

# New edition of the “Rules for the Type Approval and Testing of Containers”

*Effective from 1/1/2022*

This new edition of the Rules provides an updated tool for the certification of ISO Series 1 freight containers (freight containers for general purposes, tank containers and thermal containers) based on the latest versions of the main applicable international conventions and standards.

# Rules for the Type Approval and Testing of Containers

*Effective from 1 January 2022*

# GENERAL CONDITIONS

## Definitions:

"Administration" means the Government of the State whose flag the Ship is entitled to fly or under whose authority the Ship is authorised to operate in the specific case.

"IACS" means the International Association of Classification Societies.

"Interested Party" means the party, other than the Society, having an interest in or responsibility for the Ship, product, plant or system subject to classification or certification (such as the owner of the Ship and his representatives, the ship builder, the engine builder or the supplier of parts to be tested) who requests the Services or on whose behalf the Services are requested.

"Owner" means the registered owner, the ship owner, the manager or any other party with the responsibility, legally or contractually, to keep the ship seaworthy or in service, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2 of the Rules for the Classification of Ships or in the corresponding rules indicated in the specific Rules.

"Rules" in these General Conditions means the documents below issued by the Society:

- (i) Rules for the Classification of Ships or other special units;
- (ii) Complementary Rules containing the requirements for product, plant, system and other certification or containing the requirements for the assignment of additional class notations;
- (iii) Rules for the application of statutory rules, containing the rules to perform the duties delegated by Administrations;
- (iv) Guides to carry out particular activities connected with Services;
- (v) Any other technical document, as for example rule variations or interpretations.

"Services" means the activities described in Article 1 below, rendered by the Society upon request made by or on behalf of the Interested Party.

"Ship" means ships, boats, craft and other special units, as for example offshore structures, floating units and underwater craft.

"Society" or "TASNEEF" means Tasneef and/or all the companies in the Tasneef Group which provide the Services.

"Surveyor" means technical staff acting on behalf of the Society in performing the Services.

## Article 1

1.1. The purpose of the Society is, among others, the classification and certification of ships and the certification of their parts and components. In particular, the Society:

- (i) sets forth and develops Rules;
- (ii) publishes the Register of Ships;
- (iii) issues certificates, statements and reports based on its survey activities.

1.2. The Society also takes part in the implementation of national and international rules and standards as delegated by various Governments.

1.3. The Society carries out technical assistance activities on request and provides special services outside the scope of classification, which are regulated by these general conditions, unless expressly excluded in the particular contract.

## Article 2

2.1. The Rules developed by the Society reflect the level of its technical knowledge at the time they are published. Therefore, the Society, although committed also through its research and development services to continuous updating of the Rules, does not guarantee the Rules meet state-of-the-art science and technology at the time of publication or that they meet the Society's or others' subsequent technical developments.

2.2. The Interested Party is required to know the Rules on the basis of which the Services are provided. With particular reference to Classification Services, special attention is to be given to the Rules concerning class suspension, withdrawal and reinstatement. In case of doubt or inaccuracy, the Interested Party is to promptly contact the Society for clarification.

The Rules for Classification of Ships are published on the Society's website: [www.tasneef.ae](http://www.tasneef.ae).

2.3. The Society exercises due care and skill:

- (i) in the selection of its Surveyors
- (ii) in the performance of its Services, taking into account the level of its technical knowledge at the time the Services are performed.

2.4. Surveys conducted by the Society include, but are not limited to, visual inspection and non-destructive testing. Unless otherwise required, surveys are conducted through sampling techniques and do not consist of comprehensive verification or monitoring of the Ship or of the items subject to certification. The surveys and checks made by the Society on board ship do not necessarily require the constant and continuous presence of the Surveyor. The Society may also commission laboratory testing, underwater inspection and other checks carried out by and under the responsibility of qualified service suppliers. Survey practices and procedures are selected by the Society based on its experience and knowledge and according to generally accepted technical standards in the sector.

## Article 3

3.1. The class assigned to a Ship, like the reports, statements, certificates or any other document or information issued by the Society, reflects the opinion of the Society concerning compliance, at the time the Service is provided, of the Ship or product subject to certification, with the applicable Rules (given the intended use and within the relevant time frame).

The Society is under no obligation to make statements or provide information about elements or facts which are not part of the specific scope of the Service requested by the Interested Party or on its behalf.

3.2. No report, statement, notation on a plan, review, Certificate of Classification, document or information issued or given as part of the Services provided by the Society shall have any legal effect or implication other than a representation that, on the basis of the checks made by the Society, the Ship, structure, materials, equipment, machinery or any other item covered by such document or information meet the Rules. Any such document is issued solely for the use of the Society, its committees and clients or other duly authorised bodies and for no other purpose. Therefore, the Society cannot be held liable for any act made or document issued by other parties on the basis of the statements or information given by the Society. The validity, application, meaning and interpretation of a Certificate of Classification, or any other document or information issued by the Society in connection with its Services, is governed by the Rules of the Society, which is the sole subject entitled to make such interpretation. Any disagreement on technical matters between the Interested Party and the Surveyor in the carrying out of his functions shall be raised in writing as soon as possible with the Society, which will settle any divergence of opinion or dispute.

