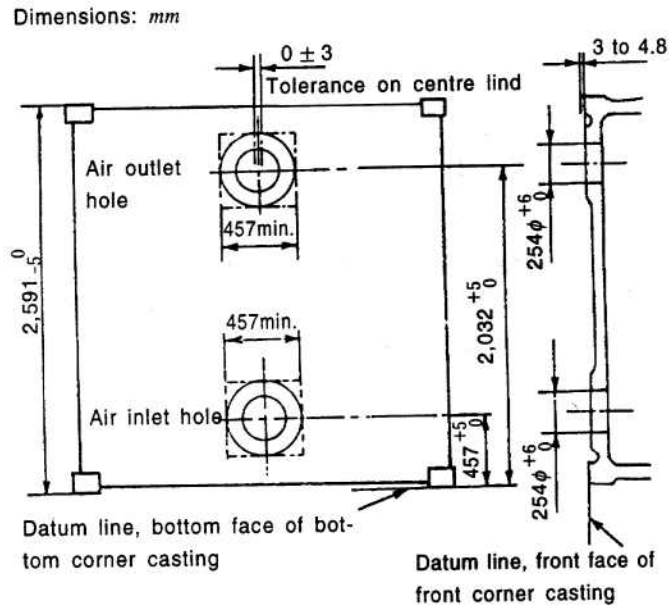


Fig 2.24 Air apertures in end wall of ICC thermal containers

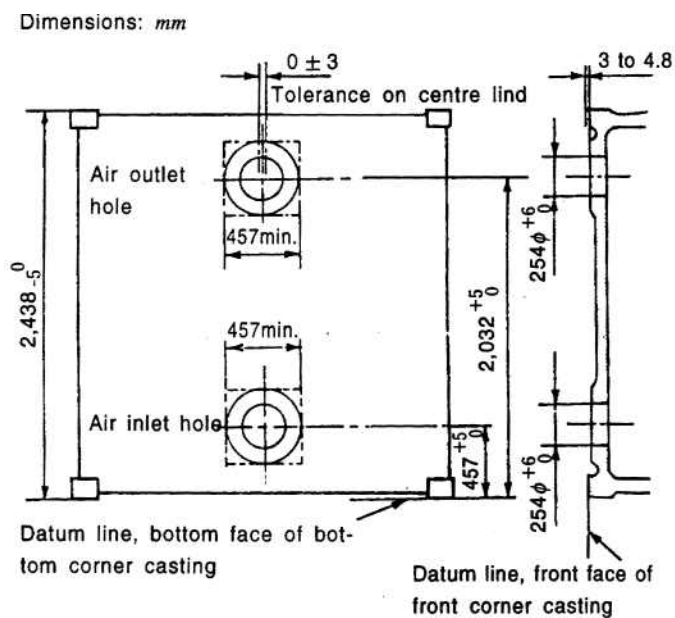


Fig 2.25 Air apertures in end wall of 1C thermal containers

## 8. Sanitary structure

The interior surface and structure of the thermal container are to be so constructed as to facilitate cleaning, and adequate provision to be made to ensure that cleaning water can drain satisfactorily from the inside of the container.

## 9. Drain appliances

- (1) Where provision of drains is made on the floor of the container, such drains are to have a closing device operable from outside the container or arrangement to protect against intrusion of water. Further, the drains are to be so constructed as not to worsen the airtightness of the container remarkably.

- (2) Where cargo space drains are required for cleaning of the interior of the container, they are to be provided with manual closures.
- (3) Where operation of cargo space drains is required for the thermal containers when carrying cargo, the drains are to be protected by fittings which is automatically opened above normal internal operating pressure.

#### 10. Arrangements for hanging cargo

Where on the ceiling of the thermal containers is provided the cargo hanging arrangements, the containers are to be so designed as to be capable of suspending a load of twice the maximum service load or 3,000 kg per meter of the usable container length, whichever is the greater.

#### 11. Temperature measuring device

- (1) The suitable instruments are to be provided for measuring the internal temperature of the thermal containers, and the temperature is to be measured by automatic temperature records.
- (2) Where automatic temperature indicator is used, a suitable device is to be provided for its calibration.

### 705. Type Approval Inspection

#### 1. General

- (1) The items of type approval inspection for thermal containers are to comply with the following.
  - (a) Visual inspection
  - (b) Dimensional inspection
  - (c) Mass measurement
  - (d) Weathertightness
  - (e) Roof strength test
  - (f) Airtightness test
  - (g) Thermal test
  - (h) Performance test for refrigerating unit
- (2) Requirements of tests and inspection prescribed in **Ch 2, 605.** are also applied in addition to those of this chapter.
- (3) Performance tests are to be carried out after successful completion of strength tests.
- (4) All instruments and devices used for performance tests are to be properly selected and periodically calibrated by the authorized calibration agencies to the precision as follows;
  - (a) Temperature measuring devices:  $\pm 0.5$  °C
  - (b) Power measuring system:  $\pm 2$  % of the quantity measured
  - (c) Flow meter system:  $\pm 3$  %
  - (d) Manometer:  $\pm 5$  %
- (5) The test procedure may be modified as appropriate to cater for special feature of the thermal container and special handling arrangements. In such cases, the general principles outlined herein are to be maintained.

#### 2. Roof strength test

During the strength test, roof strength test for hanging cargo (where provided is to be carried out as follows.

- (1) With the container in the normal position supported at the base corner fittings, a load of twice the service load or 3,000 kg per meter of the usable container length, whichever is the greater, is to be suspended from the roof support simulating normal service loading.
- (2) Maximum deflection and permanent set of the section under test are to be measured.
- (3) On completion of the test, container is to show neither permanent deformation nor abnormality which will make it unsuitable for use.

#### 3. Airtightness test

- (1) **Procedure**
  - (a) The test is to be carried out prior to thermal test after successful completion of all strength test.
  - (b) The container is to be in its normal operating condition and to be closed in the normal manner.
  - (c) Temperatures inside and outside the container are both to be within the range of 15 °C to 25 °C and temperatures are to be stabilized within 3 °C of each other.

- (d) The refrigerating unit/or heating equipment are to be fitted in place, except for the container provided with the removable equipment and having closures at the interfaces. In this case, the equipment is to be removed and the closures are to be shut.
- (e) All drain openings are to be closed.
- (f) An air supply through a metering device and suitable manometer is to be connected to the container by a leak-proof connection. The manometer is not to be fitted direct to the air supply pipe.
- (g) Air is to be admitted to the container to raise the internal pressure to  $250 \pm 10$  Pa ( $25 \pm 1$  mm water head height) and the air supply to be regulated to maintain this pressure. After the steady test conditions are established, the test pressure is to be maintained for not less than 30 minutes.

### (2) Measurements

- (a) Internal and ambient temperatures are to be measured.
- (b) Air flow required to maintain the test pressure is to be measured.

### (3) Requirements

The air leakage rate, expressed in standard atmospheric conditions is to be more than  $10 \text{ m}^3/\text{h}$ . However, for each additional door opening (e.g. side doors) provided, an extra rate of  $5 \text{ m}^3/\text{h}$  is to be granted.

## 4. Thermal test

### (1) Procedure

- (A) The test is to be carried out after successful completion of airtightness test.
- (B) The test is to be performed with the refrigerating unit and/or heating equipment fitted in place with all openings closed, except that, where the container is designed for use with removable equipment, the equipment is not to be in position but the closures are to be shut.
- (C) The inner heating method only are to be used in the test. The test is to be performed for a period of not less than 8 hours under steady state condition which is maintained following conditions.
  - (a) Mean wall temperature is to be in the range of minimum  $20^\circ\text{C}$  and maximum  $32^\circ\text{C}$ , and a temperature difference between inside and outside not less than  $20^\circ\text{C}$ .
  - (b) Maximum temperature difference between any two inside points at any one time  $3^\circ\text{C}$ .
  - (c) Maximum temperature difference between any two outside points at any one time  $3^\circ\text{C}$ .
  - (d) Maximum difference between any two average inside air temperatures,  $\theta_i$  at different times  $1.5^\circ\text{C}$ .
  - (e) Maximum difference between any two average outside air temperatures,  $\theta_e$  at different times  $1.5^\circ\text{C}$ .
  - (f) Maximum percentage difference between lowest and highest power dissipation values is not to exceed 3% of the lowest figure.
- (D) The inside and outside temperature-measuring points of containers under the test are to be given in **Fig 2.26** and **Fig 2.27**.

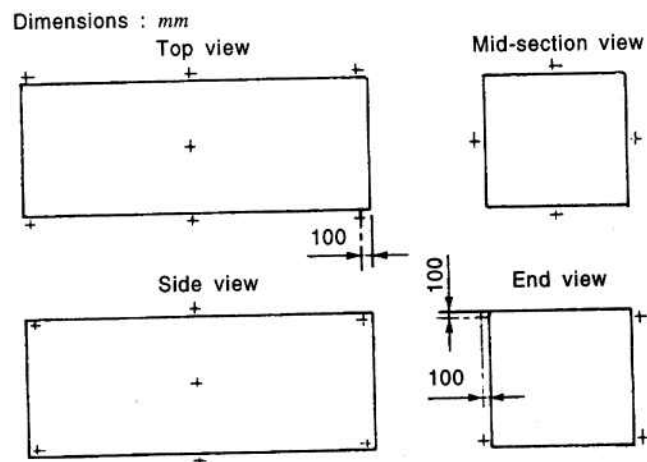


Fig 2.26 Outside Air Temperature Measurement Points

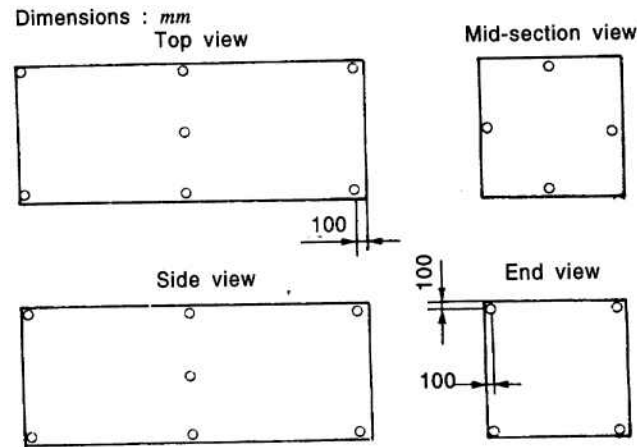


Fig 2.27 Inside Air Temperature Measurement Points

- (E) For the electrical heating method, a non-radiant heater suitably shield and circulating fan(s) are to be positioned at the geometric center of the container and electric heating element(s) are to be operated at temperature sufficiently low to minimize radiation effect. Furthermore the heat from the element(s) is to be distributed by a fan or fans delivering a quantity of air sufficient, but not exceeding the level necessary, to ensure that the temperature distribution inside the body of the container is within the limit in (C) above.
- (F) Air is to be circulated over the exterior surfaces of the container at a velocity not exceeding 2 m/sec at points approximately 100 mm from the mid-length of the side walls and roof of the container.
- (G) All temperature-measuring instruments placed inside and outside the container are to be protected against radiation.
- (H) The heat leakage is to be expressed by the total heat leakage rate,  $U_{\theta}$ , which is given by the following formula:

$$U_{\theta} = \frac{Q}{\theta_i - \theta_e}$$

$U_{\theta}$ : The total heat leakage rate (W/°C)

$Q$ : The power dissipated or absorbed by the operation of internal heaters and fans (W).

$\theta_i$ : The average inside temperature of the container (°C).

$\theta_e$ : The average outside temperature of the container (°C).

