STANDARD FOR CERTIFICATION
No. 2.7-4

FREIGHT CONTAINERS

JUNE 2011
FOREWORD

DET NORSKE VERITAS (DNV) is an autonomous and independent foundation with the objectives of safeguarding life, property and the environment, at sea and onshore. DNV undertakes classification, certification, and other verification and consultancy services relating to quality of ships, offshore units and installations, and onshore industries worldwide, and carries out research in relation to these functions.

Standards for Certification
Standards for Certification (previously Certification Notes) are publications that contain principles, acceptance criteria and practical information related to the Society's consideration of objects, personnel, organisations, services and operations. Standards for Certification also apply as the basis for the issue of certificates and/or declarations that may not necessarily be related to classification.

All publications may be downloaded from the Society's Web site http://www.dnv.com/.

The Society reserves the exclusive right to interpret, decide equivalence or make exemptions to this Standard for Certification.

Main changes:
In June 2011 this document was moved from the document category “DNV Rules for Other Objects” to “DNV Standards for Certification” and given two new cover pages. Otherwise the document is unchanged and contains the same pages as the previous “Rules for Certification of Freight Containers” of 1981. This should be kept in mind when reading the standard, and phrases like “these Rules” should normally be interpreted as “this Standard”.

The electronic pdf version of this document found through http://www.dnv.com is the officially binding version
© Det Norske Veritas

Any comments may be sent by e-mail to rules@dnv.com
For subscription orders or information about subscription terms, please use distribution@dnv.com
Computer Typesetting (Adobe Frame Maker) by Det Norske Veritas

This service document has been prepared based on available knowledge, technology and/or information at the time of issuance of this document, and is believed to reflect the best of contemporary technology. The use of this document by others than DNV is at the user's sole risk. DNV does not accept any liability or responsibility for loss or damages resulting from any use of this document.
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sec. 1</td>
<td>General Requirements</td>
<td></td>
</tr>
<tr>
<td>A.</td>
<td>Certification</td>
<td>1</td>
</tr>
<tr>
<td>B.</td>
<td>Documentation</td>
<td>2</td>
</tr>
<tr>
<td>C.</td>
<td>Design approval</td>
<td>2</td>
</tr>
<tr>
<td>D.</td>
<td>Materials</td>
<td>2</td>
</tr>
<tr>
<td>E.</td>
<td>Quality assurance system as basis for production survey</td>
<td>3</td>
</tr>
<tr>
<td>Sec. 2</td>
<td>General Cargo Containers</td>
<td></td>
</tr>
<tr>
<td>A.</td>
<td>General requirements</td>
<td>4</td>
</tr>
<tr>
<td>B.</td>
<td>Design requirements</td>
<td>4</td>
</tr>
<tr>
<td>C.</td>
<td>Testing</td>
<td>5</td>
</tr>
<tr>
<td>Sec. 3</td>
<td>Thermal Containers</td>
<td></td>
</tr>
<tr>
<td>A.</td>
<td>General requirements</td>
<td>10</td>
</tr>
<tr>
<td>B.</td>
<td>General design and equipment</td>
<td>10</td>
</tr>
<tr>
<td>C.</td>
<td>Heating appliances</td>
<td>11</td>
</tr>
<tr>
<td>D.</td>
<td>Refrigerating appliances</td>
<td>11</td>
</tr>
<tr>
<td>E.</td>
<td>Strength tests</td>
<td>12</td>
</tr>
<tr>
<td>F.</td>
<td>Weathertightness test</td>
<td>12</td>
</tr>
<tr>
<td>G.</td>
<td>Airtightness test</td>
<td>12</td>
</tr>
<tr>
<td>H.</td>
<td>Heat transfer test</td>
<td>12</td>
</tr>
<tr>
<td>I.</td>
<td>Performance test of thermal appliances</td>
<td>14</td>
</tr>
<tr>
<td>J.</td>
<td>Marking</td>
<td>14</td>
</tr>
<tr>
<td>Sec. 4</td>
<td>Tank Containers</td>
<td></td>
</tr>
<tr>
<td>A.</td>
<td>General requirements</td>
<td>15</td>
</tr>
<tr>
<td>B.</td>
<td>General design</td>
<td>15</td>
</tr>
<tr>
<td>C.</td>
<td>Design of framework</td>
<td>15</td>
</tr>
<tr>
<td>D.</td>
<td>Design of tank</td>
<td>16</td>
</tr>
<tr>
<td>E.</td>
<td>Testing</td>
<td>16</td>
</tr>
<tr>
<td>F.</td>
<td>Marking</td>
<td>17</td>
</tr>
<tr>
<td>Sec. 5</td>
<td>Platforms and Platform-based Containers</td>
<td></td>
</tr>
<tr>
<td>A.</td>
<td>General requirements</td>
<td>18</td>
</tr>
<tr>
<td>B.</td>
<td>Design requirements</td>
<td>18</td>
</tr>
<tr>
<td>C.</td>
<td>Testing</td>
<td>19</td>
</tr>
<tr>
<td>Sec. 6</td>
<td>Repair of Containers after Damage</td>
<td></td>
</tr>
<tr>
<td>A.</td>
<td>General requirements</td>
<td>32</td>
</tr>
<tr>
<td>B.</td>
<td>Approval of repair shops</td>
<td>32</td>
</tr>
<tr>
<td>C.</td>
<td>Approval of containers repaired in shops not approved for this purpose</td>
<td>32</td>
</tr>
<tr>
<td>Appendix 1</td>
<td>Certificates</td>
<td>34</td>
</tr>
<tr>
<td>Appendix 2</td>
<td>Plate for CSC Safety Approval</td>
<td>39</td>
</tr>
<tr>
<td>Appendix 3</td>
<td>External container dimensions, tolerances and ratings.</td>
<td>40</td>
</tr>
<tr>
<td>Appendix 4</td>
<td>Standard corner fittings</td>
<td>43</td>
</tr>
<tr>
<td>Appendix 5</td>
<td>Load-transferring areas in base structures of containers</td>
<td>45</td>
</tr>
<tr>
<td>Appendix 6</td>
<td>Optional features</td>
<td>47</td>
</tr>
</tbody>
</table>
SECTION 1
GENERAL REQUIREMENTS

Contents.

A. Certification.
   A 100 Application.
   A 200 Scope.
   A 300 The certification concept.
   A 400 Certification of individually surveyed containers.
   A 500 Certification based on the manufacturer's quality assurance system.
   A 600 Definitions.
   A 700 Marking.
   A 800 Nominal lengths of ISO-containers.

B. Documentation.
   B 100 Plans and calculations.
   B 200 Material certificates.

C. Design Approval.
   C 100 Individual approval.
   C 200 Type approval.

D. Materials.
   D 100 Metallic materials, general.
   D 200 Corner fitting materials.
   D 300 Non-metallic materials.

E. Quality Assurance System as Basis for Production Survey.
   E 100 General.

   A. Certification.

A 100 Application.
   101 These Rules apply to freight containers for repeated use and which are:
      — suitable for intercontinental traffic,
      — of closed or open box configuration,
      — of tank configuration,
      — of loadable platform or platform based configuration,
      — designed to be easy to fill and empty,
      — designed to facilitate the carriage of goods by one or more modes of transportation without intermediate reloading,
      — fitted with devices permitting their easy handling, in particular during their transfer from one mode of transportation to another.
   102 The term freight container includes neither vehicles nor conventional packing.
   103 The Rules apply to ISO standard containers, but relevant parts of the Rules may be applied also to non-ISO containers.

A 200 Scope.
   201 The certification covers the freight container structure and any permanent equipment for filling, emptying, refrigerating, heating and safety purposes.

A 300 The certification concept.
   301 Freight containers designed, constructed, tested and marked in compliance with the following Rules may be certified by Det norske Veritas. The certification of a container implies that a certificate is issued by the Society and the Society's emblem on which the certificate number is stamped, is fixed to the container. This completes the Society's commission.

302 Containers of other characteristics than specified by the Rules, may be certified by Owner's specifications, provided the strength is equivalent to that required by the Rules. The marking of the containers and the wording of their certificates will be accordingly.

303 Note: For some certificates information in addition to that specified in 400 and 500 may be required in order to satisfy the requirements of an Administration (governmental body).

A 400 Certification of individually surveyed containers.
   401 Upon construction under the supervision of the Surveyor, testing in his presence and his final inspection of the individual container, a Freight Container Certificate is issued by the Surveyor, provided the details of design, materials and construction conform to the approved plans and the prototype container.
   The certificate form applied by Veritas is shown in Appendix 1A.4.
   If wanted, one certificate may comprise a series of containers.

A 500 Certification based on the manufacturer's quality assurance system.
   501 When approval of the individual containers is based on the Society's surveillance of the Manufacturer's approved Quality Assurance System, see E, a Freight Container Production Certificate is issued by the Manufacturer and endorsed by the Surveyor.
   The certificate form to be applied is shown in Appendix 1.3.
   If wanted, one certificate may comprise a series of containers.

A 600 Definitions.
   601 The following terms and symbols are common for all containers dealt with in these Rules.
   \[ T = \text{Tare Weight (Mass)} \]
   \[ R = \text{Rating or Maximum Gross Weight (Mass)} \]
   \[ P = R - T = \text{Maximum Payload, i.e. Maximum Gross Weight minus Tare Weight} \]

A 700 Marking.
   701 Each container is to be durably marked with at least the following data:
      — Name of Manufacturer.
      — Manufacturer's container type designation and serial number.
      — Date of manufacture (month and year).
      — Owner's mark and serial number.
      — Maximum gross weight.
      — Tare weight.
   702 When containers are certified in accordance with international schemes, e.g. International Convention for Safe Containers (CSC), marking is to be as shown in Appendix 2.
   703 The container is to be stamped with the Society's mark at the left bottom corner at door end. The Society's emblem, on which the certificate number is stamped, will be affixed on the left door.
A 800 Nominal lengths of ISO-containers.

801 Nominal lengths of ISO Series 1 containers are given in Table A1.

Table A1 Nominal lengths.

<table>
<thead>
<tr>
<th>Freight container designation</th>
<th>Nominal length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
</tr>
<tr>
<td>1AA</td>
<td>12*</td>
</tr>
<tr>
<td>1A</td>
<td>9</td>
</tr>
<tr>
<td>1AX</td>
<td>3</td>
</tr>
<tr>
<td>1BB</td>
<td>6</td>
</tr>
<tr>
<td>1B</td>
<td>6</td>
</tr>
<tr>
<td>1BX</td>
<td>6</td>
</tr>
<tr>
<td>1CC</td>
<td>6</td>
</tr>
<tr>
<td>1C</td>
<td>6</td>
</tr>
<tr>
<td>1CX</td>
<td>6</td>
</tr>
<tr>
<td>1D</td>
<td>6</td>
</tr>
<tr>
<td>1DX</td>
<td>6</td>
</tr>
</tbody>
</table>

* In certain countries there are legal limitations to the overall length of vehicle and load.

B. Documentation.

B 100 Plans and calculations.

101 Containers to be certified are to be constructed in accordance with plans approved by the Society. The documents are to be submitted in triplicate in ample time before commencement of construction, and are to include:
- Plans showing arrangement, dimensions, scantlings of strength members, corner fittings and design details as well as specification of materials to be used.
- Particulars of joining methods (welding, rivetting, screw connections, adhesive joints etc.).
- Calculations as required for the container type in question.
- Other documentation as required for special purpose containers.

B 200 Material certificates.

201 Materials used for construction of containers are to be furnished with documentation in accordance with Table B1. All materials are to be identifiable against the certificates, which are to be made available to the Surveyor.

Table B1 Documentation of material.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Verification</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corner fittings</td>
<td>Veritas</td>
<td>Works</td>
</tr>
<tr>
<td>Primary structural members</td>
<td>Certificate</td>
<td>Certificate</td>
</tr>
<tr>
<td>Secondary structural members</td>
<td>x [11]</td>
<td>x</td>
</tr>
</tbody>
</table>

D 100 Metallic materials.

101 The chemical composition, heat treatment, weldability, mechanical properties (including impact properties) are to be suitable for the intended use of the materials. When materials of different galvanic potential are used, measures are to be taken to prevent galvanic corrosion. Welding consumables are to be of approved types.

D 200 Corner fitting materials.