3.3. The classification of a Ship, or the issuance of a certificate or other document connected with classification or certification and in general with the performance of Services by the Society shall have the validity conferred upon it by the Rules of the Society at the time of the assignment of class or issuance of the certificate; in no case shall it amount to a statement or warranty of seaworthiness,

structural integrity, quality or fitness for a particular purpose or service of any Ship, structure, material, equipment or machinery inspected or tested by the Society.

3.4. Any document issued by the Society in relation to its activities reflects the condition of the Ship or the subject of certification or other activity at the time of the check.

3.5. The Rules, surveys and activities performed by the Society, reports, certificates and other documents issued by the Society are in no way intended to replace the duties and responsibilities of other parties such as Governments, designers, ship builders, manufacturers, repairers, suppliers, contractors or sub-contractors, Owners, operators, charterers, underwriters, sellers or intended buyers of a Ship or other product or system surveyed.

These documents and activities do not relieve such parties from any fulfilment, warranty, responsibility, duty or obligation (also of a contractual nature) expressed or implied or in any case incumbent on them, nor do they confer on such parties any right, claim or cause of action against the Society. With particular regard to the duties of the ship Owner, the Services undertaken by the Society do not relieve the Owner of his duty to ensure proper maintenance of the Ship and ensure seaworthiness at all times. Likewise, the Rules, surveys performed, reports, certificates and other documents issued by the Society are intended neither to guarantee the buyers of the Ship, its components or any other surveyed or certified item, nor to relieve the seller of the duties arising out of the law or the contract, regarding the quality, commercial value or characteristics of the item which is the subject of transaction.

In no case, therefore, shall the Society assume the obligations incumbent upon the above-mentioned parties, even when it is consulted in connection with matters not covered by its Rules or other documents.

In consideration of the above, the Interested Party undertakes to relieve and hold harmless the Society from any third party claim, as well as from any liability in relation to the latter concerning the Services rendered.

Insofar as they are not expressly provided for in these General Conditions, the duties and responsibilities of the Owner and Interested Parties with respect to the services rendered by the Society are described in the Rules applicable to the specific Service rendered.

#### **Article 4**

4.1. Any request for the Society's Services shall be submitted in writing and signed by or on behalf of the Interested Party. Such a request will be considered irrevocable as soon as received by the Society and shall entail acceptance by the applicant of all relevant requirements of the Rules, including these General Conditions. Upon acceptance of the written request by the Society, a contract between the Society and the Interested Party is entered into, which is regulated by the present General Conditions.

4.2. In consideration of the Services rendered by the Society, the Interested Party and the person requesting the service shall be jointly liable for the payment of the relevant fees, even if the service is not concluded for any cause not pertaining to the Society. In the latter case, the Society shall not be held liable for non-fulfilment or partial fulfilment of the Services requested. In the event of late payment, interest at the legal current rate increased by 1.5% may be demanded.

4.3. The contract for the classification of a Ship or for other Services may be terminated and any certificates revoked at the request of one of the parties, subject to at least 30 days' notice to be given in writing. Failure to pay, even in part, the fees due for Services carried out by the Society will entitle the Society to immediately terminate the contract and suspend the Services.

For every termination of the contract, the fees for the activities performed until the time of the termination shall be owed to the Society as well as the expenses incurred in view of activities already programmed; this is without prejudice to the right to compensation due to the Society as a consequence of the termination.

With particular reference to Ship classification and certification, unless decided otherwise by the Society, termination of the contract implies that the assignment of class to a Ship is withheld or, if already assigned, that it is suspended or withdrawn; any statutory certificates issued by the Society will be withdrawn in those cases where provided for by agreements between the Society and the flag State.

#### **Article 5**

5.1. In providing the Services, as well as other correlated information or advice, the Society, its Surveyors, servants or agents operate with due diligence for the proper execution of the activity. However, considering the nature of the activities performed (see art. 2.4), it is not possible to guarantee absolute accuracy, correctness and completeness of any information or advice supplied. Express and implied warranties are specifically disclaimed.

Therefore, except as provided for in paragraph 5.2 below, and also in the case of activities carried out by delegation of Governments, neither the Society nor any of its Surveyors will be liable for any loss, damage or expense of whatever nature sustained by any person, in tort or in contract, derived from carrying out the Services.