- (I) The mean wall temperature is defined by the following formula.

$$\theta = \frac{\theta_e + \theta_i}{2}$$

## (2) Measurements

Data of outside and inside temperatures of the container and power dissipation value are to be taken at intervals of not more than 30 minutes, and the heat leakage  $U$  is to be calculated from the average of the 17 or more sets of reading using the following formula and the value of  $U$  obtained from this formula is to be recorded together with the mean of the mean wall temperature(s) which were maintained during the test period.

$$U = \frac{1}{n} \sum_{i=1}^n U_{\theta} \text{ (sets of reading: } n \geq 17)$$

## (3) Requirements

The heat leakage,  $U$ , obtained from (2) is to be not more than the value prescribed in **704. 2**.

## 5. Performance test of refrigerating unit

### (1) Procedure

- (a) The performance test of refrigerating unit is to be carried out after successful completion of thermal test.
- (b) The container fitted with a refrigerating unit is to be placed in a test chamber where the temperature is held constant at the outside temperature prescribed in **704. 2 (2)** and the inside temperature measured at points specified in **Fig 2.27** are not to exceed the specified temperature prescribed in **704. 2 (2)**
- (c) The outside air velocity is not to exceed 2 m/sec at a distance of 100 mm from the side of the container. The inside air velocity is to be produced by the evaporator fans and, fans associated with heaters.
- (d) The test is to be carried out on the container in its normal operating condition. Floor drains, defrost drains (where fitted) and relief valves are to be in their operation states, and doors and vent devices are to be closed in the normal manner.
- (e) At this point the unit may be defrosted; if this done, steady-state conditions are to be re-established prior to continuing the test.
- (f) Using the refrigerating unit, the inside temperature of the container is to be cooled down to  $-18\text{ }^{\circ}\text{C}$  and then maintained this temperature for a period of 8 hours.
- (g) After completion of the above-mentioned test, a non-radiant heater placed in the air stream inside the container is to be turned on, having a capacity of at least 25 % of the total heat transfer rate ( $U_{\theta}$ ) of the container established by the thermal test prescribed in **705. 4**. With the heater in operation, the average internal temperature of the container is to be maintained at the specified inside temperature for a period of at least 4 hours. The capacity of the heater is defined by the formula below:

$$\text{Heating Capacity} = 0.25 U_{\theta} ( \theta_e - \theta_i )$$

- (h) The measuring points of temperature for outside of the container are to be in the place prescribed in **Fig 2.26** and for inside of the container the temperatures at air inlet and outlet are to be recorded at least.

### (2) Measurements

- (a) During the periods of 8 hours and 4 hours of steady-state operation, the inside and outside temperature are to be recorded at intervals not exceeding 30 min.
- (b) The power dissipated of electrical heater is to be recorded.

### (3) Requirement

It is to be confirmed that the average inside temperature of the container is to be maintained at the specified temperature during the test.

## 706. Production Unit Inspection for Type-Series Containers

The kinds of tests and inspections for production unit inspection of type-series container are as specified in **Ch 2, 403**. and to be carried out in accordance with the requirements of **705**. and **Ch 2, 605**.

## Section 8 Tank Containers

### 801. Application

1. The requirements in this chapter apply to the type approval test and production unit inspection of tank containers for the carriage of liquids and gases with a maximum allowable working pressure of 0.3 bar (30 kPa, 50 °C) gauge or above.
2. Tank containers to be used for the carriage of dangerous goods are to be applied by this Rule, in addition to the requirements of the relevant Government regulations and *IMDG Code* (international maritime dangerous goods code) etc.
3. Tank and its associated fittings are to be suitably designed, manufactured and tested in accordance with the requirements of this chapter, in addition to the requirements of regulations deemed necessary by the Society.

### 802. Materials and Workmanship

Materials and construction used in the tank containers are to be applied by following requirements, in addition to the requirements of **Ch 2, 602**.

- (1) The materials selected for the tank are not to cause a dangerous reaction in contact with the contents. Allowance for corrosion is to be at the discretion of the Society.
- (2) For the materials of *ISO* containers, the minimum temperature range over which materials are to be suitable is -10 °C to +50 °C.

### 803. Dimensions and Ratings

1. External dimensions, permissible tolerances and ratings for tank containers are to comply with the requirements prescribed in **Ch 2, 603. 1**. However, internal dimensions are not to be applied.
2. No part of the tank container and its associated fittings or equipment are to project beyond the overall external dimensions.

### 804. Design Conditions

#### 1. Design load

- (1) The tank container is to be capable of withstanding the loads and loadings specified in **Table 2.8**, when loads or loadings are removed, container is not to show permanent deformation or abnormality which will make it unsuitable for use.
- (2) Each tank container shall be designed to withstand the effects of inertia of the tank contents resulting from transport motions. For design purposes, the effects may be taken to be equivalent to loadings of  $2 R_g$  longitudinally,  $R_g$  laterally and  $2 R_g$  vertically.

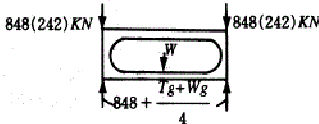
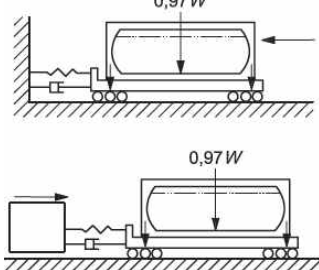
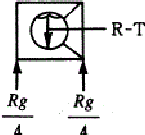
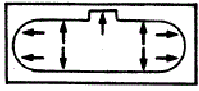
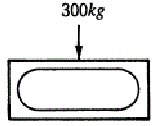
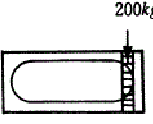
#### 2. Framework

- (1) Corner fittings of tank containers are to be applied in accordance with the requirements in **Ch 2, 604. 2**. In particular, the upper faces of top corner fittings are to protrude above the top of all other components of tank container by a minimum of 6 mm.
- (2) Base structure of tank container is to be in accordance with the requirements in **Ch 2, 604. 3**. and gooseneck tunnel of tank container is to be in accordance with the requirements in **Ch 2, 604. 8**. When the tank container is loaded to R, no part of the tank and its associated shell fittings are to project below a plane 25 mm above the bottom faces of the lower corner fittings.
- (3) End structure of tank container is to be in accordance with the requirements in **Ch 2, 604. 4**.
- (4) Side structure of tank container is to be in accordance with the requirements in **Ch 2, 604. 5**.

#### 3. Optional features for framework

- (1) In principal, fork-lift pocket is not to be provided in tank containers. However, where fork-lift pocket is required by the Owner is to be at the discretion of the Society.
- (2) Where tank containers are provided with the features for handling tank containers by means of grapples or similar devices is to be in accordance with the requirements in **Ch 2, 604. 9**.
- (3) Where provided, walkways are to be designed to withstand a loading of 3 kN uniformly distributed over an any area of 600 mm × 300 mm.  
Longitudinal walkways shall have a minimum width of 400 mm.
- (4) Where provided, ladders are to be designed to with stand a load of 200 kg on any rung.

Table 2.8 Load Condition

Item	Where Applied	Direction	Notes
Stacking	Top corner fittings Off-set: -38 mm longitudinally -25.4 mm laterally	Other than 1 D and 1 DX contain- ers	3392 kN (848 kN per top corner fitting)
			896 kN (224 kN per top corner fitting)
Top Lifting	As specified in Ch 6, Table 6.3		
Bottom Lifting	As specified in Ch 6, Table 6.3		
Longitudinal Restraint	As specified in Ch 6, Table 6.3		
Transverse Racking	As specified in Ch 6, Table 6.3		
Longitudinal Racking	As specified in Ch 6, Table 6.3		
Grappler lift (where fitted)	As specified in Ch 6, Table 6.3		
Internal restraint (longitudinal) dynamic	All		0.97W
Lateral Inertia	Side of barrel wall	Outerwards normal to the side	Uniformly distributed load 1.0 P
			
Internal Pressure	Tank or fluid-tight compartment		Minimum 1.5 times of Concentrated eccentrically applied load design pressure
Walkway	Walkway (An area of 600 mm × 300 mm Located at the weakest area)	Vertically upwards	300 kg
			
Ladder	2 Point on any rung in both end of ladder	Vertically upwards	200 kg
			



#### 4. Tank structure

- (1) Each tank or tanks are to be firmly secured to structural elements of the tank framework. The tank or tanks are to be capable of being filled and emptied without removal from the framework.
- (2) Tanks or tank compartments without vacuum relief devices are to be designed to withstand an external pressure of at least 0.4 bar (39.2 kPa) above the internal pressure. However, tanks equipped with vacuum relief valves are to be designed to withstand an external over-pressure of 0.21 bar (20.6 kPa) or greater.
- (3) All tank openings except pressure relief devices are to be provided with adequate closures of capable of being sealed up to prevent accidental escape of the contents, and closure devices are to be capable of being sealed for customs requirements.
- (4) Tank nozzles and outlet fittings are to be substantially made and attached to the tank in such a manner as to minimize the risk of breakage. Protective covers or housings are to be employed as necessary.
- (5) All tank openings located below the normal liquid level of the contents and fitted with a valve capable of being operated manually are to be provided with an additional means of closure on the outlet side of valve. Such additional means of closure may be a fluid-tight cap, bolted blank flange or other suitable protection against accidental escape of the contents.
- (6) All valves, whether fitted internally or externally, are to be located as close to the tank shell as practicable.
- (7) Stop valves with screwed spindles are to be closed by clockwise motion of the hand-wheel.
- (8) All tank connections, such as nozzles, outlet fittings and stop valves, are to be clearly marked to indicated their appropriate functions.

#### 5. Pressure relief devices

- (1) Each tank or compartment thereof intended to carry non-dangerous cargo is to be fitted with a pressure relief device set to be fully open at a pressure not greater than the tank's test pressure. Such devices are to be connected to the vapour space of the tank and located as near to the top of the tank and as near to the tank's or tank compartment's mid-length as practicable where inspection can be readily conducted.
- (2) Above mentioned pressure relief devices are to have a minimum relief capacity of 0.05 m<sup>3</sup>/sec at standard air [1 bar (100 kPa) 15 °C] to prevent excessive internal overpressure under non-emergency conditions.
- (3) Tanks, or a compartment thereof, intended for the carriage of dangerous goods are to be provided with pressure relief devices meeting the relevant regulations to the satisfaction of the competent authority and international convention.
- (4) Tank container will be utilized for both dangerous and non-dangerous cargo, the relief devices are to be set in accordance with (3).
- (5) Each pressure relief device is to be plainly and permanently marked with the pressure at which it is set to operate.
- (6) A tank container, or a compartment thereof, with external design pressure of less than 0.4 bar (40 kPa) is to be equipped with a vacuum relief device set to relieve at 0.79 bar (79 kPa) absolute, except that a lower absolute setting may be utilized provided that the external design pressure is not exceeded. The vacuum relief device is to have a minimum through area of 284mm<sup>2</sup>.

#### 6. Manholes

Each tank is to be provided with manholes or other openings of a minimum diameter of 500 mm to permit internal inspections and repairs.

#### 7. Gauging devices

Gauging devices which may be indirect communication with the contents of tank are not to be made of easily destructible material.

#### 8. Optional features for tank

- (1) When insulation is provided, the design and construction are to be such that the insulation will in no way impinge on the requirements in **802**. nor interfere with the proper function of the tank fittings.
- (2) When heating or refrigeration provisions are required, due consideration is to be given to the safety of the tank and its contents. Suitable safeguards are to be provided to avoid the development of excessive temperature and stresses. Such safeguards are to be easily operable.

- (3) Adequate provision shall be made for the sealing of the tank in accordance with international customs agreements.