201 A steel with tensile strength not less than 410 N/mm² and yield stress not less than 215 N/mm² is to be used.
- The chemical composition is to satisfy the following requirements:
  - Carbon, max 0.22%  
  - Sulphur, max 0.05%  
  - Phosphorus, max 0.05%  
- Plate material if used, is to be at least semi-killed and is to have an impact energy not less than 27 J at 0°C, using Charpy V-notch test specimen.

D 300 Non-metallic materials.

301 Timber used in container construction is to be from best quality wood, well seasoned and dried and free from sapwood and bad knots.
- Plywood is to be of adequate quality.
- Reinforced plastics used for strength members are to be of approved quality.
E. Quality Assurance System as Basis for Production Survey.

E 100 General.

101 Manufacturers of type approved containers having in operation a Quality Assurance System approved by the Society, may on certain conditions use this system as basis for a production survey arrangement agreed with the Society.

The Society will carry out audits on the Manufacturer’s Quality Assurance System to ensure that the containers conform to the design which has been granted type approval.

102 The basic particulars stated in the production survey arrangement which will be reviewed by the Society when an agreement on container certification is to be made, are outlined as follows:

- Works’ organization.
- Line of responsibility of the quality control department and the production departments.
- Arrangements for introducing approved design/production changes and ensuring that they are acted upon at the appropriate production stage.

- Arrangements to ensure that supplies and services from subsuppliers meet with design requirements. Identifiable test data for materials and components are to be available.
- Jigs suitable for maintaining dimensional accuracy during repeated use are to be provided at mainframe assembly points. Jig dimensions are to be periodically verified.
- Approved fabrication procedures (welding, riveting etc.) and qualified personnel are to be engaged in fabricating panels and mainframes.
- Rejection procedure and rejected component identification arrangements are to be engaged in fabricating panels and mainframes.
- 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.

103 The Surveyor will keep the quality assurance system and workmanship under review. The number of containers selected at random by the Surveyor for testing in his presence will be specially agreed upon, dependent on the rate of container production.
SECTION 2
GENERAL CARGO CONTAINERS

Contents.

A. General Requirements.
A 100 Application.

B. Design Requirements.
B 100 Container dimensions and ratings.
B 200 Design loads.
B 300 Corner fittings.
B 400 Base structure.
B 500 End structure.
B 600 Side structure.
B 700 Roof structure.
B 800 Door openings and doors.
B 900 Optional features.

C. Testing.
C 100 General.
C 200 Deformations.
C 300 Dimensional checking.
C 400 Weathertightness test.
C 500 Stacking test.
C 600 Top lifting test.
C 700 Bottom lifting test.
C 800 Longitudinal restraint test.
C 900 End wall test.
C 1000 Side wall test.
C 1100 Roof panel test.
C 1200 Floor strength test.
C 1300 Transverse racking test.
C 1400 Longitudinal racking test.
C 1500 Lifting from fork lift pockets.
C 1600 Lifting from side grappler lift positions.

A. General Requirements.

A 100 Application.

The requirements in this section of the Rules apply to box type general cargo containers of ISO Series I, intended for intercontinental traffic.

Containers of other types or for special purposes will be considered in accordance with the general principles of this section and other relevant parts of the Rules.

B. Design Requirements.

B 100 Container dimensions and ratings.

External dimensions, tolerances and ratings are given in Appendix 3. No part of the container is to project beyond the overall external dimensions.

B 200 Design loads.

Each structural member of the container is to be able to withstand the forces arising from the container design loads specified by the test requirements given in C for the completed container.

Each container is to be capable of carrying at least 5 tiers of fully loaded containers on top, applying a factor of 1.8 to represent the static equivalent of assumed dynamic conditions. This will be seen from the stacking test requirements.

B 300 Corner fittings.

Each container is to have top and bottom corner fittings. Distances between the corner fittings are to be as specified in Appendix 3. The design requirements and standard dimensions of corner fittings are given in Appendix 4.

The upper faces of top corner fittings are to protrude not less than 6 mm above top of container. The lower faces of the load transfer areas in the container base, including its end transverse members, are to lie in a plane min. 11 mm and max. 17.5 mm above the bottom faces of lower corner fittings.

B 400 Base structure.

All containers are to be capable of being supported by their bottom corner fittings only.

Containers IAA, IA, IBB, ICC and IC are also to be capable of being supported on load transfer areas in their base structures only. Consequently, these containers are to have end transverse members and sufficient intermediate load transfer areas for a flat underside of sufficient strength to permit vertical load transfer to or from the longitudinal members of a carrying vehicle. The load transfer areas are assumed to lie within the two 250 mm wide zones defined by the dotted lines of Fig. 1 in Appendix 5.

Containers having all of their intermediate transverse members spaced 1000 mm apart or less (or having a flat underside), are considered to comply with these requirements.

Requirements for containers having (intermediate) transverse members, any pair of which is spaced more than 1000 mm apart, are given in Appendix 5. For such containers each pair of load transfer areas associated with an end transverse member is to be capable of transferring loads of 0.5 R i.e. the loads which may occur when a container is placed onto a carrying vehicle of the kind which does not support the container by its corner fittings. Furthermore, each pair of load transfer areas is to be capable...
of transferring loads of 1.5 R/n where n is the number of pairs of intermediate load transfer areas, i.e. loads which may occur during transport operations.

403 The structural design of all containers is to be such that no part of the base structure will deflect more than 6 mm below the bottom faces of the bottom corner fittings under a load of 1.8 R—T uniformly distributed over the floor.

B 500 End structure.

501 For containers I AA, I A, I BB, I B, I CC and I C, the sideways deflection of the top of the container in relation to the bottom, when it is subjected to a 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.

B 600 Side structure.

601 For containers I AA, I A, I BB, I B, I CC and I C, the longitudinal deflection of the top of the container in relation to the bottom of the container, when it is subjected to a longitudinal racking force of 75 kN, is not to exceed 25 mm.

B 700 Roof structure.

701 The roof panel design is to be such that any accumulation of water is avoided.

702 The structural strength is to be sufficient to withstand the roof panel test specified in C.

B 800 Door openings and doors.

801 Door end openings are, if practicable, to have dimensions corresponding to the free internal cross-section of the container cargo space. For containers I A, I B, I C and I D the door opening is not to be less than 2134 mm (7 ft 6 in) high and 2286 mm (7 ft 6 in) wide.

For containers I AA, I BB and I CC the door opening is not to be less than 2261 mm (7 ft 5 in) high and 2286 mm (7 ft 6 in) wide.

802 Doors are to be equipped with securing devices and sealing for weathertight closing. Devices for clasping of doors in open position are to be provided.

B 900 Optional features.

901 Fork lift pockets according to Appendix 6.1 may be provided on I CC, I C, I CX, I D and I DX containers for handling in the loaded and unloaded condition. Where one set of fork lift pockets has been fitted, as stipulated in Appendix 6.1, a second set of fork lift pockets may in addition be provided on I CC, I C and I CX containers for handling in empty condition only.

Fork lift pockets are to pass completely through the base structure of the container, so that lifting devices may be inserted from either side.

902 Containers may be provided with features for handling at the base by means of grapple arms or similar devices. Such features are to be as shown in Appendix 6.2.

903 Containers I A, I AA and I AX may be provided with gooseneck tunnels as shown in Appendix 6.3.

C Testing.

C 100 General.

101 The following requirements apply to prototype testing and individual testing of containers. The frequency of the Surveyor's attendance to the testing of the completed containers will depend on the quality assurance arrangements of the container manufacturer, see Sec. 1. The Surveyor will prepare a detailed test report. A summary report on prototype strength is prepared. The form used is shown in Appendix 1.2.

102 For each container the manufacturer is to carry out dimensional checking and weathertightness test. For strength tests, the number of containers to be tested will be specially agreed, depending on the rate of container production.

103 Measuring instruments to be used for tests and checking are to be duly calibrated to the satisfaction of the Surveyor.

104 The procedures specified for the strength tests may be modified as appropriate for special purpose containers and special handling arrangements. 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. The test loads inside the container are to be uniformly distributed. The container is to be measured before the testing, and the dimensions checked after the testing.

C 200 Deformations.

201 For acceptable elastic deformation under test load, reference is made to B 400 (base structure), B 500 (end structure) and B 600 (side structure).

202 Upon completion of the test, the container is to show neither permanent deformation which will render it unsuitable for use nor abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange are to be satisfied.

C 300 Dimensional checking.

301 Each completed container is to be checked to verify that the overall dimensions of the container and the position of the corner fittings are within the specified tolerances.

C 400 Weathertightness test.

401 The doors of each completed container are to be subjected to a weathertightness test. Every 10th completed container is to be subjected to a complete weathertightness test of all external surfaces. For containers which also are strength tested, the weathertightness test is to be carried out after completion of all strength tests.

402 All surfaces of the container are to be subjected to a water test from a 12.5 mm nozzle, with a water pressure of 1 bar at the nozzle, which is to be traversed at a speed of approximately 100 mm per second at a distance of 1.5 m from the surface under test. The interior of the container is to remain dry.

403 Except for the prototype of type approved containers, the hose testing specified in 402 may be substituted by a light test.

Procedure: The Surveyor will enter the container. The doors are then closed, and the Surveyor is to accustom himself to the darkness for at least 3 minutes before powerful light beams surrounding all external surfaces are switched on. The container is to be free from any observable light penetration.
Sec. 2

C 500 Stacking test.

501 Internal loading \(1.8 \, R - T\) is to be uniformly distributed over the base.

The container under test is to be placed on four level pads, one under each bottom corner fitting or equivalent corner structure. The pads are to be centralized under the fittings and be substantially of the same plan dimensions as the fittings.

The container under test is to be subjected to a vertical force equivalent to a load of \(2.25 \, R\) on each of the top corner fittings simultaneously or \(4.5 \, R\) on each pair of end fittings, in such a manner that the planes of application of the forces and the supports of the container remain horizontal and unchanged during the test. The forces are to be applied through a corner fitting or a pad of the same plan area as a corner fitting. Each pad is to be offset in the same direction by 25 mm laterally and 38 mm longitudinally.

![Fig. 1 Stacking test. Support and load areas.](image)

502 The following measurements are to be made:

- Deflection 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.
- Deflection in two directions at midheight or other point of maximum deflection of the corner posts.
- Permanent set remaining on removal of the load.
- Overall height.

![Fig. 2 Stacking test measurements.](image)

C 600 Top lifting test.

601 Internal loading \(2 \, R - T\) is to be uniformly distributed over the base.

With the container in the normal position lifting forces are to be applied gradually to the top corner fittings

- vertically to containers \(1AA, 1A, 1AX, 1BB, 1B, 1BX, 1CC, 1C\) and \(1CX\).
- at \(30^\circ\) to the vertical to containers \(1D\) and \(1DX\).

The container is to be suspended for 5 minutes.

602 The following measurements are to be made:

- 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.
- Any distress due to lifting.
- Permanent set remaining on removal of the load.

![Fig. 3 Top lifting test.](image)
C 700 Bottom lifting test.

701 Internal loading 2 R - T is to be uniformly distributed over the base.
With the container in the normal position, lifting forces are to be applied gradually through the bottom corner fitting side apertures as follows:

<table>
<thead>
<tr>
<th>Container designation</th>
<th>Direction of applied forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAA, IA and IAX</td>
<td>30° to horizontal</td>
</tr>
<tr>
<td>IBB, IB and IBX</td>
<td>37° to horizontal</td>
</tr>
<tr>
<td>ICC, IC and ICX</td>
<td>45° to horizontal</td>
</tr>
<tr>
<td>ID and IDX</td>
<td>60° to horizontal</td>
</tr>
</tbody>
</table>

In each case the line of action of the lifting force and the outer face of the corner fitting is to be no further apart than 38 mm.
The container is to be suspended for 5 minutes.

702 Any distress due to lifting is to be recorded.

![Fig. 4 Bottom lifting test.](image)

C 800 Longitudinal restraint test.

801 Internal loading R - T is to be uniformly distributed over the base.
With the container in the normal position, anchored by locking devices through the bottom apertures in the bottom corner fittings at one end, loads equivalent to R are to be applied to each side rail through the bottom corner fittings at the other end, first in compression then in tension.

802 The change in length of bottom side rails during and after the test (in each direction) is to be recorded.

![Fig. 5 Longitudinal restraint test.](image)

C 900 End wall test.

901 Internal loading 0.4 P is to be uniformly distributed over the wall (or end doors) under test in such a way as to allow free deflection of the end wall. If one end has doors, both end walls are to be tested.