5.2. Notwithstanding the provisions in paragraph 5.1 above, should any user of the Society's Services prove that he has suffered a loss or damage due to any negligent act or omission of the Society, its Surveyors, servants or agents, then the Society will pay compensation to such person for his proved loss, up to, but not exceeding, five times the amount of the fees charged for the specific services, information or opinions from which the loss or damage derives or, if no fee has been charged, a maximum of AED5,000 (Arab Emirates Dirhams Five Thousand only). Where the fees charged are related to a number of Services, the amount of the fees will be apportioned for the purpose of the calculation of the maximum compensation, by reference to the estimated time involved in the performance of the Service from which the damage or loss derives. Any liability for indirect or consequential loss, damage or expense is specifically excluded. In any case, irrespective of the amount of the fees charged, the maximum damages payable by the Society will not be more than AED5,000,000 (Arab Emirates Dirhams Five Millions only). Payment of compensation under this paragraph will not entail any admission of responsibility and/or liability by the Society and will be made without prejudice to the disclaimer clause contained in paragraph 5.1 above.

5.3. Any claim for loss or damage of whatever nature by virtue of the provisions set forth herein shall be made to the Society in writing, within the shorter of the following periods: (i) THREE (3) MONTHS from the date on which the Services were performed, or (ii) THREE (3) MONTHS from the date on which the damage was discovered. Failure to comply with the above deadline will constitute an absolute bar to the pursuit of such a claim against the Society.

#### **Article 6**

6.1. These General Conditions shall be governed by and construed in accordance with United Arab Emirates (UAE) law, and any dispute arising from or in connection with the Rules or with the Services of the Society, including any issues concerning responsibility, liability or limitations of liability of the Society, shall be determined in accordance with UAE law. The courts of the Dubai International Financial Centre (DIFC) shall have exclusive jurisdiction in relation to any claim or dispute which may arise out of or in connection with the Rules or with the Services of the Society.

6.2. However,

- (i) In cases where neither the claim nor any counterclaim exceeds the sum of AED300,000 (Arab Emirates Dirhams Three Hundred Thousand) the dispute shall be referred to the jurisdiction of the DIFC Small Claims Tribunal; and
- (ii) for disputes concerning non-payment of the fees and/or expenses due to the Society for services, the Society shall have the

right to submit any claim to the jurisdiction of the Courts of the place where the registered or operating office of the Interested Party or of the applicant who requested the Service is located.

In the case of actions taken against the Society by a third party before a public Court, the Society shall also have the right to summon the Interested Party or the subject who requested the Service before that Court, in order to be relieved and held harmless according to art. 3.5 above.

#### **Article 7**

**7.1.** All plans, specifications, documents and information provided by, issued by, or made known to the Society, in connection with the performance of its Services, will be treated as confidential and will not be made available to any other party other than the Owner without authorisation of the Interested Party, except as provided for or required by any applicable international, European or domestic legislation, Charter or other IACS resolutions, or order from a competent authority. Information about the status and validity of class and statutory certificates, including transfers, changes, suspensions, withdrawals of class, recommendations/conditions of class, operating conditions or restrictions issued against classed ships and other related information, as may be required, may be published on the website or released by other means, without the prior consent of the Interested Party.

Information about the status and validity of other certificates and statements may also be published on the website or released by other means, without the prior consent of the Interested Party.

**7.2.** Notwithstanding the general duty of confidentiality owed by the Society to its clients in clause 7.1 above, the Society's clients hereby accept that the Society may participate in the IACS Early Warning System which requires each Classification Society to provide other involved Classification Societies with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and used to facilitate the proper working of the IACS Early Warning System. The Society will provide its clients with written details of such information sent to the involved Classification Societies.

**7.3.** In the event of transfer of class, addition of a second class or withdrawal from a double/dual class, the Interested Party undertakes to provide or to permit the Society to provide the other Classification Society with all building plans and drawings, certificates, documents and information relevant to the classed unit, including its history file, as the other Classification Society may require for the purpose of classification in compliance with the applicable legislation and relative IACS Procedure. It is the Owner's duty to ensure that, whenever required, the consent of the builder is obtained with regard to the provision of plans and drawings to the new Society, either by way of appropriate stipulation in the building contract or by other agreement.

In the event that the ownership of the ship, product or system subject to certification is transferred to a new subject, the latter shall have the right to access all pertinent drawings, specifications, documents or information issued by the Society or which has come to the knowledge of the Society while carrying out its Services, even if related to a period prior to transfer of ownership.

#### **Article 8**

**8.1.** Should any part of these General Conditions be declared invalid, this will not affect the validity of the remaining provisions.





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## Chapter 1 - General

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### 1 GENERAL

#### 1.1 PREMISE

These requirements define the specifications and procedures for the purpose of prototype approval as well as individual testing of mass-produced freight containers.

#### 1.2 SCOPE

These requirements apply to ISO Series 1 freight containers, as defined in ISO 830 Standard.

At Tasneef judgement, however, freight containers of type different from the above-mentioned one may be considered, for which these requirements shall be valid, as far as applicable, considering the conditions of employ foreseen.