## 805. Type Approval Inspection

### 1. General

- (1) The test items of type approval test for the tank containers are to comply with the followings.
  - (a) Visual inspection
  - (b) Dimensional inspection
  - (c) Mass measurement
  - (d) Strength tests
  - (e) Pressure test
- (2) The tests and inspections procedures are to be in accordance with the requirements **Ch 2, 605**, unless otherwise prescribed in this chapter.
- (3) The test procedure may be modified and omitted as appropriate to cater for special features of tank containers.
- (4) Where electrical equipment is fitted on the tank container, the installation is to be inspected and found satisfactory in accordance with the requirements of standards acceptable by the Society.

### 2. Visual inspection

For insulated tank containers, the visual inspection is to be conducted prior to commencement of the insulating work.

### 3. Strength tests

- (1) Strength tests are to be carried out as specified in **Table 2.9** after completion of all the work. However internal restraint (longitudinal) dynamic test (dynamic longitudinal impact test) is to be carried out as specified in **4**.
- (2) In the strength tests measurements are to be taken as required in **Table 2.9**. Additional measurements may be required, where deemed necessary by the Society.
- (3) The required loadings in each test are to be applied in such a manner as to allow free deflection of the container section under test.
- (4) The tank container is to be loaded with a suitable fluid to the material to achieve the test load or loading specified. And, when the load at a suitable fluid or dry bulk less than specified internal load, a supplementary load distributed over the length of tank is to be added to the container.
- (5) Upon completion of the longitudinal or lateral inertia test the tank itself and the tank-to-frame work connection are not to show crack or deformation.
- (6) Upon completion of the test, the container is to show neither permanent deformation nor abnormality which will make it unsuitable for use.

### 4. Internal restraint (longitudinal) dynamic tests (dynamic longitudinal impact test)

#### (1) Test container

Ensure the tank container under test (hereafter referred to as container-under-test) is representative of the tank container design for which conformity confirmation is being sought (design type). Permitted design variations:

- (a) a reduction of 10 % or an increase of 20 % in capacity (resulting from variations in diameter and length);
- (b) a decrease in maximum gross mass;
- (c) an equal or greater thickness, independent of design pressure and temperature;
- (d) a change to the grade of material of construction provided that the permitted yield strength meets or exceeds that of the tested container;
- (e) a change of location or a modification to nozzles and manways.

#### (2) Test platform

The test platform shall be

- (a) configured so as to allow the container-under-test to be mounted as close as possible to the impacting end;
- (b) fitted with four securing devices in good condition;
- (c) equipped with a cushioning device for the purpose of achieving a suitable duration of impact.

Table 2.9 Test Procedures and Measurements

Tests	Procedures and Measurements
Stacking	Procedure: As specified in <b>Ch 2, 605, Table 2.5</b> . However, internal loading need not provided during test. Measurements: As specified in <b>Ch 2, 605, Table 2.5</b> .
· Top/Bottom Lifting · Longitudinal Restraint · Transverse Racking · Longitudinal Racking · Grappler Arm	As specified in <b>Ch 2, 605, Table 2.5</b> .
Internal restraint (longitudinal) dynamic	As specified in <b>Ch 2, 805. 4</b> .
Lateral Inertia	Procedure: Internal load and application: With <i>R-T</i> internal load, the container is to be positioned with its transverse axis vertical and supported by its four bottom corner fittings. The container is to be supported for 5 minutes. Measurements: Diagonal dimension at end section of framework and deflection of tank wall at lower part.
Walkway	Procedure: Internal load: Nil. Applied loads: 300 kg uniformly distributed over a 600 mm × 300 mm an any area of the walkway. Measurements: Maximum deflection and permanent set of the walkway under test.
Ladder	Procedure: Internal load: Nil. Applied loads: 200 kg on center of rung. Measurements: Maximum deflection and permanent set of the ladder under test.
Pressure	Procedure: The Pressure test is to be carried out after all strength test have been completed. The tank container together with its associated pipework and fittings is to be hydrostatically tested to a test pressure not less than 1.5 times the maximum allowable working pressure or design pressure. The test pressure is to be measured at the top of the tank in its normal position and is to be maintained to enable a complete examination of tank. The test pressure to be maintained for not less than 30 minutes. Relief devices, where fitted, are to be rendered in operative or removed. For test procedures other than the above, special consideration may be given by the Society.

**(3) Impact creation**

(A) The impact may be created by:

- (a) the test platform striking a stationary mass, or
- (b) the test platform being struck by a moving mass.

(B) When the stationary mass consists of two or more railway vehicles connected together, each railway vehicle shall be equipped with cushioning devices. Free play between the vehicles shall be eliminated and the brakes on each of the railway vehicles shall be applied.

**(4) Measuring/recording system**(A) Unless otherwise specified within this International Standard, the measuring system shall comply with *KS R ISO 6487*.

(B) The following equipment shall be available for the test:

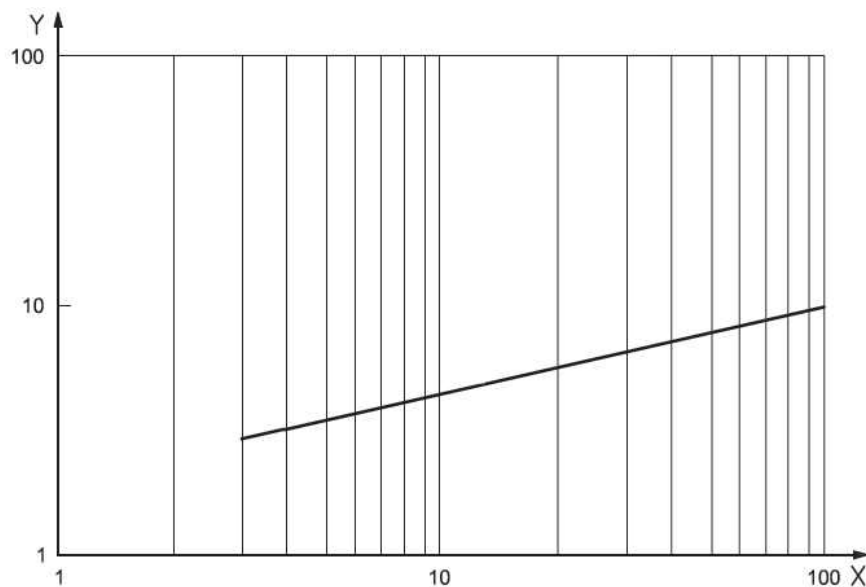
- (a) Two accelerometers with a minimum amplitude range of 200g, a maximum lower frequency limit of 1 Hz and a minimum upper frequency limit of 3,000 Hz. Each accelerometer shall be rigidly attached to the outer end or side face of the two adjacent bottom corner fittings closest to the impact source, and aligned so as to measure the acceleration in the longitudinal axis. The preferred method is to attach each accelerometer to a flat mounting plate by means of bolting and to bond the mounting plates to the corner fittings.

(b) A method of measuring the impact velocity.

- (c) An analogue-to-digital data acquisition system capable of recording the shock disturbance as an acceleration versus time history at a minimum sampling frequency of 1 000 Hz and incorporating a lowpass anti-aliasing analogue filter with a corner frequency set to a minimum of 200 Hz and a maximum of 20 % of the sampling rate and a minimum roll off rate of 40 dB/octave.
- (d) A method of permanently storing in electronic format the acceleration versus time histories so that they can be subsequently retrieved and analysed.

**(5) Procedure**

- (a) The container under test shall be filled, before or after mounting on the test platform, with a quantity of water or any other non-pressurized product to approximately 97 % volumetric capacity, ensuring that it is not pressurized during the test. However, if for reasons of overload it is not possible to fill to 97 % of the capacity, then the test mass of the container (tare and product) shall be as close as possible to R. Measure and record the as-tested payload mass.
- (b) The container under test shall be placed on the test platform as close as possible to the impacting end, with the container end considered to be more vulnerable to impact damage facing the point of impact. All four bottom corners of the container shall be locked in position by means of the corner fittings restraining movement in all directions.
- (c) Create an impact such that for a single impact the as tested SRS at both corner fittings equals or exceeds the minimum SRS shown in **Fig 2.28** at all frequencies within the range 3 Hz to 100 Hz.(Repeated impacts may be required to achieve this result.)
- (d) Examine the container under test for evidence of any faults and record the result.



**Key**

X Frequency (Hz)

Y Acceleration, g (m/s<sup>2</sup>)

Equation for generating the above minimum SRS curve:  $ACCEL = 1,95 FREQ^{0,355}$

**Fig 2.28 Minimum SRS Curve (5 % Damping)**

**(6) Analysis/processing of data**

Analysis and processing of the acceleration time history data obtained from test specified in (5) above shall be in accordance with *ISO 1496-3, Annex D*

**(7) Requirements**

On completion of the test, the tank container shall not show leakage or permanent deformation or abnormality that will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

### 5. Pressure test

- (1) The pressure test is to be carried out as specified in **Table 2.9** after all strength tests have been completed.
- (2) Upon completion of the test, the container is to show no leakage, no permanent deformation or abnormality which will render it unsuitable for use.

### 806. Production Unit Inspection for Type-Series Containers

1. The kinds of tests and inspections for production unit of type-series containers, are as specified in **Ch 2, 403.** and to be carried out in accordance with the requirements in **805.** and **Ch 2, 605.** unless otherwise specified herewith.
2. For insulated tank containers, the visual inspection is to be conducted prior to commencement of the insulating work.
3. For production line containers, the pressure test is to be carried out at a reasonable stage during production. In the case of insulated tank containers, the pressure test is to be carried out prior to commencement of the insulating work. ↓

(2019)



## APPROVAL CERTIFICATE FOR MANUFACTURING PROCESS

Certificate No. : Initial Approval :  
 Product :  
 Manufacturer :  
 Product Description :

Approval Condition :

**THIS IS TO CERTIFY** that the manufacturing process for the above mentioned product has been approved in accordance with the relevant requirement of this Society's Rules and / or of the recognized standards as follows and entered in the "List of Approved Manufacturers and Type Approved Equipment".

Issued at on



This e-certificate is signed electronically in accordance with IMO FAL.5/Circ.39/Rev.2. Validation and authentication of the certificate can be confirmed from "<http://e-cert.krs.co.kr>" by using the tracking No. (ME ) and certificate No.( )



KOREAN REGISTER OF SHIPPING

General Manager of  
Marine & Ocean Equipment Team

Note 1. This certificate will be valid subject to complying with the approval conditions described on the certificate and/or on the Rules of this Society.  
 2. This certificate will be invalid from the expiry date aforementioned unless the extension or renewal has been granted to the applicant or the manufacturer.  
 3. Any significant modifications or changes in design or construction to the above product without approval from this Society will render this certificate invalid.  
 4. Should the specified rules, regulations or standards be amended during the validity of this certificate, the product is to be re-approved by this Society in accordance with the requirements as amended.