902 Deflection and permanent set at the centre and at least two other locations are to be recorded.

![Fig. 6 End wall test.](image)

C 1000 Side wall test.

1001 Internal loading 0.6 P is to be 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 be tested when both are similar in construction.

1002 Deflection and permanent set at the centre of the side wall and the centre of the top and bottom side rails or at the weakest section of the side wall are to be recorded.

![Fig. 7 Side wall test.](image)

C 1100 Roof panel test.

1101 Internal loading is not to be applied. On the roof a loading of 3 kN is to be uniformly distributed over a 600 mm x 300 mm area at the weakest section of the roof.

1102 Maximum deflection and permanent set of the section under test are to be recorded.
Sec. 2

C 1200 Floor strength test.

1201 Internal loading is not to be applied.
With container supported at the bottom corner fittings, a vehicle equipped with 180 mm wide tires at 760 mm centres each having a contact area of 142 cm², loaded to an axle weight of 54.6 kN, is to be manoeuvred over the entire floor area.

1202 Deflection and permanent set in three locations of the base are to be recorded.

C 1300 Transverse racking test.

1301 Internal loading is not to be applied.
The container under test is to be placed on four level pads, one under each bottom corner fitting, and to be anchored through the bottom apertures so that no vertical movement is possible. Lateral restraint of an end wall is to be provided only at the bottom corner fitting diagonally opposite to, and in the same end frame as, the top corner fitting to which force is applied. Forces of 150 kN are to be applied either separately or simultaneously to each of the top corner fittings on one end of the container in parallels to both the side wall and to the base plane. The forces are to be applied first towards and then away from the top corner fittings. Where a side wall is essentially asymmetrical about its own vertical centre line, the side wall is to be tested from both ends.

1302 Difference in diagonals before, during and after testing is to be recorded.

C 1400 Longitudinal racking test.

1401 Internal loading is not to be applied.
The container under test is to be placed on four level pads, one under each bottom corner fitting, and to be anchored through their bottom apertures so that no vertical movement is possible. Longitudinal restraint of a side wall is to be provided only at the bottom corner fitting opposite to, and in the same side frame as, the top corner fitting to which force is applied. Forces of 75 kN are to be applied either separately or simultaneously to each of the top corner fittings on one end of the container in parallels to both the side wall and to the base plane. The forces are to be applied first towards and then away from the top corner fittings. Only one of two identical side walls need be tested. Where a side wall is essentially asymmetrical about its own vertical centre line, the side wall is to be tested from both ends.

1402 Longitudinal displacement of top side rails is to be recorded.

C 1500 Lifting from fork lift pockets.

1501 ICC, IC and ICX containers equipped with only one set of fork lift pockets, and ID and IDX containers: Internal loading 1.25 R − T is to be uniformly distributed over the base.
The container is to be supported for 5 minutes by two bars 200 mm wide inserted in the fork pockets to a depth of 1828 ± 3 mm. The bars are to be centred within the pockets.

Undue local distortion during the test and any permanent distortion are to be recorded.

1502 ICC, IC and ICX containers equipped with two sets of fork lift pockets:
The procedure stated in 1501 applies to the external fork lift pockets, while the internal ones are subject to the following procedure:
Internal loading 0.625 R - T is to be uniformly distributed over the base.
The container is to be supported on two horizontal bars as specified in 1501, placed into the additional internal fork lift pockets.
The container is to be supported for 5 minutes.
Undue local distortion during the test and any permanent distortion are to be recorded.

C 1600 Lifting from side grapple lift positions.

1601 Internal loading 1.25 R - T is to be uniformly distributed over the base.
The container is to be supported for 5 minutes by pads at the four grapple arm positions. The pads are to be of the same area as the grapple arms intended to be used.
Undue local distortion during the test and any permanent distortion are to be recorded.
SECTION 3

THERMAL CONTAINERS

Contents.

A. General Requirements.
A 100 Application.
A 200 Documentation.

B. General Design and Equipment.
B 100 Container dimensions and ratings.
B 200 Structural strength.
B 300 Airtightness.
B 400 Insulation.
B 500 Lining.
B 600 Drainage.
B 700 Temperature monitoring equipment.

C. Heating Appliances.
C 100 General.

D. Refrigerating Appliances.
D 100 Capacity of refrigerating units.
D 200 Design pressures.
D 300 Safety devices.
D 400 Pressure gauges.
D 500 Connections for water-cooling of container.
D 600 Connections for air-cooling of container.
D 700 Electrical equipment.

E. Strength Tests.
E 100 General.

F. Weathertightness test.
F 100 General.

G. Airtightness test.
G 100 General.
G 200 Procedure.
G 300 Measurements.

H. Heat Transfer Test.
H 100 General.
H 200 Procedure.
H 300 Measurements.

I. Performance Test of Thermal Appliances.
I 100 General.
I 200 Procedure.
I 300 Measurements.

J. Marking.
J 100 Refrigerated containers.
J 200 Heated containers.

A 100 Application.

101 This section of the Rules applies to:
- insulated containers without refrigerating or heating appliances,
- insulated containers with refrigerating appliances (refrigerated containers),
- insulated containers with heating appliances (heated containers),
- dual purpose refrigerated/heated containers.

102 The requirements stipulated in the following are additional to relevant requirements of Secs. 1 and 2.

103 Regarding refrigerating plant, see also the Rules for Steel Ships Pt. 6 Ch. 2, as far as relevant for refrigerated containers.

A 200 Documentation.

201 In addition to the documentation required in Sec. 1, the following documents are to be submitted for approval:
- Plans of insulation with design details, material specification and data of heat transmission.
- Description of corrosion protection.
- Plan of drainage arrangement.
- Description of the refrigerating and/or heating appliances.
- Arrangement plan for the refrigerating and/or heating appliances.
- Heat balance calculation.
- Plan showing cross-section of refrigerant compressor.
- Plan of compressor crankshaft.
- Plan of pressure vessels in the plant.
- Piping diagram for the plant.
- Plan with particulars of the temperature measuring appliances.
- Electrical wiring diagram including necessary connection data.
- Description of automatic temperature regulation.

B. General Design and Equipment.

B 100 Container dimensions and ratings.

101 External dimensions, tolerances and ratings are given in Appendix 3. Units for refrigerating and/or heating purposes may be located partially or totally outside the external dimensional envelope of the container. Such units will have to be removable or retractable to facilitate certain modes of transportation.

B 200 Structural strength.

201 The structural strength of the completed container is to be sufficient to withstand the test requirements given in E.

B 300 Airtightness.

301 Insulated containers are to be of airtight construction to comply with the test requirements given in G.

B 400 Insulation.

401 The coefficient of heat transfer K is not to exceed 0.4 W/m² °C for refrigerated and/or heated containers. For containers without refrigerating or heating appliances, the coefficient K will be agreed in each case.

402 The cargo space boundaries are to be diffusion tight against water vapour from the side which is warm in normal operation.

403 The insulation material is to have the following properties:
- It is not to absorb and give off odours which may affect the cargo.
- It is to have mechanical resistance to vibrations and deformations at the service temperatures.
- It is to be resistant to decay and be chemically neutral.
- It is to have high resistance to moisture transmission and air movement in the material.
- It is to be durable at the temperatures and temperature variations in service. Material placed against
external surfaces is to be able to withstand at least 100°C.
- Plastic foams are to be «self-extinguishing» according to a recognized standard.

B 500 Lining.
201 The inner surface of the container is to permit thorough cleaning methods, e.g. water cleaning, wet steam cleaning and detergents normally used, without detrimental effects on the container performance.

502 The materials used in the inner space of the container are not to give off any substances detrimental to foodstuffs and health.

B 600 Drainage.
601 Provisions are to be made to ensure that water from cleaning of the interior of the container can be completely drained. Cargo space drains for this purpose are to have closing devices manually operable from the outside of the container.

602 Where drainage of cargo space will be necessary also when carrying cargo, such draining equipment is to open automatically when the acceptable level is exceeded.

B 700 Temperature monitoring equipment.
701 At least two independent devices are to be provided for measuring the internal temperature of the container. Unless otherwise agreed, a maximal total error of ± 0.5°C will be acceptable for the indication and measuring accuracy.

C. Heating Appliances.

C 100 General.
101 Unless otherwise specified by the purchaser of the container, heating appliances are to be designed to be capable of maintaining an inside temperature of 16°C at a temperature of −20°C outside the container, on the basis of a daily service period of 18 hours.

102 Other particulars are as far as relevant to be in compliance with the requirements in D. and as agreed with the Society.

D. Refrigerating Appliances.

D 100 Capacity of refrigerating units.
101 Each refrigerated container is to be equipped with its own refrigerating system operating independently, except for electric power supply.

102 Unless otherwise specified, the inside design temperature is to be taken as −18°C at a temperature of 38°C outside the container.

For water-cooled condensers for the refrigerant the design temperature of the cooling water is not to be taken less than 36°C.

103 If only one refrigerating unit is installed, it is to be capable of maintaining the required lowest internal temperature in the container at the conditions specified in 102, on the basis of a daily service period of 18 hours.

104 If two entirely independent refrigerating systems, each with its own evaporator, are installed for one container, they may be considered as a single unit for jointly to satisfy the requirements given in 103.

D 200 Design pressures.
201 For the conventional Group 1 refrigerants R 12 and R 22, the design working pressures are not to exceed the values given in Table D1.

<table>
<thead>
<tr>
<th>Refrigerant</th>
<th>max. working pressure (Air-cooled condensers)</th>
<th>max. working pressure (Water-cooled condensers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R 12</td>
<td>17 bar</td>
<td>R 12</td>
</tr>
<tr>
<td>R 22</td>
<td>28 bar</td>
<td>R 22</td>
</tr>
</tbody>
</table>

D 300 Safety devices.
301 Devices are to be arranged for automatic cut-off of power supply to compressor when the maximum allowable working pressure is exceeded.

302 Pressure vessels for liquid refrigerant are to be protected by a safety valve, if the pressure vessel can be isolated from the system. For refrigerants of Group 1, a corrosion-resistant safety disc may be substituted for the safety valve.

D 400 Pressure gauges.
401 When Group 1 refrigerants are used, suction and delivery pressure gauges will be required only for the performance test. If the gauges are removed after the testing, the connections are, however, to remain accessible for later measurements.

D 500 Connections for water-cooling of container.
501 Water-cooled appliances are to incorporate possibility for draining the unit to prevent freezing of water. The inlet and outlet connections are, unless otherwise specified, to comply with ISO 1496/II−1979.

D 600 Connections for air-cooling of container.
601 If the container is designed for ducted air systems and for use with externally located removable equipment, the inlet and outlet openings are to have closing devices attached to the container. The air apertures are, unless otherwise specified, to comply with ISO 1496/II−1979.

D 700 Electrical equipment.
701 Electrical equipment for refrigerated containers is to be suitable for the ambient conditions aboard ships, and is to be in general compliance with the Rules for Steel Ships, Pt.4, Ch.4. Electrical motors are to be of a design suitable for continuous operation.

702 Unless otherwise specified, the electrical equipment is to be designed to operate satisfactorily at voltage and frequency variations not less than:

Voltage: ± 2.5% at steady conditions
- 15% and + 20% at transient conditions

Frequency: ± 3% at steady conditions
± 10% at transient conditions

703 Plug and socket connections are to be in compliance with ISO 1496/II−1979, unless otherwise specified.
E. Strength Tests.

E 100 General.

101 During the strength tests, refrigerating and/or heating equipment that may contribute to the overall strength is to be in position. Alternatively, suitable equivalents for the equipment may be fitted to simulate the service condition. In such cases, the ability of the refrigerating and/or heating equipment to withstand the cargo loading and/or the forces or static equivalents of accelerations represented by the strength tests, is to be verified independently.

102 Thermal containers are to be subjected to the same tests as specified for general cargo containers as stated in Sec. 2.

103 If the roof is strengthened for hanging cargo, the following additional roof strength test is to be carried out:

With the container in the normal position supported at the base corner fittings, a load of twice the service load or 30 kN per metre of usable inside container length, whichever is the greater, is to be suspended from the roof support, simulating normal service loading.

Maximum deflection and permanent set of the section under test are to be recorded.

F. Weathertightness test.

F 100 General.

101 Weathertightness test is to be carried out as specified for general cargo containers. The testing of the container envelope is to be made before the container is insulated. Care is, however, to be taken that tests are carried out on door seals, exterior gasketed joints and other openings fitted with closing devices.