In particular, Tasneef may, upon request, certify the conformity of freight containers to particular specifications or to regulations of other international Bodies or Conventions (CSC, IRS, IMDG, ADR, RID, ISO 10855).

#### 1.3 GENERAL REQUIREMENTS

ISO Series 1 freight containers shall be designed and manufactured according to these requirements and shall, in particular, be able to withstand the tests specified in Chapter 4.

#### 1.4 DEFINITIONS

The following definitions are taken from ISO 830 Standard "Freight containers-Terminology".

**Freight container:** Article of transport equipment:

- a) of a permanent character and accordingly strong enough to be suitable for repeated use;
- b) specially designed to facilitate the carriage of goods by one or more modes of transport, without intermediate reloading;
- c) fitted with devices permitting its ready handling, particularly its transfer from one mode of transport to another;
- d) so designed as to be easy to fill and empty;
- e) having an internal volume of 1 m<sup>3</sup> (35.3 ft<sup>3</sup>) or more.

The term **freight container** includes neither vehicles nor conventional packing.

**ISO freight container:** Freight container complying with all relevant ISO container standards in existence at the time of its manufacture.

**Rating (maximum gross mass) R:** The maximum permissible combined mass of the container and its contents, i.e. the maximum operating gross mass. This mass represents the minimum value for testing purpose.

Ratings are indicated in Chapter 4, Table 4.1.

**Tare mass (tare) T:** Mass of empty container including all fittings and appliances associated with a particular type of container in its normal operating condition, i.e. in the case of a mechanically

refrigerated container: with its refrigeration equipment installed and, where appropriate, full of fuel.

**Payload P:** Maximum permitted mass of payload (including such cargo securement arrangements and/or dunnage as are not associated with the container in its normal operating condition); determined by subtracting tare mass **T** from rating **R**.

**Corner fittings:** Fittings located at the corners of containers providing means of supporting, stacking, handling and securing the container.

Top and bottom end transverse members:

- a) **Top end transverse member:** Transverse structural member at the top of an **end frame** of a container joining the top corner fittings of the end in question; where mounted above end doors, these members are commonly known as **door headers**, and in open top containers such headers are often movable (swinging or hinged) and sometimes completely removable. Platform based containers with free standing (corner) posts do not have top end transverse members.
- b) **Bottom end transverse member:** Transverse structural member at the bottom of an **end frame** of a container joining the bottom corner fittings of the end in question; when mounted below end doors, these members are commonly known as **door sills**.

**Top and bottom side rails:**

- (a) Longitudinal structural member at the top of a side of a container joining top corner fittings of the side in question; in **platform based containers** which are open sided and open top, these longitudinal members may be removable, and are not necessarily intended to take longitudinal loadings; in **open top containers**, they may be used to support removable (or sliding) roof bows, which in turn support a canvas or plastic cover.
- (b) **Bottom side rail:** Longitudinal structural member at the bottom of a side of a container joining the bottom corner fittings of the side in question.

**Corner post:** Vertical structural member at either side of an **end frame** of a container joining a top and a bottom corner fitting (and thereby forming a corner structure).

**Floor:** Component supporting payload of container; the floor is generally constructed from a number of planks or panels; in certain categories of **thermal containers**, floor components may be especially designed to allow air (or gas) to be passed underneath the cargo.

**Floor bearers:** Components in the **base structure** of a container supporting the floor; in **general cargo containers**, such components are commonly laid transversely; in such cases they are also known as **cross members** or **intermediate transverse members**, i.e. transverse members in the base

## Chapter 1 - General

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structure, intermediate between the bottom end transverse members in end frames; in **platform based containers**, floor planking is sometimes arranged transversely and supported on longitudinal members which, in this case, may also be regarded as floor bearers.

**Roof bows:** Members mounted transversely across the top of a container and either forming part of a rigid roof structure or supporting flexible, removable covers, in which case the members are commonly removable, or so designed as to slide to facilitate the loading of cargo through the top of the container.

**Fork (lift) pockets:** Reinforced pockets running transversely across the base structure of a freight container piercing the bottom side rails at prescribed positions to permit the entry of the tines of fork lift devices for lifting and carrying the container.

**Grappler arm lifting areas:** Recesses in the bottom side rails of a container having specified features to permit the use of grapples for lifting and carrying the container.

**Gooseneck tunnel:** Recess at one end (commonly the front end) of a container designed to accommodate the raised portion of a goosenecked chassis; in certain types of containers, gooseneck tunnels are fitted at each end.