Form AC-1X (2019.01)

[별지 제62호서식]

제 호 Certificate No.			
컨테이너형식승인시험합격증서 Certificate for Type Approval Test of Freight Container			
신청인 (Applicant)	①상 호 Company Name		
	②대 표 자 Representative		
	③사업자등록번호 Registration No.		
	④주 소 Address		
컨테이너 Container	⑤품 명 Kind of Container		
	⑥규 격 Size		
	⑦형 식 Type		
⑧제 조 번 호 Manufacturer's Serial No.		⑨제 조 일 자 Date of Manufacture	
⑩비 고 Remark			
<p>「선박안전법 시행규칙」 제58조 제4항에 따라 이 증서를 발급합니다.                  This certificate is issued in accordance with Article 58.4 Enforcement Decree of the Ship Safety Act.</p> <p style="text-align: center;">                     년            월            일                      Year            Month            Date                 </p> <p style="text-align: center;">                     (사)한국선급 회장 인                      Korean Register of Shipping                 </p>			

210mm × 297mm[보존용지(1종) 220g/m<sup>2</sup>]

[별지 제64호서식]

제 호 Certificate No.					
컨테이너검정증서 CERTIFICATE OF INSPECTION ON ARTICLES FOR SHIP USE OF APPROVED TYPE					
신청인 Applicant	①상 호 Company				
	②대표자 Name				
	③사업자등록번호 Registration No.				
	④주 소 Address				
컨테이너의 내용(PARTICULAR OF ARTICLES)					
⑤형식승인증서 번호 Type Approval Certificate No.	⑥규격 Size	⑦형 식 Type	⑧수 량 Quantity	⑨제 조 번 호 Manufacturer. Serial No.	⑩제 조 일 자 Date of Manufacturer.
⑪비고 Remarks					
<p>「선박안전법」 제23조제4항 및 같은 법 시행규칙 제59조제2항에 따라 대한민국 정부의 권한으로 이 증서를 발급합니다.</p> <p>This certificate is issued in accordance with Article 23.4 of the Ship Safety Act and Article 59.2 Enforcement Decree of the Ship Safety Act and the provisions of CSC under the authority of the Government of Republic of Korea.</p> <p style="text-align: center;">년            월            일 Y            M            D</p> <p style="text-align: center;">(사)한국선급 회장 인 Korean Register of Shipping</p>					

210mm × 297mm[보존용지(1종) 220g/m<sup>2</sup>]



## CHAPTER 3 GUIDANCE FOR APPROVAL OF CONTAINERS(TIR CONVENTION)

### Section 1 General

#### 101. General

##### 1. Application

- (1) The requirement in this Chapter is to apply to the procedure of application, testings and inspections, certificates, etc. of freight containers when the Type Approval and individual inspection are to be carried out by the Society in accordance with the provisions of the relevant Government regulations which implement CUSTOMS CONVENTION ON THE INTERNATIONAL TRANSPORT OF GOODS UNDER COVER OF TIR CARNETS 1975 (hereinafter referred to as "TIR CONVENTION" and CUSTOMS CONVENTION ON CONTAINERS, 1972.
- (2) For the technical conditions of the containers not fully covered in this Chapter, TIR CONVENTION, CUSTOMS CONVENTION ON CONTAINERS and the relevant Government regulations which implement these conventions are to be applied.

##### 2. General Condition of Container

The term "Container" is to mean an article of transport equipment (life-van, movable tank or other similar structure):

- (1) fully or partially enclosed to constitute a compartment intended for containing goods;
  - (2) of a permanent character and accordingly strong enough to be suitable for repeated use;
  - (3) specially designed to facilitate the transport of goods by one or more modes of transport without intermediate reloading;
  - (4) designed for ready handling, particularly when being transferred from one mode of transport to another;
  - (5) designed to be easy to fill and to empty; and
  - (6) Having an internal volume of one cubic metre or more;
- "Demountable bodies" are to be treated as containers.

##### 3. Basic Principle of Type Approval and Production Unit Inspection

In order that the containers are to be used for the international transport of goods under Customs seal, the Society approves only those that are manufactured and equipped in conformity with the requirements laid down in **Annex 7** to TIR CONVENTION— as prescribed in **Article 13** of the Convention— and Annex 4 to CUSTOMS CONVENTION ON CONTAINERS— as prescribed in **Article 12** of the Convention. (refer to attached in **appendix 3-1**).

##### 4. Validity

The relevant portions of this Chapter apply also to containers of special types not fully covered in this Chapter in association with additional requirements (these are to satisfy the requirements prescribed in **Article 13** of TIR CONVENTION and are to contain no risks of smuggling) as may be considered appropriate in an individual case.

#### 102. Definitions

Terms used in this Chapter are defined as follows, unless otherwise specially provided.

1. "Type Approval" is to approve a design—type after a inspection of the prototype container manufactured in accordance with the character of the design—type and found satisfactory by the Society at a stage of manufacture.
2. "Design Type-Series container" means the containers manufactured in series with the same characteristics as the approved prototype container.
3. "Approval by individual (or specified numbers of the same type) inspection" at a stage subsequent to manufacture is to approve the containers which have been inspected and found satisfactory by the Society, either individually or in respect of a specified number of containers of the same type. These approvals are valid only to those containers approved earlier individually or in respect of a

specified number.

4. "Inspection" is to examine that the produced containers are manufactured in conformity with the provisions of this Rule, prior to Approval by design type or by individual inspection.
5. "Production unit inspection" is to confirm that the produced design type series containers are manufactured in accordance with the same characteristics as the approved prototype container.

### 103. Fees

When the Type Approval, Individual Approval and Production unit Inspection of containers are carried out by the surveyors of the Society, fee will be charged for surveys and the certificates issued in accordance with fee regulations of the Society.

## Section 2 Type Approval

### 201. General

1. The requirements of this Section are applied in case that the container manufacturers are to obtain the Type Approval at the manufacturing stage in accordance with the provisions of TIR CONVENTION and CUSTOMS CONVENTION ON CONTAINERS.
2. In order to be approved according to the provision of above **1**, the prototype container manufactured in conformity with the characteristics of the design type is to be inspected, in advance, by the Society.

### 202. Application of Type Approval

A manufacturer who wants to obtain a Type Approval of container is required to submit an application sheet of **appendix 3-2** with plans and documents prescribed in **203.** to the Society.

### 203. Plans and Documents to be Submitted

1. The following plans and documents are to be submitted for an application of Type Approval
  - (1) Specifications
  - (2) Plans showing in detail an important feature of structure
  - (3) Marking method of manufacturer's serial number, etc.
  - (4) Manufacturer's covenant (refer to the back of the application sheet)
  - (5) Any other matters which may be required by the Society
2. The Society may require partial alterations to the design when necessary in order to conform to the provisions of Conventions and Rules.

### 204. Type of Container

A type of container means a certain type of containers built in accordance with the same basic design and specifications. However, the Society may consider it the same type as the original one, even if minor alterations, which approved by the Society within the limits of the requirements prescribed in **Article 13** of TIR CONVENTION and have no risks of smuggling, are made in the certain type of containers already approved.

### 205. Certificate of Type Approval and Approval Plate

1. A Type Approval Certificate will be issued in **appendix 3-3** by the Society to the type of container which is satisfactory in plan approval and prototype inspection in accordance with the provisions of **203.**
2. The approval plate to be affixed to a approved container is to meet the provision of **405., Ch 2.**

### 206. Approval for a Alteration of Design Type

For any alteration of the already approved design type, the container manufacturer is required to submit the plans and documents in which details of alteration is prescribed to the Society for approval.

### 207. An Exception for Containers to be Exported

In case an inspection for containers to be exported is carried out by other Authorized Inspection Agency, the procedure for Type Approval is as follows.

1. An application form, documents and plans prescribed in **202.** and **203.** are to be submitted with a certificate showing that the concerned containers have passed the inspection of the Authorized Inspection Agency.
2. Inspections for approval of these containers may be omitted, provided that the submitted certificate prescribed in above **1** is found satisfactory by the Society.

**208. Validity of Type Approval**

A Type Approval of container is to lose validity, for the particular containers, in case that;

1. The major parts of container are repaired or a substantial characteristics of container are altered without approval of the Society.
2. A container no longer complies with the technical conditions prescribed for its original approval.

## Section 3 Individual Approval

### 301. General

1. The requirements of this chapter are applied in case that the container manufacturers obtain an approval at a stage subsequent to manufacture, either individually or in respect of a specified number of containers of the same type, in accordance with the provisions of TIR CONVENTION and CUSTOMS CONVENTION ON CONTAINERS.
2. In order to be approved according to the provision of above **1**, the containers are to be inspected, in advance, by the Society.

### 302. Application of Individual Approval

A manufacturer who wants to obtain a Individual Approval of container is required to submit an application sheet of **appendix 3-2** with plans and documents prescribed in **303.** to the Society.

### 303. Plans and Documents to be Submitted

1. The following plans and documents are to be submitted for an application of the approval.
  - (1) Plans showing in detail an important feature of structure
  - (2) Any other matters which may be required by the Society
2. The Society may require an additional plans and documents depending on circumstances.

### 304. Certificate of Individual Approval and Approval Plate

1. An Individual Approval Certificate will be issued in **appendix 3-4** by the Society to the containers which are satisfactory in approval of plans and individual inspections in accordance with the provisions of **203.**
2. An Approval Plate to be affixed to the approved container is to meet the provision of **405., Ch 3.**

### 305. An Exception for Containers to be Exported

In case that an inspection for containers to be exported is carried out by other Authorized Inspection Agency, the procedure for approval is as follows.

1. An application sheet, documents and plans prescribed in **302.** and **303.** are to be submitted with a certificate showing that the concerned containers have passed the inspection of the Authorized Inspection Agency.
2. An inspection for approval of these containers may be omitted, provided that the submitted certificate prescribed in **above 1** is found satisfactory by the Society.

### 306. Validity of Individual Approval

The Validity of Individual Approval of containers is to comply with the requirements in **208., Ch 3.**

## Section 4 Production Unit Inspection

### 401. General

The provisions of this chapter apply to an inspection of each production unit which is to be carried out before the containers are used for international transport under Customs seal, when the design-type series containers are going to be manufactured in series in accordance with the approved design type.

### 402. Application of Production Units Inspection

A manufacturer who wants to get a production unit inspection is to submit an application sheet of **appendix 3-2** to the Society.

### 403. Presentation of Approved Plans and Documents

The surveyor may require the presentation of the approved plans and documents of relevant containers depending upon the circumstances.

### 404. Inspection

A production unit inspection is carried out by confirming that the design-type series containers have been manufactured in accordance with the approved plans and documents and conform to the required technical condition,

### 405. Certificate for Production Unit and Approval Plate

1. A Container Production Unit Certificate will be issued in **appendix 3-6** by the Society to the containers which have passed the inspections in accordance with the provision of **404**.
2. The manufacturer is to affix permanently the approval plate as shown in **appendix 3-5** in a clearly visible place outside of the door by means of welding, bolting, riveting, etc., to the containers which production unit certificates are issued to. ↓

## APPENDIX 3-1 Regulation on Technical Conditions

### 1. General

The provisions of this Regulation set the technical requirements that containers, which they transport under Customs seal, are to meet for being approved by the Society.

### 2. Basic Principles

Approval for the international transport of goods under Customs seal may be granted only to containers constructed and equipped in such a manner that:

- (1) No goods can be removed from, or introduced into, the sealed part of the container without leaving visible traces or without breaking the Customs seal;
- (2) Customs seals can be simply and effectively affixed to them;
- (3) They contain no concealed spaces where goods may be hidden;
- (4) All spaces capable of holding goods are readily accessible for Customs inspection.

### 3. Structure of Containers

- (1) The constituent parts of the container, door and all other closing systems, apertures for ventilation and drainage are to comply with the requirements in **2** above.