G. Airtightness test.

G 100 General.

101 Each completed container is to be subjected to an airtightness test after any strength tests.

G 200 Procedure.

201 The container is to be closed in the normal manner and in addition all drain openings are to be closed. Temperatures inside and outside the container are both to be within the range of 15°C to 25°C, and the temperature difference is to be within 3°C of each other. Internal pressure of the container is to be raised to (25 ± 1) 10^-4 bar (25 ± 1 mm H2O) and maintained for not less than 30 minutes.

G 300 Measurements

301 The accuracy of measuring devices is to be within the limits:

| Temperature measuring devices | ± 0.5°C |
| Flow meter system             | ± 3%   |
| Manometer                     | ± 5%   |

302 The following measurements to be made:

- Internal and ambient temperatures.
- Air flow required to maintain internal pressure.
- This air flow is not to exceed the following values:

<table>
<thead>
<tr>
<th>Container designation</th>
<th>Air flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1AA and 1A</td>
<td>30 m³/h</td>
</tr>
<tr>
<td>1BB and 1B</td>
<td>23 m³/h</td>
</tr>
<tr>
<td>1CC and 1C</td>
<td>16 m³/h</td>
</tr>
<tr>
<td>1D</td>
<td>9 m³/h</td>
</tr>
</tbody>
</table>

H. Heat Transfer Test.

H 100 General.

101 The following requirements apply to prototype testing and individual testing of containers. For series production, the number of containers to be tested will be specially agreed. The frequency of the Surveyor’s attendance to the testing of the containers will depend on the quality assurance arrangements of the container manufacturer, see Sec. 1.

H 200 Procedure.

201 Heat transfer test is to be conducted after airtightness test. The test is to be carried out either by electric heating or other acceptable method in a test chamber. The container is to be empty but otherwise in its normal service condition. For the electrical heating method, a non-radiant heater suitably shielded and circulating fan(s) are to be positioned at the geometric centre of the container.

202 The test is to be performed under steady state condition, which is to be maintained for a period of not less than 8 hours within the tolerances listed below. The steady state condition shall be deemed to have been achieved when the input of the electrical energy required to maintain a steady internal temperature remains constant.

Test conditions:

- Mean wall temperature between 20°C and 32°C and a temperature difference between inside and outside not less than 20°C.
- Maximum temperature difference between any two points at any time 3°C.
- Maximum temperature difference between any two outside points at any time 3°C.
- Maximum difference between any two average inside air temperatures at different times 1.5°C.
- Maximum difference between any two average outside air temperatures at different times 1.5°C.
- Maximum percentage difference between the lowest and the highest power dissipation. 

\[ \frac{\text{Watt hr}}{\text{hr}} \text{ values is not to exceed } 3\% \text{ of the lowest figure.} \]

Temperatures are to be measured 100 mm from the inside and outside surfaces of the container walls at least at the following points:

- eight inside corners.
- eight outside corners.
- centres of inside and outside surfaces of the side walls.
- floor and roof, see Fig. 1.

Note:

\[ \Theta_a = \text{Average outside temperature, viz. arithmetic mean of the outside air temperatures measured as above.} \]

\[ \Theta_i = \text{Average inside temperature, viz. arithmetic mean of the inside air temperatures measured as above.} \]
Fig. 1 Measuring points for air temperature.
II 300 Measurements.

301 The accuracy of power measuring systems is to be within ± 2% of the quantity measured.

The accuracy of other measuring devices is to be as specified in G 300.

302 Data for determining the heat leakage (total heat transfer rate) of the container are to be taken at intervals of not more than 30 minutes and for a continuous period of not less than 8 hours.

Note:
Heat transfer rate \( U = \frac{Q}{\Theta_2 - \Theta_1} \)

\( Q = \) Power dissipated or absorbed by the operation of internal heaters and fans or internal cooling units.

I. Performance Test of Thermal Appliances.

I 100 General.

101 All containers which have undergone a heat transfer test, are to be subjected to a performance test to verify the ability of the refrigerating and/or heating equipment to maintain the specified internal temperature at a 75% duty cycle (i.e. daily service period of 18 hours).

For the purpose of testing a refrigerating equipment, continuous operation may be accepted, provided the test procedure stated in 200 is applied.

I 200 Procedure.

201 Using the refrigerating unit, the container placed in a test chamber, where the temperature is held constant at the anticipated maximum ambient temperature, is to be cooled down to the design temperature. The temperature is to be maintained for a period of 8 hours.

After this time, 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 of the container, established by the heat transfer test. 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.

I 300 Measurements.

301 The internal and external temperatures and the electrical input to the heater are to be recorded.

J. Marking.

J 100 Refrigerated containers.

101 In addition to the marking required in Sec.1 for all containers, at least the following particulars are to be clearly and durably indicated on the exterior of refrigerated containers:

- Type and date of manufacture of refrigerating unit.
- Refrigerant.
- Internal service temperature and ambient air temperature (when condenser is air-cooled).
- Motor for refrigerant compressor:
  - output, r.p.m., rated voltage, frequency and phases,
  - full load current and total starting current.

102 For containers fitted with cargo hanging arrangements, the maximum service load is to be stated on a signboard fitted in an easily visible position in the container cargo space.

J 200 Heated containers.

201 Additional marking of heated containers will be considered for each type and make of container.
SECTION 4
TANK CONTAINERS

Contents.

A. General Requirements.
   A 100 Application.
   A 200 Documentation.

B. General Design.
   B 100 Container dimensions and ratings.

C. Design of Framework.
   C 100 General.
   C 200 Design loads.
   C 300 Optional features.

D. Design of Tank.
   D 100 General.
   D 200 Design loads.
   D 300 Openings for inspection and maintenance.
   D 400 Tank fittings.
   D 500 Pressure relief devices.
   D 600 Vacuum relief devices.
   D 700 Gauging devices.

E. Testing.
   E 100 General.
   E 200 Stacking test.
   E 300 Top lifting test.
   E 400 Bottom lifting test.
   E 500 Longitudinal restraint test (external).
   E 600 Longitudinal inertia test.
   E 700 Lateral inertia test.
   E 800 Transverse racking test.
   E 900 Longitudinal racking test.
   E 1000 Lifting from side grapple lift positions.
   E 1100 Walkway test.
   E 1200 Pressure test of tank.
   E 1300 Testing of special equipment.

F. Marking.
   F 100 General.
   F 200 Tank fittings and pressure relief devices.

A. General Requirements.

A 100 Application.

101 This section of the Rules apply to tank containers intended for carriage of gases or liquids under pressure or for gravity discharge, and which can be transported and stacked in loaded condition.

102 A tank container is defined as consisting of a tank, a framework and the connecting members between these two structures, as well as any appliances for heating or refrigeration of the tank content.

103 The requirements stipulated in the following are additional to relevant requirements of Secs. 1 and 2. Any heating or refrigerating appliances, as well as associated electrical equipment, will be specially considered.

104 Tank containers for carriage of substances which are regarded as dangerous cargoes according to internationally agreed codes or relevant national codes, will be specially considered.

A 200 Documentation.

201 In addition to the documentation required in Sec. 1, the following documents are to be submitted for approval:

- Plans of tank with scannings and design details of openings for inspection and maintenance, as well as details of the connection of valves, nozzles and other tank fittings.
- Specification of cargoes intended to be carried and proposed operating conditions.
- Plan of tank supports with details.
- Specification of materials and weld procedures for tank and supports with details of weld connections.
- Strength calculations for tank and supporting framework.
- Description of corrosion protection.
- Plan of tank insulation, if any, with design details.
- Arrangement plan and details of valves, nozzles and other tank fittings.
- Documentation of blow-off capacity of safety equipment.
- Arrangement plan, system diagram and particulars of any heating or refrigerating appliances.
- Specification of any electrical equipment fitted on the container.

202 Material certificates for tank structure and supports and certificates for fittings etc. are to be provided in accordance with relevant chapters of the «Steel Ship Rules».

B. General Design.

B 100 Container dimensions and ratings.

101 External dimensions of framework, tolerances and ratings are given in Appendix 3. No part of the tank, its equipment or fittings is to protrude outside the dimensional envelope of the container.

C. Design of Framework.

C 100 General.

101 The upper faces of the top corner fittings are to protrude above the top of the tank shell with any insulation and its associated piping and fittings by minimum 6 mm.

102 When the tank container is loaded to its rating R, no part of the tank with any insulation and its associated shell fittings is to project downwards below a plane 25 mm above the base plane (bottom faces of the lower corner fittings).

103 When the tank container is loaded uniformly to a total weight (mass) of 1.8 R (the static equivalent of the dynamic condition), no part is to deflect more than 6 mm below the base plane (bottom faces of the lower corner fittings).
C 200 Design Loads.

201 The framework and tank supports are to be designed to withstand the following static equivalents of the inertia effects of the tank contents, considered individually: 1R longitudinally, 1R laterally and 2R vertically. Vertical loadings are total loadings including gravitational effects.

202 Each structural member of the framework is to be able to withstand the forces arising from the design loads specified by the test requirements given in E for the completed tank container.

203 Walkways, if fitted, are to be designed to withstand a loading of 3 kN uniformly distributed over an area of 600 mm x 300 mm.

204 Ladders, if fitted, are to be designed to withstand a loading of 2 kN on any rung.

C 300 Optional features.

301 Fork lift pockets are not to be provided in tank containers.

302 Tank containers may be provided with features for handling at the base by means of grapple arms or similar devices. Such features are to be as shown in Appendix 6.2.

303 Tank containers IA and IAA may be provided with gooseneck tunnels as shown in Appendix 6.3.

D. Design of Tank.

D 100 General.

101 The requirements stipulated in the following are additional to relevant requirements of the «Steel Ship Rules».

102 Regarding basic requirements for the tank shell design, materials, valves and fittings, it is referred to the Steel Ship Rules as follows:

Pt.2 Materials and Welding
Pt.4, Ch.3 Boilers and Pressure Vessels
Pt.5, Ch.3 Oil Carriers
Pt.5, Ch.4 Chemical Carriers
Pt.5, Ch.5 Liquefied Gas Carriers

103 The tank(s) is (are) to be adequately secured to the container framework.

104 Tanks are to be capable of being filled and emptied without removal from the framework.

D 200 Design loads.

201 The tank structure is to be designed to withstand the following static equivalents of the inertia effects of the tank contents:

1R longitudinally, 1R laterally and 2R vertically.

The loadings may be considered individually, evenly distributed, and acting through the geometric centre of the tank. The vertical loading 2R includes gravitational effects. The above loadings are not considered to give rise to any increase in the pressure in the vapour space of the tank.

202 Tanks or tank compartments without vacuum relief valves are to be designed to withstand an external pressure of at least 0.4 bar above the internal pressure, without any permanent deformation.

203 When heating or refrigerating appliances are provided, due consideration is to be given to the avoidance of the development of excessive temperatures and stresses in the tank and its supporting structure.

D 300 Openings for inspection and maintenance.

301 Tanks are to be provided with manholes or other openings to allow for complete internal inspection. The size of manholes is to be a minimum of 450 mm diameter and is to be determined by the need for men and machines to enter the tank to inspect, maintain or repair its interior.

D 400 Tank fittings.

401 All tank openings, except pressure relief devices, are to be provided with adequate closures to prevent accidental escape of the tank content.

402 The design of tank nozzles and outlet fittings, as well as their attachments to the tank, are to be such that the risk of breakage is minimized. Protective covers or housings are to be provided if considered necessary.

403 All tank openings located below the normal liquid level of the tank content 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 the valve. Such additional means of closure may be a fluid-tight cap, bolted blank flange, or other suitable protection against accidental escape of tank content.

404 All valves, whether fitted internally or externally, are to be located as close to the tank shell as practicable.

405 Stop valves with screw spindles are to be closed by clockwise motion of the handwheel.

D 500 Pressure relief devices.

501 Each tank or fluid-tight compartment is to be fitted with a pressure relief device connected to the vapour space and located on the top of the tank as near to the midlength of the tank (or compartment) as practicable.

502 The opening pressure and the capacity of the pressure relief devices will be considered for each type and design of tank container and its intended use.

D 600 Vacuum relief devices.

601 Tanks not designed to withstand an external over-pressure of at least 0.4 bar, are to be fitted with a vacuum relief device to prevent permanent deformation of tank (or tank compartment) caused by external pressure.

D 700 Gauging devices.