### Openings, doors and covers:

(a) **opening:** Aperture closed by a movable or removable panel of a container designed as a load bearing structure and also to be weatherproof and reasonably airtight;

- (b) **end door:** Load bearing panel located in an end wall, arranged to open or close an aperture having prescribed minimum width and height;
- (c) **side door:** Load bearing panel located in a side wall, arranged to open or close an aperture of unspecified dimensions but at least big enough to allow a man to walk through;
- (d) **covers:** Flexible, removable sheets (such as sheets of canvas, plastic or plastic coated cloth) usually intended to provide a weatherproof closure to an open top, side and/or end of a container;
- (e) **vent (ventilator):** Aperture which permits the exchange of air between the inside of the container and the outside.

**Load transfer areas:** Parts of the base structure of the container specifically designed to transmit a proportion or all of the container weight to the longitudinal members of the carrying vehicle.

**Load transfer zones:** Zones within which the **load transfer areas** may be expected to lie.

**Doubler plates:** Horizontal reinforcing plates adjacent to the top and/or bottom corner fittings to protect relevant container parts against misalignment of fixing and/or lifting devices.

## Chapter 2 - Procedures and certifications

### 2 PROCEDURES AND CERTIFICATIONS

#### 2.1 PREAMBLE

This chapter specifies the procedures for issuing certifications relevant to container type approval and individual testing of freight containers.

#### 2.2 MASS PRODUCED FREIGHT CONTAINERS

##### 2.2.1 Manufacturer requirements

Manufacturers interested in submitting their mass production of freight containers to Tasneef control shall prove that they possess all arrangements and procedures for internal control apt to insure in the course of time a production conforming with the prototype approved by Tasneef.

To comply with the above, manufacture shall be performed employing qualified welding and riveting procedures and relevant authorized personnel. In addition, the dimensional accuracy and geometry of the structure shall be insured by using suitable patterns, whose dimensions shall be periodically checked.

The materials and various components used shall be provided with internal testing certificates of the supplier.

For each freight container manufactured, the reports relating to checking and testing with relevant outcome shall be available. Such reports shall contain the workshop number, the delivery date and the purchaser's identifying data. Tasneef will carry out, at its judgement, at the manufacturer's factory, all controls deemed necessary to ascertain that the required features are maintained in the course of time.

##### 2.2.2 Approval of quality control organization

The manufacturer interested in the application of a testing procedure by lot according to [4.11.3], shall possess, in addition to what is required under [2.2.1], an internal quality control organization approved by Tasneef.

For this purpose, a detailed description of the following items shall be submitted to Tasneef:

- general organization of the factory;
- organization of internal controls showing that the personnel entrusted with such controls is independent of production departments;
- procedure relevant to rejection of components and their identification;
- procedure for introduction of variants in production and assuring the introduction of such variants at the appropriate stage of production;
- procedure to assure that materials and services supplied by third parties are conforming to design requirements;
- arrangements to ensure a proper storage of stock materials and spare parts;
- the system to arrange internal audits and corrective actions;

- the system of documentation at the stages of manufacturing of containers.

What is listed above, along with final dimensional checks, shall, anyhow, fall under the responsibility of the internal control, and through such internal control, of the factory's management.

These documents shall be collected in a quality control manual subject to Tasneef approval. The factory shall be subjected to an inspection by Tasneef to verify the compliance of the data submitted to and approved by Tasneef and ascertain the compliance with the present requirements.

Upon favourable outcome of these ascertainment, the factory will be issued a certificate stating that the same factory has an internal control system approved by Tasneef. The internal quality control shall be periodically subjected to an inspection by a Tasneef surveyor to ascertain that the required features are maintained in the course of time.

##### 2.2.3 Certification of the manufacturer's quality control system

In the case where the manufacturer's quality control system is certified by a credited and recognized body, Tasneef, in lieu of what is required under [2.2.2], will confine itself to ascertaining that the quality system certified is suitable for the mass production of containers and that the conditions under which the certification was issued are still valid and are suitably maintained.

### 2.3 TYPE APPROVAL

By type approval is meant the formal recognition of the full compliance of the prototype to the conditions established by the present Regulations or with other requirements specially agreed upon. This recognition is expressed by the issue of a **Type approval certificate**.

The procedure to obtain type approval is specified in the following paragraphs [2.3.1] to [2.3.3], inclusive.

#### 2.3.1 Application for type approval

The application shall be submitted to Tasneef, enclosing the following documents:

- main technical data of the freight container;
- assembly drawing of the freight container;
- working drawing of the main components, including the load bearing structure, walls, floor, doors, fittings and piping, and with specification of materials;
- drawing of the CSC plate (where applicable).

#### 2.3.2 Testing on the prototype

On a prototype, manufactured under Tasneef control and in compliance with the documents mentioned in [2.3.1], all tests established by the present regulations, or by applicable requirements, according to the features of the prototype proposed, shall be carried out in the presence of a Tasneef surveyor.

## Chapter 2 - Procedures and certifications

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Test procedures equivalent to those required by these regulations and additional tests may be accepted by Tasneef on a case by case basis.