#### (A) *Constituent parts of the container*

- (a) The constituent parts of the container such as sides, floor, doors, roof, uprights, frames, cross-pieces, etc. are to meet the following requirements.
  - (i) These are to be assembled either by means of devices which cannot be removed and replaced from the outside without leaving visible traces or by such methods as will produce a structure which cannot be modified without leaving visible traces.
  - (ii) When the sides, floor, doors and roof are made up of various components, these are to meet the same requirements and be of sufficient strength.
- (b) Joining devices for assembly of constituent parts are to be constructed by the following methods.
  - (i) Where joining devices (rivets, screws, bolts and nuts, etc.) are used, a sufficient number of such devices are to be inserted from outside, traverse the assembled constituent parts, protrude inside and there be firmly secured. However, conventional rivets (rivets whose placing requires handling from both sides of the assembly of constituent parts) may also be inserted from the inside.
  - (ii) The following methods are to be used, in principle, for securing firmly.
    - ① Welding
    - ② Riveting (except expansion rivets, blind rivets and the like)
    - ③ Bushing the protruded end
    - ④ After bolting, swaging the protruded end of bolt
    - ⑤ After bolting, welding on the nut
- (c) Notwithstanding the above, load compartment floors may be secured by means of self-tapping screws, or self-drilling rivets or rivets inserted by means of an explosive charge, when placed from inside and passing at right-angles through the floor and the metallic cross-pieces underneath, on condition, except in the case of self-tapping screws, that some of their ends be flush with the level of the outside part of the cross-piece or be welded on to it.
- (d) The number of joining devices is to be so sufficient as to give the assembly of constituent parts enough strength.
- (e) Where, due to technical reasons, it is not practicable to secure parts in the manner described in sub-paragraphs (b) and (c), the constituent parts may be joined by means of the devices such as expansion rivets, blind rivets, and the like of this note provided that the devices used on the inner face of the wall are not accessible from the outside.

#### (B) *Doors and other closing system*

- (a) Doors and all other closing system (including stopcocks, manhole-covers, flanges, etc.) are to comply with the following requirements.
  - (i) These are to be fitted with a device on which Customs seals can be fixed. This devices must be such that it cannot be removed and replaced from the outside without leaving visible traces.

- (ii) The doors or fastening must be unable to be opened without breaking the Customs seals. Also the Customs seals are to be adequately protected.
- (iii) Containers comprising a large number of closures must be designed so as to keep the number of Customs seals to a minimum. To this end, neighbouring closures must be interconnected by a common device requiring only one Customs seal, or must be provided with a cover meeting the same purpose.
- (b) Containers with opening roofs must be constructed in such a manner as to permit sealing with a minimum number of Customs seals,
- (c) The device on which Customs seals can be fixed must:
  - (i) be secured by welding, or by not less than two joining devices complying with the requirements in (b) and (c), (a), 3.
  - (ii) be so designed that when the load compartment has been closed and sealed the device cannot be removed without leaving visible traces.
  - (iii) incorporate holes of not less than 11 mm in diameter or slots of at least 11 mm in length by 3 mm in width.
  - (iv) afford equal security whatever type of sea is used.
- (d) Butt hinge, strap hinges, hinge-pins and other devices for hanging doors and the like are to comply with the following requirements.
  - (i) These must be secured in conformity with the requirements in (i) and (ii), (c).
  - (ii) Moreover, the various components of such devices (e.g. hinge-plates, pins or swivels) must be so fitted that they cannot be removed or dismantled when the load compartment is closed and sealed without leaving visible traces. However, where such a device is not accessible from outside it will suffice it, when the door or the like has been closed and sealed, it cannot be detached from the hinge or similar device without leaving visible traces.
  - (iii) Where a door or closure-device has more than two hinges, only those two hinges nearest to the extremities of the door need to be fixed in conformity with the requirements in (i) and (ii), (c).
- (e) In the case of thermal containers, the Customs sealing device, the hinges, and any fittings, the removal of which would give access to the interior of the load compartment or to spaces in which goods could be concealed, may be fixed to the doors of such load compartments by means of set bolts or set screws which are inserted from the outside, on condition that:
  - (i) the tails of the set bolts or set screws are fixed into a tapping plate or similar device fitted behind the outer layer or layers of the door structure.
  - (ii) the heads of the appropriate number of set bolts or set screws are so welded to the Customs sealing device, hinges, etc., that they are completely deformed and that the set bolts or set screws cannot be removed without leaving visible signs of tampering. (see Fig 1).

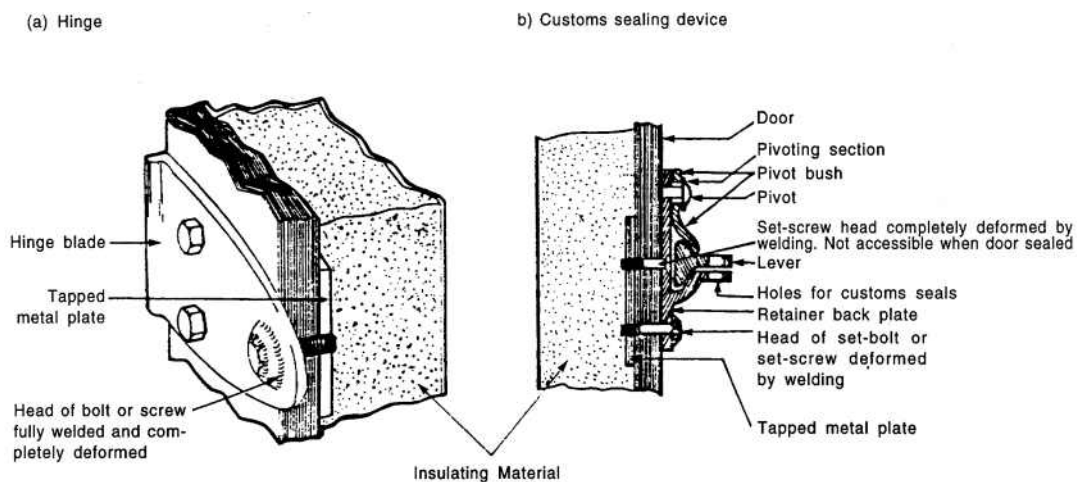


Fig 1 Example of Hinge and Customs Sealing Device on Doors of Thermal Containers

(C) Ventilation apertures and drainage apertures

- (a) Apertures for ventilation and drainage are to be provided with a device preventing access to



- the interior of the container. This device must be such that it cannot be removed and replaced from outside the container without leaving visible traces.
- (b) Ventilation apertures are to comply with the following requirements.
    - (i) Their greatest dimension must, in principle, not exceed 400 mm.
    - (ii) Apertures permitting direct access to the load compartment, must be obstructed by means of wire gauze or perforated metal screens (maximum dimension of holes: 3 mm in both cases) and protected by welded metal lattice work (maximum dimension of holes: 10 mm)
    - (iii) Apertures not permitting direct access to the load compartment (e.g. because of elbow or baffle-plate systems) must be provided with the same devices, in which, however, the dimensions of the holes may be as much as 10 mm and 20 mm respectively.
    - (iv) Identical non-metal devices complying with the following requirements may be allowed.
      - ① The holes are of the requisite dimensions
      - ② The material used is strong enough to prevent the holes from being substantially enlarged without visible damage.
    - (v) Where openings are made in sheets.
      - ① the devices are to comply with the requirements in (ii), in principle. However, blocking devices in the form of a perforated metal screen fitted outside, and wire or other gauze fitted inside, will be allowed.
      - ② it must be impossible to replace the ventilation device by working from one side of the sheet only.
  - (c) Drainage apertures are to comply with the following requirements.
    - (i) Their greatest dimension must, in principle, not exceed 35 mm
    - (ii) Apertures permitting direct access to the load compartment must be provided with devices complying with the requirement in (ii), (b).
    - (iii) When drainage apertures do not permit direct access to the load compartment, the devices complying with the requirement in (ii), (b) with not be provided, on condition that the apertures are provided with a reliable baffle system readily accessible from inside the load compartment.
- (2) Notwithstanding the provision of (3), **2** in these regulations, constituent parts of the container which, for practical reasons, have to include empty spaces (for example, between the partitions of a double wall) are to be permitted. In order that the said spaces cannot be used to conceal goods:
- (a) It is not to be possible to remove and replace the lining inside the container without leaving visible traces; or
  - (b) the number of the said spaces is to be kept to a minimum and these spaces shall be readily accessible for Customs inspection.

#### 4. Containers Capable of Being Folded or Dismantled

Containers capable of being folded or dismantled are to be subject to the provisions of **2** and **3**; in addition.

- (a) They are to be fitted with a bolting system which locks the various parts together once the container has been erected.
- (b) This bolting system must be capable of being sealed by the Customs if it is on the outside of the container when the container has been erected.

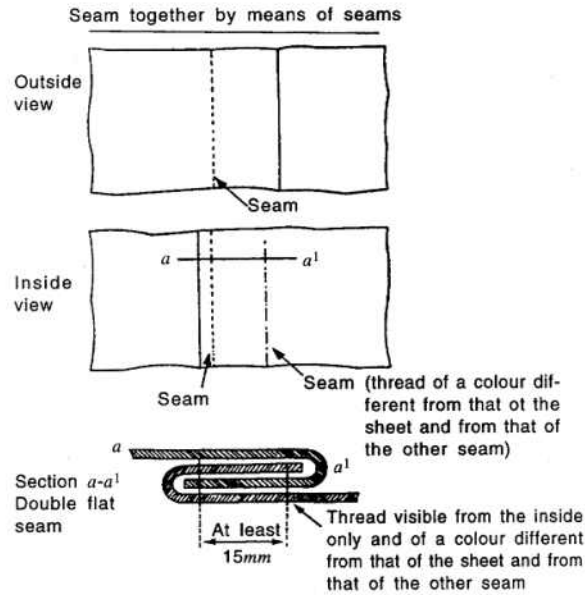
#### 5. Sheeted Container

(1) Where applicable, the provisions of **2**, **3** and **4**. are to apply to sheeted containers. In addition, these containers are to conform to the followings

##### (A) Sheet

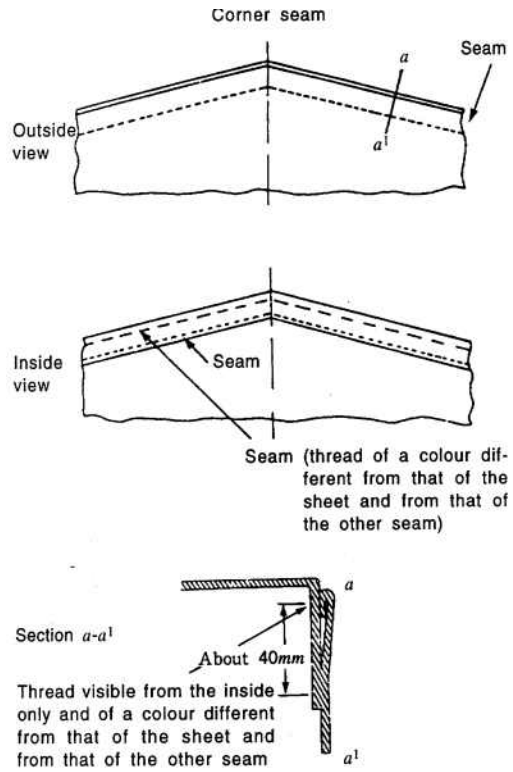
- (a) The sheet is to be either of strong canvas or of plastic-covered or rubberized cloth, which are to;
  - (i) be of sufficient strength and unstretchable.
  - (ii) be in good condition without harmful defect in surface.
- (b) The sheet is to be made up in the following way. However, any way which adequately guarantees security will be allowed in making up the sheet, on condition that the Society approved.
  - (i) It is to be made up in such a way that once the closing device has been secured, it is impossible to gain access to the load without leaving visible traces.
  - (ii) Sewing and welding method of the pieces are to comply with the requirements in (c) or

- (d) below, in principle. If the sheet is made up of several pieces, it may be made of different materials complying with the requirements in (a) above.
- (c) Sewing of sheet is to be conformed to the followings.
- (i) If the sheet is made up of several pieces, their edges are to be folded into one another and sewn together with two seams at least 15 mm apart. (shown in **Fig 2**)