701 The arrangement, design and materials of gauging devices are to be compatible with the cargoes intended to be carried in the tank.

E. Testing.

E 100 General.

101 The following requirements apply to prototype testing and individual testing of tank containers. The frequency of the Surveyor’s attendance to the testing of completed containers will depend on the quality assurance programme of the container manufacturer, see Sec.I.

102 For each tank container the manufacturer is to carry out dimensional checking and pressure testing. For strength tests of framework, the number of containers to be tested will be specially agreed, depending on the rate of container production.
E 200 Stacking test.
   201 No internal loading in tank.
   202 Applied forces and measurements as required for general cargo containers.

E 300 Top lifting test.
   301 Internal loading 2 R-T (see 105).
   302 Applied forces and measurements as required for general cargo containers.

E 400 Bottom lifting test.
   401 Internal loading 2 R-T (see 105).
   402 Applied forces and measurements as required for general cargo containers.

E 500 Longitudinal restraint test (external).
   501 Internal loading R-T in tank.
   502 Applied forces and measurements as required for general cargo containers.

E 600 Longitudinal inertia test.
   601 With R-T internal loading in tank, the container is to be positioned with its longitudinal axis vertical and supported by its four bottom corner fittings. The container is to be supported for 5 minutes.
   602 Any distress due to the test is to be recorded.

E 700 Lateral inertia test.
   701 With R-T internal loading in tank, 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.
   702 Any distress due to the test is to be recorded.

E 800 Transverse racking test.
   801 No internal loading in tank.
   802 Applied forces and measurements as required for general cargo containers. Any distress due to the test is to be observed.

E 900 Longitudinal racking test.
   901 No internal loading in tank.
   902 Applied forces as required for general cargo containers.
   903 Difference in diagonals before, during and after testing is to be recorded. Any distress due to the test is to be observed.

E 1000 Lifting from side grapple lift positions.
   1001 Internal loading 1.25 R-T (see 105).
   1002 Applied forces and measurements as required for general cargo containers.

E 1100 Walkway test.
   1101 No internal load in tank.
   1102 A load of 3 kN is to be uniformly distributed over an area 600 mm x 300 mm at the weakest section of the walkway.
   1103 Maximum deflection and permanent set of walkway under test are to be recorded.

E 1200 Pressure test of tank.
   1201 This test is to be carried out after all mainframe strength tests have been completed and before any insulation is fitted. 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.
   1202 Where the tank is provided with fluid-tight compartments, additional pressure test is to be carried out individually for each compartment with the adjacent compartments empty and under atmospheric pressure.
   1203 Test procedures other than the above may be accepted by the Society after special consideration. 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 the tank. Relief devices, where fitted, are to be rendered inoperative or removed.
   1204 The tank container is to show no leakage, no permanent deformation or abnormality which will render it unsuitable for use.

E 1300 Testing of special equipment.
   1301 Testing of heating or refrigerating appliances and other special feature of tank containers will be considered by the Society for each type and intended service of the container.

F. Marking.

F 100 General.
   101 In addition to the marking required in Sec. 1 for all containers, at least the following particulars are to be clearly and durably indicated on the tank container:
      — Maximum allowable working pressure.
      — Test pressure.
      — Total cubic capacity.
      — Setting of pressure relief device.

F 200 Tank fittings and pressure relief devices.
   201 All tank connections are to be clearly and durably marked to indicate their appropriate functions.
   202 Each pressure relief device is to be marked with the pressure at which it is set to operate.
SECTION 5
PLATFORMS AND PLATFORM-BASED CONTAINERS

Contents.

A. General Requirements.
A 100 Application.
A 200 Cross reference.

B. Design Requirements.
B 100 Container dimensions and ratings.
B 200 Design loads.
B 300 Corner fittings.
B 400 Base structure.
B 500 Lashing devices for cargo.
B 600 Optional features.

C. Testing.
C 100 General.
C 200 Deformations.
C 300 Dimensional checking.
C 400 Testing of platforms.
C 500 Testing of platform-based containers with incomplete superstructure and fixed ends.
C 600 Testing of platform-based containers with incomplete superstructure and folding ends.
C 700 Testing of platform-based containers, open-sided, with complete superstructure.

A. General Requirements.

A 100 Application.

A 101 This section of the Rules applies to platforms and platform-based containers of the configurations specified in 102–105.

A 102 A platform (container) is a loadable platform having no superstructure, but having the same length and width as the base of ISO Series 1 freight container.

A 103 A platform-based container (Series 1) with incomplete superstructure and fixed ends may have either:
- fixed complete end structure (Type 61) or
- fixed free-standing posts (Type 62).

A 104 A platform-based container (Series 1) with incomplete structure and folding ends may have either:
- folding complete end structure (Type 63) or
- folding free-standing posts (Type 64).

A 105 A platform-based container (Series 1), open-sided, with complete superstructure may have either:
- roof (Type 65) or
- open top (Type 66) or
- open top and open ends (Type 67).

A 200 Cross reference.

A 201 The requirements stipulated in the following are modifications of or supplements to relevant requirements of Secs. 1 and 2.

B. Design Requirements.

B 100 Container dimensions and ratings.

B 101 The dimensions and ratings of platforms and platform-based containers of ISO Series 1, are generally to be as specified in Appendix 3.

102 For platform-based containers with incomplete superstructure, the requirements for the overall top lengths (any folding ends in erected position) given in Appendix 3, may be modified to the extreme limits given in Table B 1.

Table B 1 Overall top lengths.

<table>
<thead>
<tr>
<th>Container designation</th>
<th>L_max (mm) tare cond.</th>
<th>L_max (mm) loaded to 1 R</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAA and IA</td>
<td>12202</td>
<td>12172</td>
</tr>
<tr>
<td>IBB and IB</td>
<td>9135</td>
<td>9105</td>
</tr>
<tr>
<td>ICC and IC</td>
<td>6068</td>
<td>6042</td>
</tr>
<tr>
<td>1D</td>
<td>3001</td>
<td>2976</td>
</tr>
</tbody>
</table>

103 For platform-based containers with ends in folded position, the external length and width are to be as specified in Appendix 3.

104 An interlocked pile of folded containers is to be capable of having the plan dimensions established in ISO 668 (see Appendix 3) and a height not exceeding 2591 mm.

105 Any movable part which, if unsecured, could lead to a hazardous situation, is to be provided with an adequate securing system having external indication of the positive securing of that system in the appropriate operating position.

B 200 Design loads.

B 201 Each structural member of a platform or platform-based container is to be able to withstand the forces arising from the design loads specified by the testing requirements for the various container configurations in erected as well as folded condition. Acceptable deflections under the tests are generally as specified in Sec. 2 for general cargo containers.

B 202 For platform-based containers IAA, IA, IB, ICC and C the strength of the side structure is to be adequate to prevent that the longitudinal deflection of the top of the container in relation to its bottom will exceed 42 mm under full longitudinal rigidity test conditions.

B 300 Corner fittings.

B 301 Platforms and platform-based containers are to be equipped with bottom corner fittings and top corner fittings where appropriate.

B 400 Base structure.

B 401 The base structure is to be designed to withstand all forces, particularly lateral forces expected induced by the cargo in service. This is particularly important where provisions are made for securement of cargo to the base structure of the container.

B 402 Strengthened load transfer areas are to be provided in the base structure as for general cargo containers.

B 500 Lashing devices for cargo.

B 501 Platforms and platform-based containers with open sides or open ends are to be equipped with permanent lashing devices for securement of the cargo to the base structure.
The securing devices are to be designed and fitted to the platform containers in such a way that:
- the ropes or other means of lashing the loads will not protrude beyond the overall length and width of the container platform.
- no part of the lashing devices will protrude above the plane located 6 mm below the upper surfaces of the top corner fittings.

B 600 Optional features.

601 Fork lift pockets, arrangements for grappler arms and gooseneck tunnels may be fitted as for general cargo containers.

C. Testing.

C 100 General.

101 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.

102 The test loads on the platform and platform-based containers are to be uniformly distributed. The container is to be measured before the testing, and the dimensions checked after the testing.

103 The requirements for prototype testing and individual testing of platforms and platform-based containers are specified in 400—700.

104 Alternative test procedures will be accepted if considered to be equivalent.

105 As to frequency of the surveyors attendance, quality assurance programme, batch testing etc., reference is made to Sec. 2.

106 Platforms and containers are to be tested in the condition in which they are designed to operate.

107 Weather tightness test as specified in Sec. 2, is to be carried out if relevant for the platform container in question.

C 200 Deformations.

201 For acceptable elastic deformations under test load, see B 400 (base structure) B 500 (end structure) and B 600 (side structure) in Sec. 2.

202 Upon completion of the test the platform and the platform-based container is to show neither permanent deformation, which will render it unsuitable for use nor abnormality, which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange are to be satisfied.

C 300 Dimensional checking.

301 Each completed platform and platform-based container is to be checked to verify that the overall dimensions of the container and the position of the corner fittings are within the specified tolerances.
C 400 Testing of platforms.

Notes:
1. The externally applied forces shown below are for one end or one side only. The internal loads are for the whole container.
2. For test procedure, see also Sec. 2 «General Cargo Containers».

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>STACKING TEST</td>
<td></td>
</tr>
<tr>
<td>2,25R</td>
<td>2,25R</td>
</tr>
<tr>
<td>2,70R</td>
<td>2,70R</td>
</tr>
</tbody>
</table>

Applicable to all sizes

Test procedure:
The platform container under test in the tare condition is to be placed on four level pads, one under each bottom corner fitting or equivalent corner structure. The pads are to be centralized under the fittings, and be substantially of the same plan dimensions as the fittings.

The platform container under test is to be subjected to a vertical force equivalent to a load of 2,25 R on each of the top corner fittings simultaneously, or 4,5 R on each pair of end fittings, in such a manner that the planes of application of the forces and the supports of the container remain horizontal and unchanged during the test. The forces are to be applied through a corner fitting or a pad of the same plan area as a corner fitting. Each pad is to be offset in the same direction by 25 mm laterally and 38 mm longitudinally.

Applicable to all sizes

Test procedure:
The platform container under test is to have a load uniformly distributed over the floor in such a way that the combined weight of container and test load is equal to 2 R, and it is to be carefully lifted from the side apertures of all four top corner fittings in such a way that no significant acceleration or deceleration forces are applied.

Lifting forces are to be applied at:
- 30° to the horizontal for 1A containers.
- 37° to the horizontal for 1B containers.
- 45° to the horizontal for 1C containers.
- 60° to the horizontal for 1D containers.

In each case the line of action of the lifting force and the outer face of the corner fitting is to be no farther apart than 38 mm. The lifting is to be carried out in such a manner that the lifting devices bear on the top corner fittings only.

The platform container is to be suspended for 5 minutes.

Applicable to 1D containers only

Test procedure:
The platform container under test is to be placed on four level pads, one under each bottom corner fitting or equivalent corner structure. The pads are to be centralized under the fittings, and be substantially of the same plan dimensions as the fittings.

The platform container under test is to be subjected to a vertical force equivalent to a load of 2,25 R on each of the top corner fittings simultaneously, or 4,5 R on each pair of end fittings, in such a manner that the planes of application of the forces and the supports of the container remain horizontal and unchanged during the test. The forces are to be applied through a corner fitting or a pad of the same plan area as a corner fitting. Each pad is to be offset in the same direction by 25 mm laterally and 38 mm longitudinally.

Applicable to 1A, 1B and 1C containers only

Test procedure:
The platform container under test is to have a load uniformly distributed over the floor in such a way that the combined weight of container and test load is equal to 2 R, and it is to be carefully lifted from the side apertures of all four top corner fittings in such a way that no significant acceleration or deceleration forces are applied.

Lifting forces are to be applied at:
- 30° to the horizontal for 1A containers.
- 37° to the horizontal for 1B containers.
- 45° to the horizontal for 1C containers.
- 60° to the horizontal for 1D containers.

In each case the line of action of the lifting force and the outer face of the corner fitting is to be no farther apart than 38 mm. The lifting is to be carried out in such a manner that the lifting devices bear on the top corner fittings only.

The platform container is to be suspended for 5 minutes.