### 2.3.3 Type approval certificate

Based upon the testing report of the surveyor who witnessed the tests, Tasneef issues the **Type approval certificate**.

## 2.4 TYPE APPROVAL OF CONTAINER COMPONENTS

The type approval procedure for **corner fittings** is specified in Chapter 3, para. [3.2.3]. Procedures similar to that specified in 2.3 may be adopted for type approval of component parts or devices connected with the employ of containers.

For such components, after the relevant ascertainment, Tasneef issues the relevant **Type approval certificate**.

## 2.5 VALIDITY OF THE TYPE APPROVAL

The type approval certificate loses its validity in the case where variants are introduced into the design, the material properties or manufacturing procedures. In such a case, the manufacturer shall apply for a new type approval, submitting to Tasneef the documents relevant to the above-mentioned variants. Based upon the examination of such documents, Tasneef may require the repetition of all or part of the type tests or consider the type tests carried out on the original model still valid.

## 2.6 TESTING OF MASS PRODUCED CONTAINERS

Testing of containers mass produced conforming to a prototype approved by Tasneef shall be carried out according to the procedures specified in the following paragraphs [2.6.1] to [2.6.3], inclusive. For tank containers and thermal containers, the procedures are specified in Chapter 5 and Chapter 6, respectively.

### 2.6.1 Application for testing

The application for testing shall be submitted to Tasneef, along with the following information:

- type of testing required (individual or by lot);
- identifying data of the Type approval certificate of the prototype;
- serial number of containers.

The manufacturer shall, in addition, state that containers have been manufactured and subjected, by the internal control, to the checks for conformity to the approved prototype and, in particular, that each container has been subjected to:

- dimensional check;
- lifting from the four top corner fittings, or equivalent test (see [4.9.3]);
- weatherproofness test (see [4.9.14]).

### 2.6.2 Checking operations

The tests specified under [4.11] shall be carried out in the presence of a Tasneef surveyor.

### 2.6.3 Testing certification

Upon favourable outcome of testing operations, Tasneef issues, depending on the container type, the following documents:

- (a) Freight containers for general use, thermal containers and tank containers carrying non-dangerous goods:
  - The **Freight container certificate** is issued.
- (b) Tank containers carrying dangerous goods:
  - For each container, **Initial tank container certificate** is issued, the validity of which is conditioned by the performance of periodical surveys as specified in [2.7.2].

## 2.7 SURVEYS ON CONTAINERS IN SERVICE

### 2.7.1 Containers provided with Freight container certificate

Containers which are issued the Freight container certificate may be subjected, upon request by the owner, to the periodical surveys provided for by **CSC Convention**, or to occasional surveys to assess their general conditions, either to the purpose of employ or repairs, if the latter are necessary.

### 2.7.2 Tank containers provided with Tank container certificate

Tank containers provided with Initial tank container certificate or previous statutory periodic inspection certificate issued by Tasneef or other IACS Society, shall be subjected to the periodical surveys provided for by the requirements regulating the carriage of dangerous goods.

### 2.7.3 Containers tested by other Bodies

Tasneef may, upon owner's request, carry out the periodical surveys provided for by the **CSC Convention** or other international requirements on containers certified by other Bodies, in addition to the occasional surveys mentioned in [2.7.1].

## Chapter 3 - Materials and manufacturing procedures

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### 3 MATERIALS AND MANUFACTURING PROCEDURES

#### 3.1 PREAMBLE

This chapter specifies the requirements relevant to materials and manufacturing procedures of freight containers.

The above-mentioned requirements are applicable to freight containers having:

- steel or aluminium load bearing structure
- welded or riveted connections.

Tasneef may accept different materials or manufacturing methods at the conditions to be established on a case by case basis.

#### 3.2 MATERIALS

##### 3.2.1 General

Materials constituting the load bearing structure shall be provided with a material certificate issued by the Manufacturer.

Tasneef reserves to accept materials, provided they conform to recognized standards and may be identified by means of the certificates supplied by the manufacturer.

##### 3.2.2 Steels

Steels used shall be suitable for the employ, the type of structure, the thickness, the radii of curvature, the manufacturing requirements and, where applicable, welding requirements.

Particular attention shall be paid to service conditions and, in particular, to galvanic corrosion risk in way of connections between different materials, as well as to brittle fracture risk in the case of low ambient temperature.

##### 3.2.3 Corner fittings

###### a) General:

Corner fittings shall be of such design and construction as to afford full reliance in respect of stresses that may occur in service.

Corner fittings shall comply with ISO 1161 and shall be manufactured of cast steel. Their dimensions and location are specified in Plates 3.1, 3.2 and 3.3.

Corner fittings of different type or material may be considered, based upon the examination of drawings and relevant specifications.

The corner fitting manufacturer requiring the type approval shall submit the following documents:

- working drawing of corner fittings, in triplicate
- manufacturing specification (chemical analysis, mechanical properties, heat treatment and welding repair procedures).