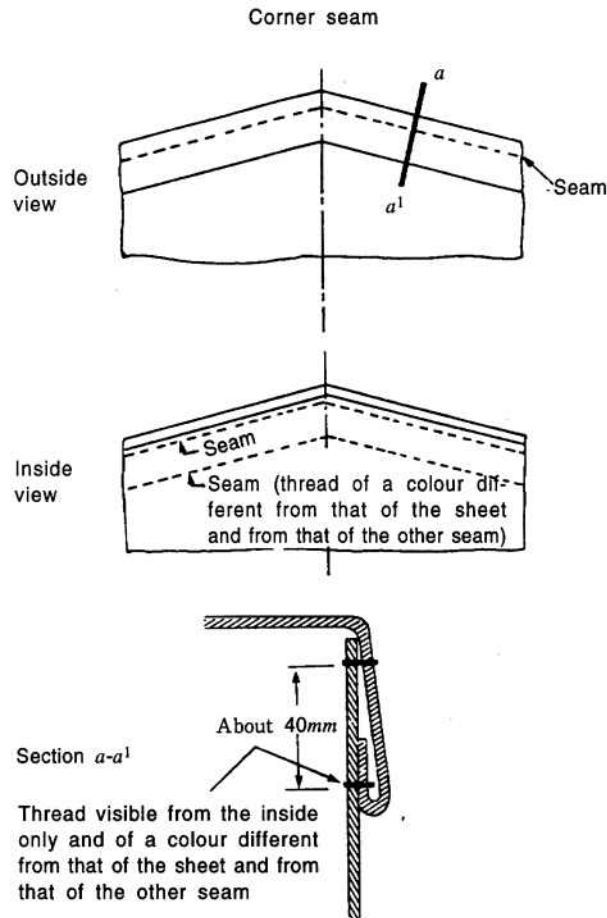
**Fig 2 Sheets Made of Several Pieces**

- (ii) However, where in the case of certain parts of the sheet (such as flaps at the rear and reinforced corners) it is not possible to assemble the pieces in above way, it is to be sufficient to fold the edge of the top section and make the seams as shown in **Fig 3.1** or **3.2**.



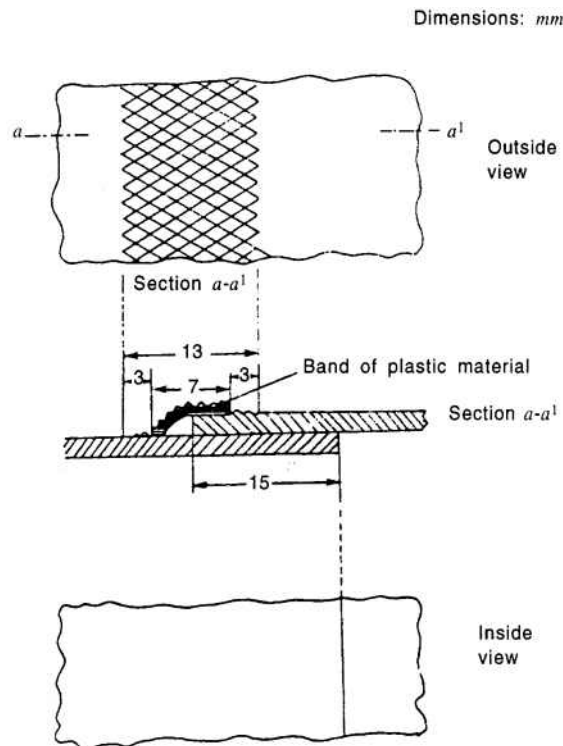
Note: The corner seams made according to the method illustrated in Fig. 3-2 are also allowed.

**Fig 3.1 Sheets Made of Several Pieces**



**Fig 3.2 Sheets Made of Several Pieces sewn Together**

- (iii) One of the seams is to be visible only from the inside and the colour of the thread used for that seam is to be clearly different from the colour of sheet itself and from the colour of the thread used for the other seam.
- (iv) All seams are to be machine-sewn.
- (d) If the sheet is of plastic-covered cloth, it is to be welded together in the manner of the followings.
  - (i) If the sheet is made up of several pieces, the pieces may alternatively be welded together in the manner shown in **Fig 4**. The edges of the pieces are to overlap by at least 15 mm. The pieces are to be fused together over the whole width of the overlap.
  - (ii) The edge of the outer sheet are to be covered with a band of plastic material at least 7 mm wide, affixed by the same welding process as above.
  - (iii) The plastic band and a width of at least 3 mm on each side are to have a well-marked uniform relief stamped on it. (shown in **Fig 4**)
  - (iv) The pieces are to be welded in such a way that they cannot be separated and rejoined without leaving visible traces.
- (e) The sheets may be provided with a flaps, known as tensioning flaps, conforming to the following requirements. However, such flaps have been used to conceal horizontal slits made in the sheets giving improper access to the goods carried in the containers. It is therefore recommended that the use of flaps of this type should not be allowed.
  - (i) A flap sewn or welded on the inside of the sheet in accordance with the requirements (c) and (d), (A), **5**.
  - (ii) Small individual flaps each pierced by one eyelet secured to the outside surface of the sheet and spaced at such distances as will permit an adequate tensioning of the sheet.



**Fig 4 Sheets Made of Several Pieces**

(B) *fastening devices of sheet*

- (a) The following types of fastening are to be provided to the sheeted container for the fixture of the sheet.
- (i) metal ring (fixed ring or sliding ring) or swivel ring fixed to the container.
  - (ii) eyelets to be reinforced enough in the edge of the sheet.
  - (iii) a fastening passing through the rings above the sheet and visible from the outside for its entire length.
- (b) Metal ring or swivel ring of above (i) are to meet the following requirements.
- (i) Fixed Ring
    - ① The rings are so affixed to the container that they cannot be removed and replaced without leaving visible traces.
    - ② The rings are affixed on condition that spaces between them shall not exceed 200 mm. However, spaces exceeding 200 mm but not exceeding 300 mm are acceptable over the uprights if the rings are recessed in the side boards and the eyelets are oval and so small that they can just pass over the rings.
  - (ii) Sliding Ring
 

Metal securing rings sliding on metal bars fixed to the containers are to comply with the following requirements. (see **Fig 5**)

    - ① The bars are affixed to the container at maximum spacings of 600 mm and in such a manner that they cannot be removed and replaced without leaving obvious traces.
    - ② Number of sliding rings are as many as the numbers of eyelets that are affixed in the edge of the sheet at maximum spacings of 200 mm.
    - ③ The sliding rings are made with a double hoop or equipped with a central bar which is made in one piece without the use of welding. (refer to **Fig 5**)
  - (iii) Swivel Ring
 

Metal swivel rings are to comply with the following requirements. (see **Fig 6**)

    - ① They rotate in a metal bracket fixed to the container on the condition that it cannot be removed and replaced without leaving visible traces.
    - ② Each bracket is affixed to the container in such a manner that it cannot be removed and replaced without leaving visible traces.
    - ③ The spring under each bracket is completely enclosed by a bell-shaped metal cover.
    - ④ Spaces between each swivel-ring are to comply with the requirement in ②, (i), (b), (B), 5.

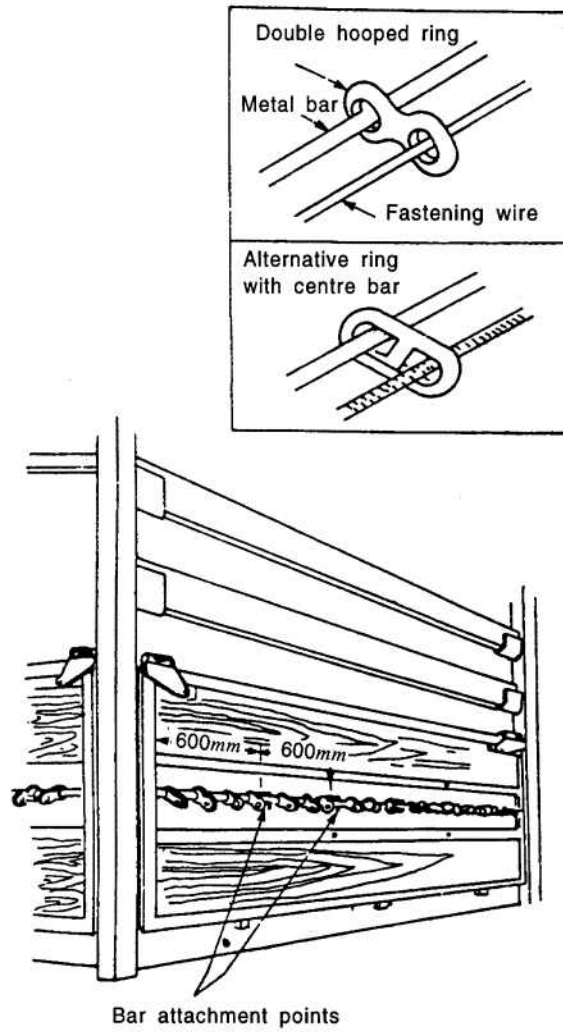


Fig 5 Sheeted Containers with Sliding Rings

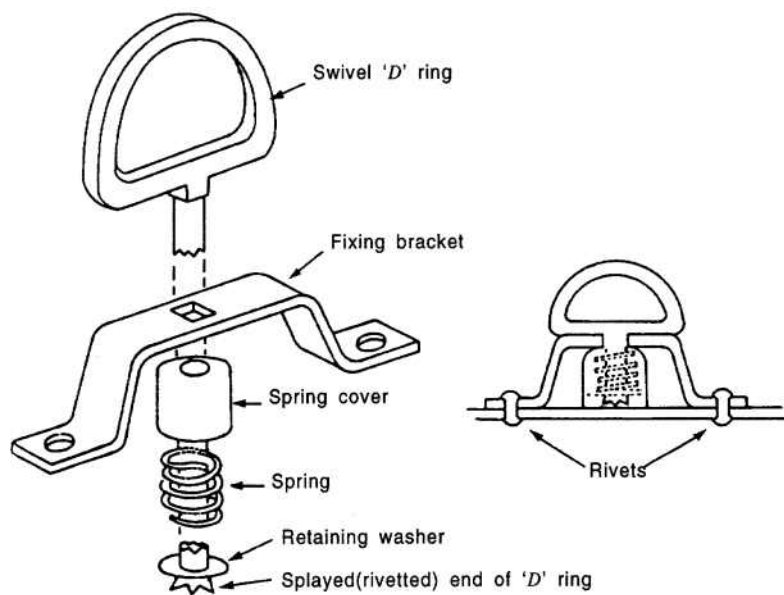
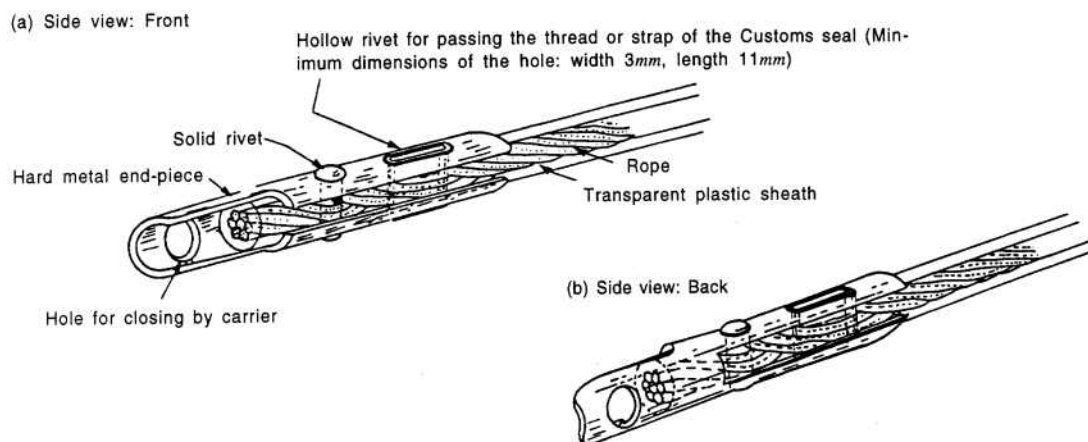