Applicable to 1D containers only

Test procedure:
<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESTRANT (LONGITDINAL)- TEST</strong></td>
<td>R-T</td>
</tr>
<tr>
<td>AT BOTTOM</td>
<td>1,00 R per side</td>
</tr>
<tr>
<td><strong>APPLICABLE TO ALL SIZES</strong></td>
<td>1,00 R per side</td>
</tr>
<tr>
<td><strong>WHEEL LOADINGS TEST</strong></td>
<td>R-T</td>
</tr>
<tr>
<td><strong>APPLICABLE TO ALL SIZES</strong></td>
<td>1,00 R per side</td>
</tr>
<tr>
<td><strong>Fork lift test</strong></td>
<td><strong>2 x 27.3 kN</strong></td>
</tr>
<tr>
<td>Applicable to 1C and 1D platform containers fitted with fork lift pockets.</td>
<td><strong>1,25 R-T</strong></td>
</tr>
<tr>
<td><strong>Grappler lift arm test</strong></td>
<td><strong>0,3125 R</strong></td>
</tr>
<tr>
<td>Applicable to 1A, 1B and 1C platform containers fitted with grappler arm lift positions.</td>
<td><strong>0,3125 R</strong> per side</td>
</tr>
</tbody>
</table>
C 500  Testing of platform-based containers with incomplete superstructure and fixed ends.

Notes:
1. The externally applied forces shown below are for one end or one side only. The internal loads are for the whole container.
2. For test procedures, see also C 200 and Sec 2 «General Cargo Containers».

End Elevations

<table>
<thead>
<tr>
<th>Stack Test</th>
<th>Side Elevations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,25R</td>
<td>2,25R</td>
</tr>
<tr>
<td>2,25R</td>
<td>2,25R</td>
</tr>
<tr>
<td>2,25R</td>
<td>2,25R</td>
</tr>
<tr>
<td>2,70R TYPE 61</td>
<td>2,70R TYPE 62</td>
</tr>
<tr>
<td>2,70R TYPE 61</td>
<td>2,70R TYPE 62</td>
</tr>
<tr>
<td>2,70R TYPE 61</td>
<td>2,70R TYPE 62</td>
</tr>
</tbody>
</table>

Top Lift Test

Top Corner Fittings

Applicable to 1D containers only.

Bottom Lift Test

Bottom Corner Fittings

To be continued
<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RIGIDITY</strong> (TRANSVERSE) TEST</td>
<td></td>
</tr>
<tr>
<td>150 kN</td>
<td>150 kN</td>
</tr>
<tr>
<td><strong>TYPE 61</strong></td>
<td><strong>TYPE 62</strong></td>
</tr>
<tr>
<td>150 kN</td>
<td>150 kN</td>
</tr>
<tr>
<td>Applicable to 1A, 1AA, 1B, 1BB, 1C and 1CC containers only.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RIGIDITY</strong> (TRANSVERSE) TEST</td>
<td></td>
</tr>
<tr>
<td>150 kN</td>
<td>150 kN</td>
</tr>
<tr>
<td><strong>TYPE 61</strong></td>
<td><strong>TYPE 62</strong></td>
</tr>
<tr>
<td>150 kN</td>
<td>150 kN</td>
</tr>
<tr>
<td>Applicable to 1A, 1AA, 1B, 1BB, 1C and 1CC containers only.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RIGIDITY</strong> (LONGITUDINAL) TEST</td>
<td></td>
</tr>
<tr>
<td>50 kN</td>
<td>50 kN</td>
</tr>
<tr>
<td>Applicable to 1A, 1AA, 1B, 1BB, 1C and 1CC containers only.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESTRAINT</strong> (LONGITUDINAL) TEST</td>
<td></td>
</tr>
<tr>
<td>1,00 R per side</td>
<td>1,00 R per side</td>
</tr>
<tr>
<td>Applicable to all containers.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRENGTH ON END LOAD</strong></td>
<td></td>
</tr>
<tr>
<td>0.4P</td>
<td></td>
</tr>
<tr>
<td>Applicable only to type 61 containers.</td>
<td></td>
</tr>
</tbody>
</table>

*to be continued*
### WHEEL LOADINGS TEST

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Type 51" /></td>
<td><img src="#" alt="Type 62" /></td>
</tr>
</tbody>
</table>

**2 x 27.3 kN**

### Fork lift test

Applicable to 1C, 1CC and 1D containers when fitted with fork lift pockets.

### Grappler arm lift test

Applicable to all containers fitted with grappler arm lift positions.
C 600  Testing of platform-based containers with incomplete superstructure and folding ends.

Notes:
1. The externally applied forces shown below are for one end or one side only. The internal loads are for the whole container.
2. For test procedures, see also C 200 and Sec. 2, «General Cargo Containers».

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STACKING TEST</strong></td>
<td><strong>STACKING TEST</strong></td>
</tr>
<tr>
<td>2,70R 2,70R 2,70R</td>
<td>2,70R 2,70R 2,70R</td>
</tr>
<tr>
<td><strong>TOP LIFT TEST</strong></td>
<td><strong>TOP LIFT TEST</strong></td>
</tr>
<tr>
<td>R/2 R/2 R/2</td>
<td>R/2 R/2 R/2</td>
</tr>
<tr>
<td><strong>TOP CORNER FITTINGS</strong></td>
<td><strong>TOP CORNER FITTINGS</strong></td>
</tr>
<tr>
<td>TYPE 63</td>
<td>TYPE 64</td>
</tr>
<tr>
<td><strong>BOTTOM LIFT TEST</strong></td>
<td><strong>BOTTOM LIFT TEST</strong></td>
</tr>
<tr>
<td>R R</td>
<td>R R</td>
</tr>
<tr>
<td>2sinθ 2sinθ</td>
<td>2sinθ 2sinθ</td>
</tr>
<tr>
<td><strong>BOTTOM CORNER FITTINGS</strong></td>
<td><strong>BOTTOM CORNER FITTINGS</strong></td>
</tr>
<tr>
<td>TYPE 63</td>
<td>TYPE 64</td>
</tr>
<tr>
<td><strong>RIGIDITY (TRANSVERSE) TEST</strong></td>
<td><strong>RIGIDITY (TRANSVERSE) TEST</strong></td>
</tr>
<tr>
<td>150kN 150kN</td>
<td>150kN 150kN</td>
</tr>
<tr>
<td><strong>RIGIDITY (TRANSVERSE) TEST</strong></td>
<td><strong>RIGIDITY (TRANSVERSE) TEST</strong></td>
</tr>
<tr>
<td>150kN 150kN</td>
<td>150kN 150kN</td>
</tr>
</tbody>
</table>
| Test procedure:
The container under test, in tare condition, is to be placed on four level supports, one under each corner fitting, and is to be restrained against lateral and vertical movement by means of anchor devices acting through the bottom apertures of the bottom corner fittings. Lateral restraint is to be provided only at a bottom corner fitting diagonally opposite to and in the same end frame as a top corner fitting to which force is applied. When testing the two end frames separately, vertical restraint is only to be applied at the end frame under test.

In the case of Type 64 containers, in order to represent typical service conditions as closely as practicable, the top corner fittings at the end or ends of the container under test are to be connected transversely by means of a member or members representing the lower transverse member(s) in the end frame(s) of a superimposed container. The representative member is to be securely attached to the corner fittings in order that the applied loads may be as evenly divided as practicable between the two posts.

Forces of 150 kN are to be applied either separately or simultaneously to each of the top corner fittings on one side of the container in lines parallel both to the base and to the planes of the ends of the container. The forces are to be applied first towards and then away from the top corner fittings.

In the case of a container with identical ends, only one need be tested. Where an end is not essentially symmetrical about its own vertical centre line, both sides of that end are to be tested.

to be continued
Rigidity (longitudinal) test procedure:
The container under test, in tare condition, is to be placed on four level supports, one under each corner fitting, and is to be restrained against longitudinal and vertical movement by means of anchor devices acting through the bottom apertures of the bottom corner fittings. Longitudinal restraint is to be provided only at a bottom corner fitting diagonally opposite to and in the same side frame as a top corner fitting to which force is applied.

Forces of 50 kN are to be applied either separately or simultaneously to each of the top corner fittings on one end of the container in lines parallel both to the base of the container and to the planes of the sides of the container. The forces are to be applied first towards and then away from the top corner fitting.

In the case of a container with identical sides, only one side need be tested. Where a side is not essentially symmetrical about its own vertical centre line, both ends of that side are to be tested.

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rigidity (longitudinal) test procedure:</strong></td>
<td><img src="" alt="Diagram" /></td>
</tr>
<tr>
<td>The container under test, in tare condition, is to be placed on four level supports, one under each corner fitting, and is to be restrained against longitudinal and vertical movement by means of anchor devices acting through the bottom apertures of the bottom corner fittings. Longitudinal restraint is to be provided only at a bottom corner fitting diagonally opposite to and in the same side frame as a top corner fitting to which force is applied. Forces of 50 kN are to be applied either separately or simultaneously to each of the top corner fittings on one end of the container in lines parallel both to the base of the container and to the planes of the sides of the container. The forces are to be applied first towards and then away from the top corner fitting. In the case of a container with identical sides, only one side need be tested. Where a side is not essentially symmetrical about its own vertical centre line, both ends of that side are to be tested.</td>
<td><img src="" alt="Diagram" /></td>
</tr>
</tbody>
</table>

| RESTRAIN (LONGITUDINAL) TEST | ![Diagram](attachment:diagram3.png) |

| STRENGTH ON END LOAD TEST | ![Diagram](attachment:diagram4.png) |

Applicable only to type 63 containers.

To be continued
### WHEEL LOADINGS

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TEST</strong></td>
<td></td>
</tr>
<tr>
<td><strong>2 x 27,3 kN</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TYPE 63</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TYPE 64</strong></td>
<td></td>
</tr>
</tbody>
</table>

#### Fork lift test
Applicable to ICC, IC and ICX containers when fitted with fork lift pockets.

#### Fork lift test (inner pockets)
Applicable to ICC, IC and ICX containers when fitted also with a second set of fork lift pockets.

#### Grappler arm lift test
Applicable to all containers fitted with grappler arm lift positions.
In folded condition (C 600 continued):

<table>
<thead>
<tr>
<th>STACKING TEST</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>END ELEVATIONS</td>
<td>SIDE ELEVATIONS</td>
</tr>
<tr>
<td>2,7R 2,7R 2,7R</td>
<td>2,7R 2,7R 2,7R</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TOP LIFT TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT/2 NT/2 NT/2</td>
</tr>
</tbody>
</table>

N = maximum number of containers which form an interlocked pile.

Test procedure:
The folded container under test is to be connected by means of interlocking devices either to the top of another container or a test load, each of weight 2 N T. The weight is to be equally shared between the interlocking devices.
The combined units are to be carefully lifted from all four top corners in such a way that no significant acceleration or deceleration forces are applied.
C 700  Testing of platform-based containers, open-sided, with complete superstructure.

Notes:
1. The externally applied forces shown below are for one end or one side only. The internal loads are for the whole container.
2. For test procedures, see also Sec. 2 «General Cargo Containers».

END ELEVATIONS

<table>
<thead>
<tr>
<th>STACKING TEST</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,25R</td>
<td>2,25R</td>
</tr>
<tr>
<td>2,70R</td>
<td>2,70R</td>
</tr>
</tbody>
</table>

Notes:
Applicable to all sizes

TOP LIFT

<table>
<thead>
<tr>
<th>TOP CORNER FITTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/2</td>
</tr>
</tbody>
</table>

Notes:
Applicable to IAA, IA, IB, 1CC and 1C containers.

TOP LIFT TEST

<table>
<thead>
<tr>
<th>TOP CORNER FITTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/2</td>
</tr>
</tbody>
</table>

Notes:
Applicable to 1D containers only.