###### b) Manufacturing process:

Steel shall be produced by electric furnace or basic oxygen process, or other process approved by Tasneef; steel shall be fully killed.

###### c) Heat treatment

Corner fittings shall be subjected to heat treatment according to the procedures stated in the manufacturer's specification.

###### d) Material properties

The manufacturer shall supply the ladle analysis of the material employed, which shall be in compliance with Table 3.1. On test specimens taken from two samples per heat, tensile and notch impact mechanical tests shall be performed, the results of which shall comply with Table 3.2.

###### e) Compression and tension tests

On eight samples, two for each of the four types of corner fittings, compression tests shall be carried out to simulate loads acting on the corner fitting during stacking and longitudinal restraint; such loads shall be 953 kN for stacking and 305 kN for restraint.

For top corner fittings, the load for stacking may be taken not exceeding 848 kN.

The test shall be judged as positive if permanent deformations are not present.

On the same number of corner fittings, tension tests shall be carried out to simulate the loads acting on the corner fitting during lifting of the container.

For top corner fittings, the test load, acting vertically, shall be not less than 150 kN, for bottom corner fittings, the test load, acting in a direction inclined by 30° to the horizontal, shall be not less than 300 kN.

The test shall be judged to be positive if permanent deformations are not present.

###### f) Crushing test

On the same samples which have been subjected to the compression test, a crushing test shall be carried out. The load applied when plastic deformation begins shall be recorded for information.

###### g) Sectioning test

On four samples, a sectioning test shall be carried out along the three middle planes. The test shall be judged to be positive if the sections do not show defects of such extent that they may be detrimental.

###### h) Testing of corner fittings

Testing is carried out according to the procedures specified in ISO 1161 and in the subparagraphs hereinafter.

This procedure applies to corner fittings type-approved by Tasneef; in the case of non-type-approved corner fittings, Tasneef reserves to require greater extent ascertainment after the examination of the working drawing.

The application for testing shall be submitted to the Tasneef office competent by territory and shall indicate the identifying data of the Type approval certificate of the corner fitting prototype.

For each lot submitted for testing, the manufacturer shall submit to the Tasneef surveyor the internal testing documents of the material and the ladle analysis, as well as a statement from which it results that:



### Chapter 3 - Materials and manufacturing procedures

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- visual examination and dimensional check of each individual item;
  - heat treatment;
- have been carried out.

For the purpose of testing, the visual examination and dimensional check shall be carried out by the manufacturer on each individual item, in order to ascertain the compliance with the drawings approved by Tasneef, the surface finish and the absence of internal or surface defects detrimental to their satisfactory employ; the repair procedures shall be to the satisfaction of the Tasneef surveyor. The Tasneef surveyor shall carry out random verifications of some items, with visual examination and dimensional check; on at least one item out of 400, and at least one for each heat, non-destructive (X-ray, gamma-ray, or ultrasonic) examinations shall be performed.

#### **i) Marking**

Corner fittings shall be marked on their inner side at least with the following symbols, which may be cast in the fitting:

- manufacturer's brand mark;
- identifying number or symbol of the heat;
- RI.

The items checked by the Tasneef surveyor shall be stamped by his/her personal brand.

#### **3.2.4 Light alloys**

As a rule, alloys having the characteristics specified in Part D of the Rules shall be employed. The employ of alloys having characteristics different from the above may be accepted subject to the conditions established by Tasneef based upon the information supplied in respect of:

- chemical composition;
- manufacturing procedures;
- treatments.

In the case of welded connections, the alloy employed shall be suitable for welding and shall maintain satisfactory characteristics in way of welded joints.

#### **3.2.5 Floor**

The floor is generally constituted of hard wood planking, or plywood panels, ibrid plywood or ibrid plywood as steal.

Hardwood planking shall be made of good quality timber, well seasoned, and as free as possible from sapwood, nodes, splits, holes, and, in general, defects which may be detrimental to their good presevation; plywood shall be of a type resistant to marine environment. Timber shall in general be subjected to treatment with immunizing agents according to sanitary regulations; the relevant certifications shall be submitted to the Tasneef surveyor.

Butt joints of planking shall be staggered, and all joints, all clearances and the perimeter of the floor shall be caulked to make them tight.

The floor shall be able to withstand the test specified in Chapter 4, para. [4.9.10].

### **3.3 MANUFACTURING PROCEDURES**

#### **3.3.1 Welding**

Connection welds of the main components, which constitute the load bearing structure, and of the corner fittings shall be double fillet or full penetration welds; electrodes and welding procedures shall be in compliance with Part D of the Rules.

Welders shall be previously authorized by Tasneef based upon qualified welding procedures, which are representative of the fabrication methods and thicknesses adopted.

Tasneef may accept welding procedures qualified and welders authorized by recognized Bodies, based upon the documents supplied by the manufacturer.