Fig 6 Example of Swivel Ring I'D' Ring

- (iv) Position of rings to be affixed  
The sheet is to overlap solid parts of the container by at least 250 mm, measured from the centre of the securing rings, unless the system of construction of the container by itself prevents all access to the goods.
- (c) The following fastenings are to be used;
  - (i) Steel wire ropes of at least 3 mm in diameter; This wire rope to be comprised a textile core surrounded by four strands consisting solely of steel wire. Also, wire ropes may have a transparent sheath of unstretchable plastic.
  - (ii) A rope of hemp or sisal of at least 8 mm in diameter encased in a transparent unstretchable plastic sheath.
- (d) Each rope used for sheeted container (including the rope of (c) (B), 5) is to be satisfied following requirements.
  - (i) Each rope is to be in one piece
  - (ii) Each rope is to have a hard metal end piece at each end.
  - (iii) The fastener of each metal end-piece is to include a hollow rivet passing through the rope as well as solid rivet.
  - (iv) A hollow rivet is to allow the passing of the thread or the strap of the Customs seal (minimum dimensions of the hole: width 3 mm, length 11 mm).
  - (v) The rope is to remain visible on either side of the hollow rivet so that it is possible to ensure that the rope is in one piece (see **Fig 7**)

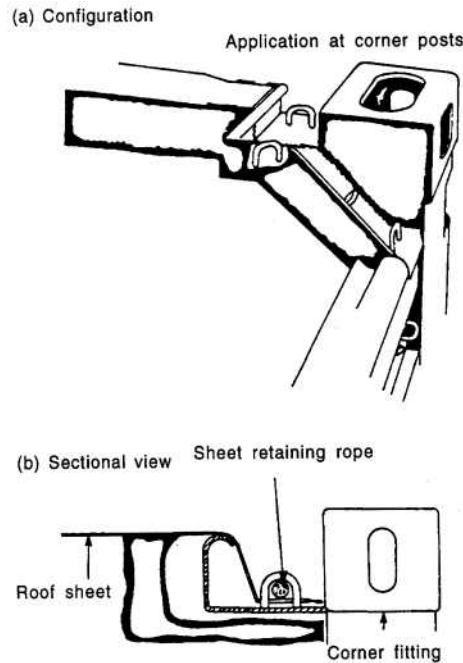


**Fig 7 Specimen of End Piece**

- (e) At the openings in the sheet, used for loading and unloading, the sheet is to meet the following requirements.
  - (i) The two edges of the sheet is to have an adequate overlap. They are to also be fastened by:
    - ① a flap sewn or welded in accordance with the requirements in (c) and (d), (A). A flap is not to be required if a special device, such as a baffle plate, is fitted, which prevents access to the goods without leaving visible traces.
    - ② rings and eyelets in accordance with the requirements in (i) and (ii), (a), (B), 5, and (i), (b), (B), 5.
    - ③ a thong made of appropriate material, in one piece and unstretchable, at least 20 mm wide and 3 mm thick, passing through the rings and holding together the two edges of the sheet and the flap; the thong is to be secured inside the sheet and fitted with an eyelet to take the rope mentioned in (c) (B).
  - (ii) The following materials are regarded as suitable for making thongs:
    - ① leather
    - ② non-tensile textile materials including plastic-covered or rubberized cloth, provided that such materials cannot after severance be welded or reconstituted without leaving visible traces.
    - ③ Furthermore, the plastic material used to cover thongs is to be transparent and smooth-surfaced.

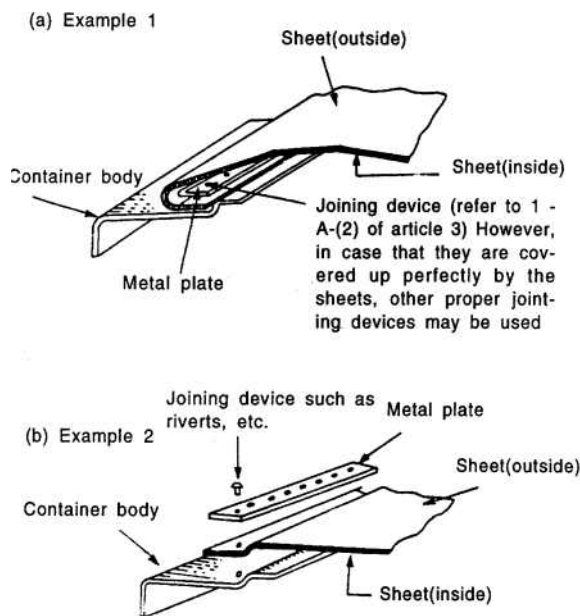
(C) *Sheets-fixation to the container*

- (a) The identification marks, which must appear on the container, and the approval plate is to in no circumstances be covered by the sheet.
- (b) The sheet is to be fixed to the container in strict compliance with the conditions set forth in (1) and (2), **Article 2**.
- (c) Example of a system of affixing sheets around containers' corner-castings is given in the **Fig 8**.



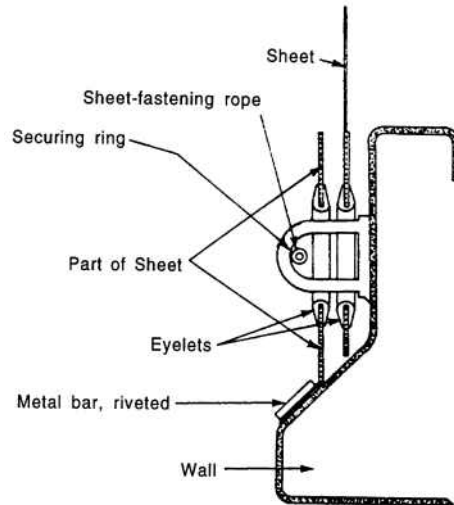
**Fig 8 Device for Affixing Sheets Around Containers' Corner Castings**

- (d) The containers having permanently - secured sheets are to meet the following requirements. (see **Fig 9.1** and **9.2**)



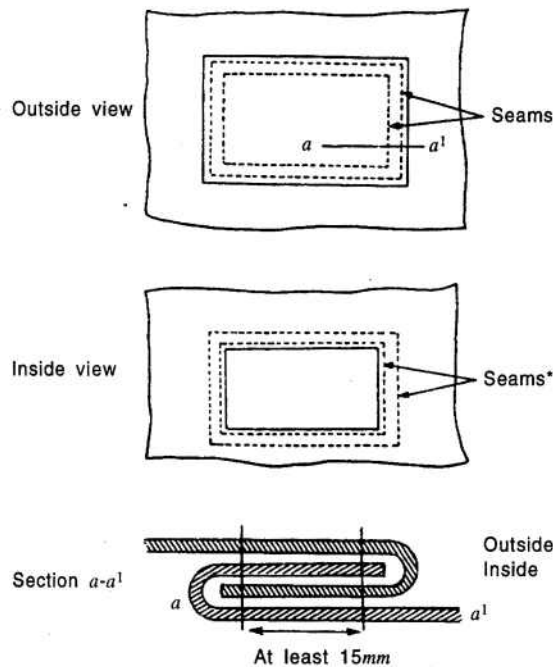
**Fig 9.1 Example of a Device for Fastening Container Sheets**





**Fig 9.2 Example of a Device for Fastening Container Sheets**

- (i) When the edge of a sheet is to be permanently secured to a container, the joint is to be continuous and effected by means of solid devices.
  - (ii) Where one or more edges of the sheet are permanently attached to the body of the container, the sheet is to be held in place by one strip of metal or other suitable material secured to the body of the container by joining devices complying with the requirement in (b), (A), 3.
- (2) Repairs are to be made in accordance with following ways.
- (a) The edges are to be folded into one another and sewn together with two visible seams at least 15 mm apart.
  - (b) The colour of the thread visible from the inside is to be different from that of the thread visible from the outside and from that of the sheet itself; (see **Fig 10**)



\*Threads visible from the inside shall be of a colour different from that of the threads visible from the outside and from that of the sheet.

**Fig 10 Repair of the Sheets**

- (c) All seams are to be machine-sewn.
- (d) When a sheet which has been damaged near the edges is repaired by replacing the damaged part by a patch, the seam can also be made in accordance with the requirements in (c), (A), (1).
- (e) Sheets of plastic-covered cloth may alternatively be repaired in accordance with the method described in (d), (A), (1), but in that case the weld must be made on both sides of the sheet, the patch being fitted on the inside of the sheet. ↓

APPENDIX 3-2 (2018)



컨테이너 TIR(개별승인, 형식승인, 검정) 신청서

APPLICATION OF CONTAINER INSPECTION FOR TIR  
(Individual Approval, Type Approval, Production Unit Inspection)

한국선급회장 귀하  
Chairman and President Esq.  
Korean Register of Shipping

년 월 일  
Date

신청자  
Applicant  
주소  
Address  
성명  
Name

국제도로 면세통과증서의 담보 하에 행하는 화물의 국제운송에 관한 관세협약 및 컨테이너에 관한 관세협약의 시행에 관한 규정 제 8조 및 제 9조에 따라 위의 건에 대하여 다음과 같이 신청합니다.

Under the provision 8 and 9 of the Regulation in relation with the implementation of CUSTOMS CONVENTION ON CONTAINERS and CUSTOMS CONVENTION ON THE INTERNATIONAL TRANSPORT OF GOODS UNDER COVER OF TIR CARNETS, the above signed apply the Korean Register of Shipping to proceed with inspection of containers described below.

컨테이너의 종류 Kind of Container		*형식승인번호 Type Approval No.	
제조사 형식 Model Number		제조사양 또는 도면번호 Drawing or Specification Number	
수검예정수량 No. of containers proposed for inspection		제조사 일련번호 Manufacturer's Serial Number	
자체질량 Tare		소유자 일련번호 Owner's Serial Number	
외형치수(cm) Overall External Dimension			
구조상의 중요특성(재질, 구조상 보강 부분, 볼트등의 취부방법, 용접방법) Essential Characteristics of structure (Material, Structural reinforced part, securing method of bolting, welding method)			
소유자의 명칭 및 기호 Owner's Name and Code Letters			
검사를 받고자하는 장소 및 일자 Place and date to be inspected			

비고 : \*표는 검정신청의 경우에 한함  
Note : The blank with asterisk(\*) shall be filled up only in case of production unit inspection

형식승인시 구비서류 : 설계도면/Drawings 3부/triplicate  
Attachment for 제조사양서/Specification 3부/triplicate  
Type Approval 기타 참고자료/Other Reference Matter 3부/triplicate  
제조자의 서약서/Manufacturer's Covenant(refer to back of this sheet)

## APPENDIX 3-2 (reverse side)

서 약 서  
COVENANT

한국선급회장 귀하  
Chairman and President Esq.  
Korean Register of Shipping

신청자  
Applicant

주소  
Address

성명  
Name

(인) (Signature)

국제도로 면세통과증서의 담보 하에 행하는 화물의 국제운송에 관한 관세협약(TIR 협약) 및 컨테이너에 관한 관세협약(CCC 협약)에 의한 설계형식별 승인신청에 대하여 아래와 같이 서약합니다.