BOTTOM LIFT TEST

<table>
<thead>
<tr>
<th>BOTTOM CORNER FITTINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/2sinθ</td>
</tr>
</tbody>
</table>

Notes:
Applicable to all containers fitted with bottom corner fittings.

to be continued
<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RIGIDITY</strong> (TRANSVERSE) TEST</td>
<td>Applicable to 1AA, 1A, 1BB, 1B, 1CC and 1C containers only.</td>
</tr>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
<tr>
<td>150 kN</td>
<td>75 kN</td>
</tr>
</tbody>
</table>

- RIGIDITY (TRANSVERSE) TEST

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RIGIDITY</strong> (LONGITUDINAL) TEST</td>
<td>Applicable to 1AA, 1A, 1BB, 1B, 1CC and 1C containers only.</td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /></td>
<td><img src="image4" alt="Diagram" /></td>
</tr>
<tr>
<td>75 kN</td>
<td>75 kN</td>
</tr>
</tbody>
</table>

- RIGIDITY (LONGITUDINAL) TEST

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESTRAINT</strong> (LONGITUDINAL) TEST</td>
<td></td>
</tr>
<tr>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td>1,00R per side</td>
<td>1,00R per side</td>
</tr>
</tbody>
</table>

- RESTRAINT (LONGITUDINAL) TEST

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROOF LOADING TEST</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image7" alt="Diagram" /></td>
<td><img src="image8" alt="Diagram" /></td>
</tr>
<tr>
<td>3kN</td>
<td>3kN</td>
</tr>
</tbody>
</table>

- ROOF LOADING TEST

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STRENGTH ON END LOAD TEST</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image9" alt="Diagram" /></td>
<td><img src="image10" alt="Diagram" /></td>
</tr>
<tr>
<td>0,4P</td>
<td></td>
</tr>
</tbody>
</table>

- STRENGTH ON END LOAD TEST

<table>
<thead>
<tr>
<th>END ELEVATIONS</th>
<th>SIDE ELEVATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHEEL LOADINGS TEST</strong></td>
<td></td>
</tr>
<tr>
<td><img src="image11" alt="Diagram" /></td>
<td><img src="image12" alt="Diagram" /></td>
</tr>
<tr>
<td>2 x 27,3 kN</td>
<td></td>
</tr>
</tbody>
</table>

- WHEEL LOADINGS TEST

---

To be continued
### Fork lift test
Applicable to ICC, IC and ID containers fitted with fork lift pockets.

### Grappler arm lift test
Applicable to all containers fitted with grappler arm lift positions.
SECTION 6
REPAIR OF CONTAINERS AFTER DAMAGE

Contents.

A General Requirements.
A 100 Application.

B Approval of Repair Shops
B 100 Application for approval.
B 200 Approval.
B 300 Surveillance of the repair shop.
B 400 Withdrawal of approval.

C Approval of Containers Repaired in Shops not Approved for this Purpose.
C 100 General.

A General Requirements.

A 100 Application.

101 The requirements of this section of the Rules apply to the repair of general cargo containers, platforms and platform-based containers.

102 Facilities for repair of tank containers, thermal containers and other special purpose containers will be specially considered.

B Approval of Repair Shops.

B 100 Application for approval.

101 The following information is to be forwarded to the Society together with application of approval:

- names of responsible personnel.
- layout of the plant.
- repair capacity.
- number of employees.
- type of repair jobs for which approval is desired.
- container types for which approval is desired.
- repair equipment.
- testing facilities.
- equipment for checking of dimensions.
- equipment for checking of paintwork.
- provisions for inspection of all surfaces of a container.
- repairer’s standard of workmanship and system for inspection.

B 200 Approval.

201 If the information received is considered to cover satisfactorily all relevant aspects, the Society’s Surveyor will visit the repair shop to verify the particulars given.

202 When the repair shop is found satisfactory, an approval valid for two years will be given.

B 300 Surveillance of the repair shop.

301 The Society’s Surveyor is to be given access to the repair shop at any reasonable time for random inspection. The minimum number of visits per validity period will be determined in each case.

B 400 Withdrawal of approval.

401 If the facilities and the repairs carried out are found not to be up to the standard under which approval was granted, and if corrections, as pointed out by the Surveyor, are not dealt with satisfactorily, the approval may be withdrawn.

C Approval of Containers Repaired in Shops not Approved for this Purpose.

C 100 General.

101 If a container has been repaired after damage, the repair may be approved by the Society’s Surveyor on the Owner’s request before the container is taken into service. The Surveyor may require the container to be partly or completely tested according to the Rules. A weathertightness test is in any case to be carried out.
# APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Certificates</td>
</tr>
<tr>
<td>1.1</td>
<td>Freight Container Type Approval Certificate</td>
</tr>
<tr>
<td>1.2</td>
<td>Summary Report on Prototype Strength Tests</td>
</tr>
<tr>
<td>1.3</td>
<td>Freight Container Production Certificate based on Manufacturer’s Quality Assurance System</td>
</tr>
<tr>
<td>1.4</td>
<td>Freight Container Certificate</td>
</tr>
<tr>
<td>1.5</td>
<td>The Society’s Emblem</td>
</tr>
<tr>
<td>2</td>
<td>Plate for CSC Safety Approval</td>
</tr>
<tr>
<td>3</td>
<td>External container Dimensions, Tolerances and Ratings</td>
</tr>
<tr>
<td>4</td>
<td>Standard Corner Fittings</td>
</tr>
<tr>
<td>4.1</td>
<td>Top corner fitting</td>
</tr>
<tr>
<td>4.2</td>
<td>Bottom corner fitting</td>
</tr>
<tr>
<td>5</td>
<td>Load-Transferring Areas in Base Structures of Containers</td>
</tr>
<tr>
<td>6</td>
<td>Optional Features</td>
</tr>
<tr>
<td>6.1</td>
<td>Fork lift pockets</td>
</tr>
<tr>
<td>6.2</td>
<td>Grappler arm lifting areas</td>
</tr>
<tr>
<td>6.3</td>
<td>Gooseneck tunnels</td>
</tr>
</tbody>
</table>
DET NORSKE VERITAS
Established 1864

TYPE APPROVAL CERTIFICATE

This is to certify that the design of: FREIGHT CONTAINER

Description of container ........................................................................................................

External dimensions ..............................................................................................................
Rating (Maximum Gross Weight R) ....................................................................................... kg. lb
Tare Weight (T) ......................................................................................................................... kg. lb
Net Cubic Capacity ................................................................................................................ m³

is found to comply with: Rules for Certification of Freight Containers.

The prototype as specified above has been tested in accordance with the Society's detailed test procedures. The tests as shown in the attached Test Report reference number: and dated: were satisfactorily completed.

The design has been approved by this Society on conditions stated below.

Remarks: Certified as conforming to the requirements of the International Convention for Safe Containers.

For traceability to this Type Approval Certificate the products are to be marked:

Manufacturer's Container Type Identification ........................................................................
Serial number of prototype ......................................................................................................
Type Approval No. & C.S.C. Approval Reference N-NV ........................................................

The Approval is valid only for the fields of application and operational limitations as follows:

Stacking capability ............................................................. kg. ........................................ lb
Stacking test load .............................................................. kg. ........................................ lb
Transverse racking test load .............................................. kg. ........................................ lb
Side wall ............................................................................. kg. ........................................ lb
End wall ............................................................................. kg. ........................................ lb

The Approval is valid until ........................................ (See, however, the conditions overleaf)

Det norske Veritas has no liability for loss or damage caused by its officers, employees or others who act under assignment by the Foundation, whether by act such person has acted intentionally or negligently and whether or not the loss or damage has affected the owner of a ship, facility or system, or a shipyard or others who have requested the Foundation's assistance, or any third party who, without having any contractual relations with the Foundation has acted on reliance on decisions made or information given by or on behalf of the Foundation. Nor, in cases as mentioned in the preceding paragraph, can the individual or individuals who have personally caused the loss or damage be held liable.
Design approval conditions
The Approval is based on the following documentation:

Det norske Veritas is to be kept informed on changes in design, choice of parts or materials. Such changes, dissatisfactory experience or amendments of applied Rules, Codes, Regulations or Standards may at any time lead to withdrawal of the Type Approval.

The Type Approval is valid only when the installation/application of the product is in accordance with the current Rules of Det norske Veritas, Codes, Regulations, Standards and Manufacturer's Specifications, as applicable.

Product certification conditions
Production survey arrangement:

Tests to be carried out for each product before installation/application:

Documents, signboards etc. which are to accompany each product/delivery:

Other conditions:
# FREIGHT CONTAINER CERTIFICATION
## SUMMARY REPORT ON PROTOTYPE STRENGTH TESTS

<table>
<thead>
<tr>
<th>Tested at</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container type</td>
<td>Design type</td>
</tr>
<tr>
<td>Rating (R)</td>
<td>Serial number</td>
</tr>
<tr>
<td>Tare weight (T)</td>
<td>Survey station</td>
</tr>
<tr>
<td>Maximum pay load (P)</td>
<td>Date:</td>
</tr>
<tr>
<td>Cubic capacity</td>
<td></td>
</tr>
</tbody>
</table>

Surveyor to Det norske Veritas

---

**Note:** In addition to this Summary Report, a full Prototype Test Report is required in each case for record purposes.

### All measurements in millimetres/inches*

#### Dimensional check**

<table>
<thead>
<tr>
<th>Stacking test</th>
<th>Deflection</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load per corner kg (0,25 R x 1,8 x )</td>
<td>(a)</td>
<td></td>
</tr>
<tr>
<td>(a) Maximum bowing of corner post front</td>
<td>(a)</td>
<td></td>
</tr>
<tr>
<td>(b) Maximum bowing of corner post rear</td>
<td>(b)</td>
<td></td>
</tr>
</tbody>
</table>

#### Lifting from top corner fittings**

<table>
<thead>
<tr>
<th>Internal load kg (2R-T)</th>
<th>Baseframe deflection before lifting</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Maximum deflection of bottom side rail</td>
<td>(a)</td>
</tr>
<tr>
<td>(b) Maximum deflection of crossmember</td>
<td>(b)</td>
</tr>
</tbody>
</table>

#### Lifting from bottom corner fittings**

#### Restraint test**

<table>
<thead>
<tr>
<th>End wall test</th>
<th>Load per wall kg (0, P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Front</td>
<td>(a)</td>
</tr>
<tr>
<td>(b) Rear (door end)</td>
<td>(b)</td>
</tr>
</tbody>
</table>

#### Side wall test

<table>
<thead>
<tr>
<th>Load per wall kg (0, P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Offside</td>
</tr>
<tr>
<td>(b) Nearside</td>
</tr>
</tbody>
</table>

#### Roof strength test

<table>
<thead>
<tr>
<th>Load 3 kN</th>
<th></th>
</tr>
</thead>
</table>

#### Floor strength test

<table>
<thead>
<tr>
<th>Axle load 54 kN</th>
<th></th>
</tr>
</thead>
</table>

### Racking

<table>
<thead>
<tr>
<th>Load per end 150 kN</th>
<th></th>
</tr>
</thead>
</table>

#### Longitudinal racking

<table>
<thead>
<tr>
<th>Load kN per side/corner post</th>
<th></th>
</tr>
</thead>
</table>

#### Fork lift test**

<table>
<thead>
<tr>
<th>Load kN per side/corner post</th>
<th></th>
</tr>
</thead>
</table>

#### Grappler lift test**

<table>
<thead>
<tr>
<th>Load kN per side/corner post</th>
<th></th>
</tr>
</thead>
</table>

#### Weathertightness** (outlet pressure 1 bar, nozzle diam. 12,5 mm)

<table>
<thead>
<tr>
<th>Tank built under survey and pressure tested**</th>
</tr>
</thead>
</table>

---

* Delete as necessary

** No dimensions need be given for these items, but a remark should be inserted. If this remark is "not satisfactory", an explanation should be provided.

---

Det norske Veritas has no liability for loss or damage caused by its officers, employees or others who act under assignment by the Foundation, whether or not such person has acted intentionally or negligently and whether or not the loss or damage has affected the owner of a ship, facility or system, or a shipyard or others who have requested the Foundation's assistance, or any third party who without having any contractual relations with the Foundation has acted or made arrangements in reliance on decisions made or information given by or on behalf of the Foundation. Nor, in cases as mentioned in the preceding paragraph, can the individual or individuals who have personally caused the loss or damage be held liable.
FREIGHT CONTAINER CERTIFICATE

Name and address of manufacturer: ..........................................................................................................

Survey station: ..........................................................................................................................................

Date: .....................................................................................................................................................

Signature of person responsible: ..............................................................................................................

(name also to be typed)

Surveyor to Det norske Veritas: ..................................................................................................................

This is to certify that the container(s) specified below has/have been surveyed by the undersigned and found to be of satisfactory construction and workmanship and in accordance with the requirements of the Society’s “Rules for Certification of Freight Containers”. The details of design, materials and construction conform to the approved plans and to the Prototype Container identified as follows:

Manufacturer’s serial number: ..................................................................................................................

Tare weight: ............................................................................................................................................... kg, .............................................................................................................. lb

DnV type approval No. & C.S.C. approval reference: .............................................................................

Marking:

Manufacturer’s Model No: ......................................................................................................................

Date of Manufacture: ..............................................................................................................................

Type of Container: ..................................................................................................................................