With the application for approval by design type pursuant to CUSTOMS CONVENTION ON THE INTERNATIONAL TRANSPORT OF GOODS UNDER COVER OF TIR CARNETS and CUSTOMS CONVENTION ON CONTAINERS, the abovesigned, hereby, vow as followings.

1. 관할당국이 검사하고자 하는 당해 형식의 원형컨테이너를 관할당국에 제시하겠음.  
To produce to competent authority such containers of the type concerned as that authority may wish to examine.
2. 당해 형식별 컨테이너의 생산기간 중 어느 때라도 제조과정에 있는 컨테이너를 검사할 수 있도록 관할당국에게 허용하겠음.  
To permit the competent authority to examine further units at any time during the production of the type series concerned.
3. 설계도 또는 설계사양서의 변경에 대하여는 그 범위가 어느 정도이든 간에 변경을 가하기 전에 관할 당국에 통보하겠음.  
To advise the competent authority of any change, of whatever magnitude, in the design or specification before proceeding with such change.
4. 승인판에 요구되는 표기 이외에 설계형식의 식별번호 또는 문자와 동형시리즈 컨테이너의 일련번호(제조자번호)를 컨테이너의 보기 쉬운 장소에 표시하겠음.  
To mark the containers in a visible place with, in addition to the markings required on the approval plate, the identification numbers or letters of the design type and the serial number of the container in the type series(manufacturer's number)
5. 승인된 설계형식에 따라 제조된 컨테이너에 관한 기록을 유지하겠음.  
To keep a record of containers manufactured to the approved design type.

APPENDIX 3-3 (2018)



한국선급

KOREAN REGISTER OF SHIPPING

TIR 가르네에 의한 화물의 국제운송에 관한 관세협약(1975)  
 CUSTOMS CONVENTION ON THE INTERNATIONAL TRANSPORT  
 OF GOODS UNDER COVER OF TIR CARNETS(1975)

설계형식별승인증명서  
 CERTIFICATE OF APPROVAL BY DESIGN TYPE

1. 증명서 번호  
 Certificate No. \_\_\_\_\_
2. 본 증서는 아래에 기술된 컨테이너 설계형식이 승인되었으며 이 형식에 따라 제조된 컨테이너가  
 세관 봉인하의 화물 운송을 위해 수락될 수 있음을 증명함.  
 This is to certify that the container design type described below has been approved and  
 that containers manufactured to this type can be accepted for the transport of goods under  
 Customs seal.
3. 컨테이너 종류  
 Kind of container \_\_\_\_\_
4. 설계형식의 식별 번호 또는 문자  
 Identification number or letters of the design type \_\_\_\_\_
5. 시공 설계도의 식별번호  
 Identification number of the working drawings \_\_\_\_\_
6. 실제사양의 식별번호  
 Identification number of the design specifications \_\_\_\_\_
7. 컨테이너 자체질량  
 Tare \_\_\_\_\_
8. 외형치수(cm)  
 External dimensions in cm \_\_\_\_\_
9. 구조의 본질적 특성(재료의 성질, 제작의 종류 등)  
 Essential characteristics of structure(Nature of materials, Kind of construction, etc.)

10. 이 증명서는 위에 언급된 설계도 및 사양에 따라 제조된 모든 컨테이너에 유효함.  
 This certificate is valid for all containers manufactured in conformity with the drawings and  
 specifications referred to above.
11. 이 증명서는 승인된 위 형식에 따라 제조된 각 컨테이너에 승인관을 부착할 권한을 부여받은 제조  
 자에게 발급하였음.

제조자 명칭 및 주소 :

Issued to \_\_\_\_\_  
 (manufacturer's name and address)

who is authorized to affix an approval plate to each container of the approved design type  
 manufactured by him. 발급장소 : \_\_\_\_\_ 발급일자 : \_\_\_\_\_

at \_\_\_\_\_ on \_\_\_\_\_  
 (place) (date)

발급기관 : \_\_\_\_\_  
 by KOREAN REGISTER OF SHIPPING  
 (signature and stamp of issuing service or organization)

\* 다음 페이지의 고지사항 참조 See notice overleaf

**APPENDIX 3-3 (reverse side)****◎ 고지사항****NOTICE**

1. 컨테이너가 그 승인을 위해 규정된 기술적 조건과 이미 일치하지 않는 경우, 세관 봉인하의 화물운송을 위해 사용되기 이전에, 동 컨테이너는 상기 기술적 조건과 재차 일치되도록 하기 위하여 그 승인을 정당화시켰던 당초의 조건으로 복구되어야 한다.

If a container no longer complies with the technical conditions prescribed for its approval, it shall, before it can be used for the transport of goods under Customs seal, be restored to the condition which had justified its approval, so as to comply again with the said technical conditions.

2. 컨테이너의 본질적 특성이 변경된 경우, 컨테이너에 대한 승인은 그 효력이 정지되며, 동 컨테이너는 세관 봉인하의 화물운송을 위해 사용되기 이전에, 관할 당국에 의해 재승인 되어야 한다.

If the essential characteristics of a container are changed, the container shall cease to be covered by the approval and shall be reapproved by the competent authority before it can be used for the transport of goods under Customs seal.



**APPENDIX 3-4 (reverse side)****◎ 고지사항****NOTICE**

1. 컨테이너가 그 승인을 위해 규정된 기술적 조건과 이미 일치하지 않는 경우, 세관 봉인하의 화물운송을 위해 사용되기 이전에, 동 컨테이너는 상기 기술적 조건과 재차 일치되도록 하기 위하여 그 승인을 정당화시켰던 당초의 조건으로 복구되어야 한다.

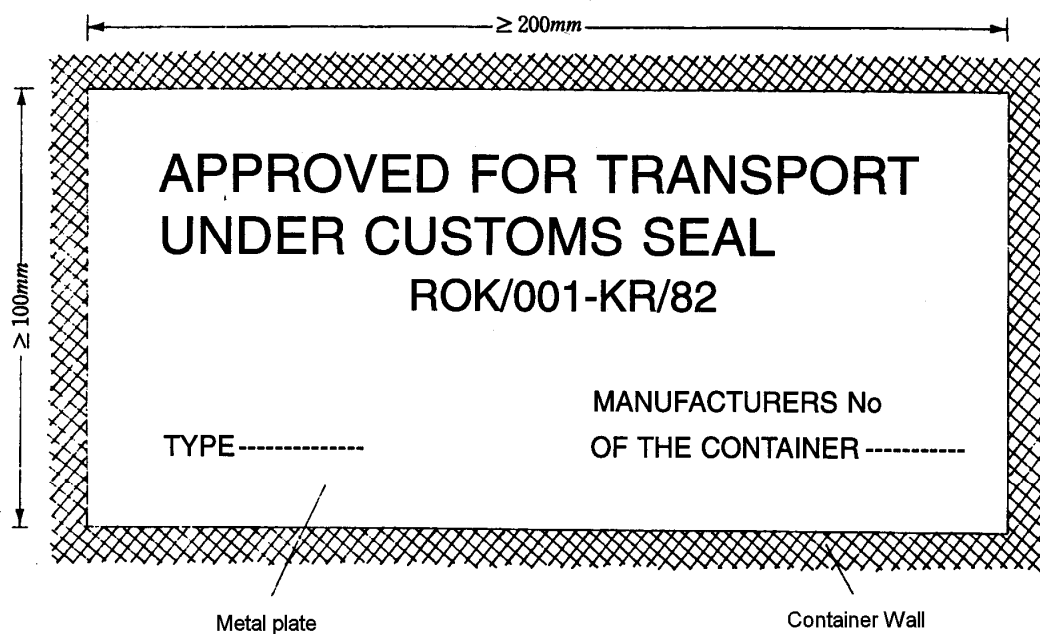
If a container no longer complies with the technical conditions prescribed for its approval, it shall, before it can be used for the transport of goods under Customs seal, be restored to the condition which had justified its approval, so as to comply again with the said technical conditions.

2. 컨테이너의 본질적 특성이 변경된 경우, 컨테이너에 대한 승인은 그 효력이 정지되며, 동 컨테이너는 세관 봉인하의 화물운송을 위해 사용되기 이전에, 관할 당국에 의해 재승인 되어야 한다.

If the essential characteristics of a container are changed, the container shall cease to be covered by the approval and shall be reapproved by the competent authority before it can be used for the transport of goods under Customs seal.



# Approval plate



\* Only in case of approval by desing type

APPENDIX 3-6 (2018)



KOREAN REGISTER OF SHIPPING  
**컨테이너검정합격증명서**  
**FREIGHT CONTAINER PRODUCTION CERTIFICATE**

증명서번호 Certificate No : \_\_\_\_\_ 일자 Date : \_\_\_\_\_

아래 컨테이너는 한국선급의 지침에 따라 제조 및 검정을 하였으며, 또한 하기의 컨테이너에 관한 국제협약 또는 관련정부규칙에 적합함을 증명함. 설계, 재료, 구조 및 공사의 상세 내용은 승인된 도면 및 원형컨테이너의 것과 일치함

THIS IS TO CERTIFY that the undermentioned containers have been manufactured, constructed and tested in accordance with the Guidance for Freight Containers of the Korean Register of Shipping and conform to the requirements of the international conventions or related national regulations for container as described below. The details of design, materials, construction and workmanship conform to the approved plans and prototype containers by the Korean Register of Shipping.

컨테이너 종류 Kind of Containers : _____ 도면/사양번호 Drawing/Specification No. : _____ 형식번호 Type/Model Number : _____ 지체질량 Tare : _____ kg _____ lb 최대 적재질량 Maximum Permissible Payload(P) : _____ kg _____ lb 최대 총질량 Maximum Operating Gross Mass : _____ kg _____ lb 치 수 Dimensions : _____ 제조일자 Manufactured during : _____ 소유자명칭 및 기호 Owner's Name and Code Letters : _____	인원번호 Serial Numbers	
	소유자 번호 Owner's	제조자 번호 Manufacturer's
	컨테이너 수량 No. of containers covered by this certificate : _____	
<input type="checkbox"/> CSC APPROVAL : No. _____	* Stacking test load per post. _____ kg	
<input type="checkbox"/> APPROVAL FOR TRANSPORT UNDER CUSTOMS SEAL : No. _____	* Floor strength test load _____ kg	
<input type="checkbox"/> UIC REGISTRATION : No. _____	* Transverse Racking test force _____ N	
<input type="checkbox"/> WOOD IMMUNIZATION TREATMENT (according to wood Maker's statement) : No. _____	* End wall strength test force _____ Pg	
<input type="checkbox"/> APPROVAL FOR TRANSPORT OF DANGEROUS GOODS : No. _____	* Side wall strength test force _____ Pg	

Note : Fill up in items with \*mark if test load applied is different from the requirements of the Rules.

제조자 명칭  
Name of Manufacturer : \_\_\_\_\_

인정 책임자의 서명  
Authorized Signatory : \_\_\_\_\_

Quality Control Superintendent

아래 검사원은 한국선급의 지침에 따라 위 컨테이너 제조 중의 품질관리상황을 점검하고 또한 시험 컨테이너에 대한 검정을 한 결과 양호하였음을 증명함.

THIS IS TO CERTIFY the undersigned Surveyor has carried out quality control surveillance, supervised tests and inspections for production units at the above Works during construction as indicated in the Guidance for Freight Containers of the Society, and found the results satisfactory.

검사중인 Inspection Marking	최초보수점검지정일 first Maintenance examination due date
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\_\_\_\_\_  
 Surveyor to Korean Register of Shipping  
 ( )

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## **GUIDANCE FOR FREIGHT CONTAINERS**

Published by

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