External Dimensions: ..............................................................................................................................

Rating: (Maximum gross weight R): ........................................................................................................ kg, .............................................................................................................. lb

Owner’s Name & Code Letters: ..............................................................................................................

Approval endorsement by Det norske Veritas:

Stacking capability: .................................................................................................................................. kg, .............................................................................................................. lb

Stacking test load: ..................................................................................................................................... kg/corner

Transverse racking test load: .................................................................................................................... kg, .............................................................................................................. lb

End wall strength: .....................................................................................................................................

Side wall strength: .................................................................................................................................

First examination due date: ......................................................................................................................

Number of units covered by this certificate: ............................................................................................

Remarks: ..................................................................................................................................................

Det norske Veritas has no liability for loss or damage caused by its officers, employees or others who act under assignment by the Foundation, whether or not such person has acted intentionally or negligently and whether or not the loss or damage has affected the owner of a ship, facility or system, or a shipyard, or others who have requested the Foundation’s assistance, or any third party who without having any contractual relation with the Foundation has acted or made arrangements in reliance on decisions made or information given by or on behalf of the Foundation. Nor, in cases as mentioned in the preceding paragraph, can the individual or individuals who have personally caused the loss or damage be held liable.
FREIGHT CONTAINER PRODUCTION CERTIFICATE
BASED ON MANUFACTURER'S QUALITY ASSURANCE SYSTEM

<table>
<thead>
<tr>
<th>Container Serial Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner's</td>
</tr>
</tbody>
</table>

Name and address of manufacturer:

Survey station:

Date:

Signature of person responsible
(name also to be typed)

Surveyor to Det norske Veritas

We hereby certify that the containers specified below have been made according to the Rules of Det norske Veritas and manufactured under the application of our Quality Assurance System as agreed with Det norske Veritas. Manufacturer's Quality Assurance System for the Container production is under surveillance of Det norske Veritas. The details of design, materials and construction conform to the approved plans and to the Prototype Container identified as follows.

Manufacturer's serial number:

Tare weight: \( \ldots \ldots \ldots \text{kg} \ldots \ldots \ldots \text{lb} \)

DnV type approval No. & C.S.C. approval reference:

Marking:

Manufacturer's Model No:

Date of Manufacture:

Type of Container:

External Dimensions:

Rating: (Maximum gross weight R): \( \ldots \ldots \ldots \text{kg} \ldots \ldots \ldots \text{lb} \)

Owner's Name & Code Letters:

Approval endorsement by Det norske Veritas

Stacking capability: \( \ldots \ldots \ldots \text{kg} \ldots \ldots \ldots \text{lb} \)

Stacking test load: \( \ldots \ldots \ldots \text{kg/corner} \)

Transverse racking test load: \( \ldots \ldots \ldots \text{kg} \ldots \ldots \ldots \text{lb} \)

End wall strength:

Side wall strength:

First examination due date:

Number of units covered by this certificate:

Remarks: This certificate is valid only when endorsed and signed by the Society's Surveyor.

Det norske Veritas has no liability for loss or damage caused by its officers, employees or others who act under assignment by the Foundation, whether or not such person has acted intentionally or negligently and whether or not the loss or damage affects the owner of a ship, facility or system, or a shipyard or others who have requested the Foundation's assistance, or any third party who without having any contractual relations with the Foundation has acted or made arrangements in reliance on decisions made or information given by or on behalf of the Foundation. Nor, in cases as mentioned in the preceding paragraph, can the individual or individuals who have personally caused the loss or damage be held liable.
APPENDIX 1.5
THE SOCIETY'S EMBLEM

APPENDIX 2
PLATE FOR CSC SAFETY APPROVAL

CSC SAFETY APPROVAL

1. [N-NV/749/2/7/75]
2. DATE MANUFACTURED
3. IDENTIFICATION NO.
4. MAXIMUM GROSS WEIGHT kg lb
5. ALLOWABLE STACKING WEIGHT
   FOR 1.8 g kg lb
6. RACKING TEST LOAD VALUE kg lb
7. 
8. 
9. 

> 200 mm

NOTES:
1. Country of Approval and Approval Reference as given in the example on line 1. (The country of Approval should be indicated by means of the distinguishing sign used to indicate country of registration of motor vehicles in international road traffic.)
2. Date (month and year) of manufacture.
3. Manufacturer's identification number of the container or, in the case of existing containers for which that number is unknown, the number allotted by the Administration.
4. Maximum Operating Gross Weight (kilogrammes and lbs.).
5. Allowable Stacking Weight for 1.8 g (kilogrammes and lbs.).
6. Transverse Racking Test Load Value (kilogrammes and lbs.).
7. End Wall Strength to be indicated on plate only if end walls are designed to withstand a load of less or greater than 0.4 times the maximum permissible payload, i.e. 0.4 P.
8. Side Wall Strength to be indicated on plate only if the side walls are designed to withstand a load of less or greater than 0.6 times the maximum permissible payload, i.e. 0.6 P.
9. First maintenance examination date (month and year) for new containers and subsequent maintenance examination dates (month and year) if Plate used for this purpose.
## EXTERNAL CONTAINER DIMENSIONS, TOLERANCES AND RATINGS

<table>
<thead>
<tr>
<th>Freight container designation</th>
<th>Length ($L$)</th>
<th>Width ($W$)</th>
<th>Height ($H$)</th>
<th>Rating (maximum gross mass)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>Tolerances mm</td>
<td>mm</td>
<td>Tolerances mm</td>
</tr>
<tr>
<td>IAA</td>
<td>12 192</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>IA</td>
<td>12 192</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>IAX</td>
<td>12 192</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>IBB</td>
<td>9 125</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>IB</td>
<td>9 125</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>IBX</td>
<td>9 125</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>ICC</td>
<td>6 058</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>IC</td>
<td>6 058</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>ICX</td>
<td>6 058</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>ID</td>
<td>2 991</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
<tr>
<td>IDX</td>
<td>2 991</td>
<td>0</td>
<td>2 438</td>
<td>0</td>
</tr>
</tbody>
</table>

* In certain countries there are legal limitations to the overall height of vehicle and load.
Appendix 3 continued

CORNER FITTINGS

NOTE — Dimensions L, H and W are measured along the appropriate edges.
Appendix 3 continued

\( S = \text{Length between centres of apertures in corner fittings} \)

\( P = \text{Width between centres of apertures in corner fittings} \)

\( C_1 = \text{Corner fitting measurement } 101,5 - 0,15 \text{ mm} \)

\( C_2 = \text{Corner fitting measurement } 89 - 0,15 \text{ mm} \)

\( L = \text{External length of the container} \)

\( W = \text{External width of the container} \)

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

\( K_1 = \text{Difference between } D_1 \text{ and } D_2 \) or between \( D_3 \) and \( D_4 \); i.e. \( K_1 = |D_1 - D_2| \) or \( K_1 = |D_3 - D_4| \)

\( K_2 = \text{Difference between } D_5 \text{ and } D_6 \); i.e. \( K_2 = |D_5 - D_6| \)

\( H = \text{Overall height} \)

### Dimensions and tolerances relating to corner fittings locations

<table>
<thead>
<tr>
<th>Freight container designation</th>
<th>( S ) mm</th>
<th>( P ) mm</th>
<th>( K_{1\text{max.}} ) mm</th>
<th>( K_{2\text{max.}} ) mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1AA</td>
<td>11,985</td>
<td>2,259</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>1A</td>
<td>11,985</td>
<td>2,259</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>1AX</td>
<td>11,985</td>
<td>2,259</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>1BB</td>
<td>8,918</td>
<td>2,259</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>1B</td>
<td>8,918</td>
<td>2,259</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>1BX</td>
<td>8,918</td>
<td>2,259</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>1CC</td>
<td>5,853</td>
<td>2,259</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>1C</td>
<td>5,853</td>
<td>2,259</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>1CX</td>
<td>5,853</td>
<td>2,259</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>1D</td>
<td>2,787</td>
<td>2,259</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>1DX</td>
<td>2,787</td>
<td>2,259</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**NOTE:**
Attention of manufacturers is drawn to the vital importance of accurately maintaining the reference dimensions of \( S \) and \( P \). The tolerances to be applied to \( S \) and \( P \) are governed by the tolerances for the overall length and width of the container.
APPENDIX 4.1
TOP CORNER FITTING
Dimensions in millimetres

NOTES
1 Solid and broken lines (— and —) show surfaces and contours which must be physically duplicated in the fitting.
2 Phantom lines (-----) show optional walls, which may be used to develop a box-shaped fitting.
NOTES

1. Solid and broken lines (— and ——) show surfaces and contours which must be physically duplicated in the fitting.
2. Phantom lines (—–—–) show optional walls, which may be used to develop a box-shaped fitting.
APPENDIX 5
LOAD-TRANSFERRING AREAS IN BASE STRUCTURES OF CONTAINERS

The base structures of containers are to have load-transferring areas of 250 mm minimum width within the zones shown in Fig. 1.

1) Containers fitted with intermediate transverse members having a spacing of 1000 mm or less comply with this requirement.
2) Containers not complying as in (1) are to have at least sufficient load-transferring areas at the positions shown in Figs. 2 to 5.

NOTE — The transfer of load between the underside of the bottom side rails and carrying vehicles is not envisaged. The transfer of load between side rails and handling equipment should only occur when provisions have been made in accordance with fork lift pockets and grappler arms.

Fig. 1 Load-transfer zones

NOTE
In Figs. 2 to 5, the load transferring areas associated with the container base are shown in black. Gooseneck tunnel transfer areas are shown shaded in Fig. 5.

Fig. 2 Load transfer areas for containers 1CC and 1C.
Appendix 5 continued

Fig. 3 Load transfer areas for containers 1BB and 1B

Fig. 4 Load transfer areas for containers 1AA and 1A without gooseneck tunnels

Fig. 5 Load transfer areas for containers 1AA and 1A with gooseneck tunnels
APPENDIX 6.1
DIMENSIONS OF FORK-LIFT POCKETS

### Dimensions

<table>
<thead>
<tr>
<th>Container</th>
<th>Dimensions</th>
<th>Fork pockets for loaded and unloaded containers</th>
<th>Fork pockets for unloaded containers only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>ICC</td>
<td>2 050</td>
<td>355</td>
<td>115</td>
</tr>
<tr>
<td>IC</td>
<td>± 50</td>
<td>min.</td>
<td>min.</td>
</tr>
<tr>
<td>TD</td>
<td>900</td>
<td>305</td>
<td>102</td>
</tr>
<tr>
<td>IE</td>
<td>± 50</td>
<td>min.</td>
<td>min.</td>
</tr>
<tr>
<td>1E</td>
<td>900</td>
<td>305</td>
<td>102</td>
</tr>
</tbody>
</table>

NOTE: C = Clear opening.
APPENDIX 6.2
DIMENSIONS OF GRAPPLER ARM LIFTING AREAS

Dimensions in millimetres

Section X-X

TYPE 1
This part of the wall (including rivet/bolt heads) must not be more than 12 \( \theta \) from the inside of the lip.
Corner must be clean and square.

\[ \theta = 35^\circ \]

Where stops are provided at ends of pockets, they shall be sloped as indicated.

TYPE 2
This part of the wall (including rivet/bolt heads) must not be more than 12 \( \theta \) from the inside of the lip.
Corner must be clean and square.

\[ \theta = 35^\circ \]

Where stops are provided at ends of pockets, they shall be sloped as indicated.

Dimensions:

- 1A, 1AA: 4876 ± 6 (lifting area)
- 1B, 1BB: 2400 min.
- 1C, 1CC: 100 min.
- 1D: 2500 (lifting area)
- Base of corner fittings: 300 min.
APPENDIX 6.3
DIMENSIONS OF GOOSENECK TUNNELS

NOTE - The $B_t$ tolerance should be measured in the rear part of the tunnel, on a length of about 600 mm.

<table>
<thead>
<tr>
<th>Symbols</th>
<th>Dimensions mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>$L_t$ 3 150 min.</td>
</tr>
<tr>
<td></td>
<td>$D$ 6 $+1 -2$</td>
</tr>
<tr>
<td>Width</td>
<td>$A_t$ 1 029 $+3 -0$</td>
</tr>
<tr>
<td>Height</td>
<td>$B_t$ 120 0 $-3$</td>
</tr>
<tr>
<td></td>
<td>$C$ 12.5 $+5 -1.5$</td>
</tr>
</tbody>
</table>