#### **3.3.2 Riveting**

The specification of riveting methods employed shall be submitted to Tasneef, with indication of materials and description of the manufacturing equipment. Steel-aluminium connections shall be carried out by interposing a suitable electrically insulating material.

**Chapter 3 - Materials and manufacturing procedures**

**TABLE 3.1: CHEMICAL COMPOSITION %**

C [1] max	Mn	Si max	P max	S max	Cr max	Ni max	Cu max	Mo max	Al [2] min	Cr+Ni+Cu+Mo max
0,20	0,90÷1,5 0	0,50	0,035	0,035	0,25	0,30	0,20	0,08	0,015	0,70

[1] The carbon equivalent  $C_{eq} = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$  (%) shall not exceed 0,45

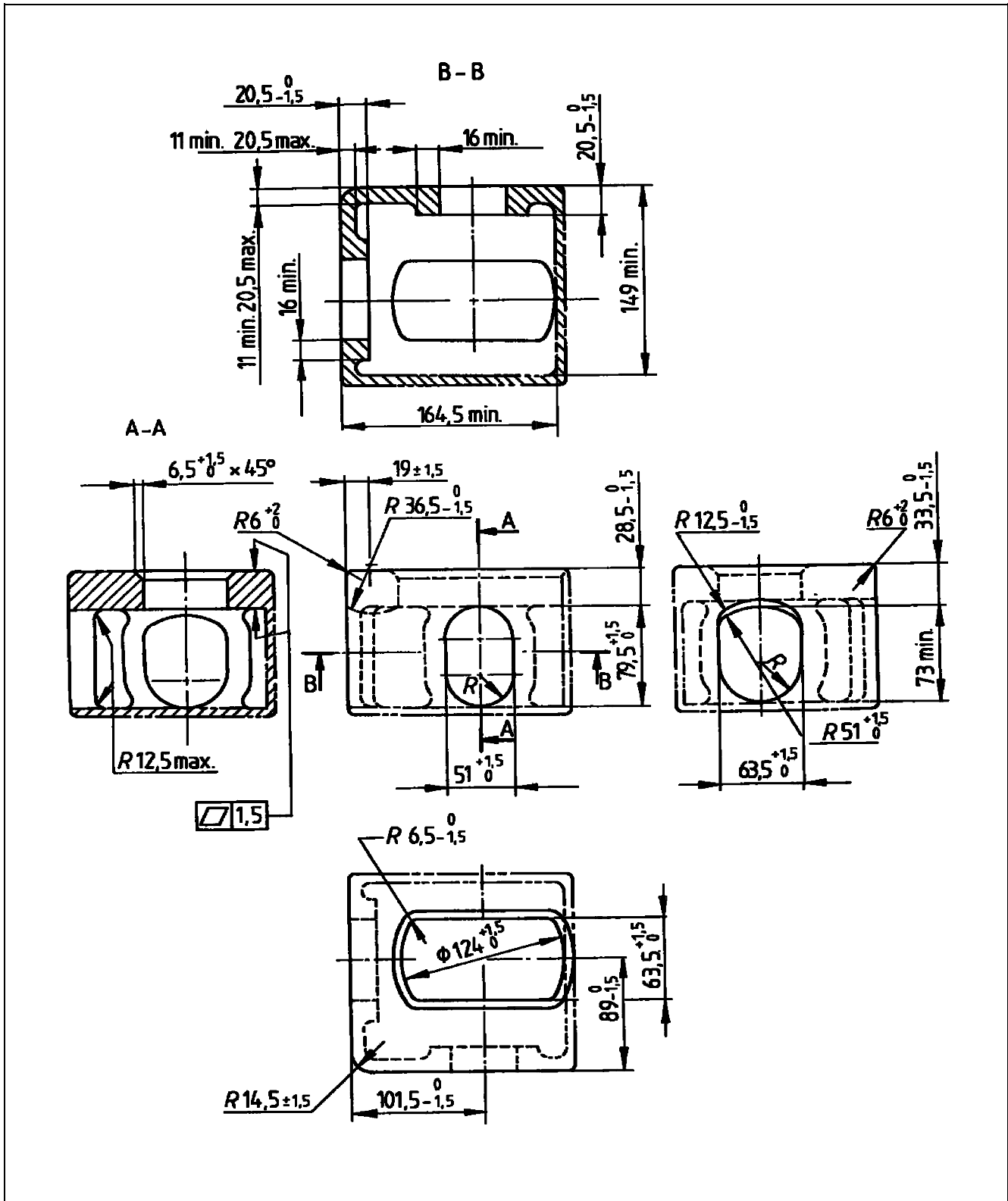
[2] Aluminium may be replaced partly or totally by other fine graining elements as stated in the approved specification.

**TABLE 3.2: MECHANICAL PROPERTIES**

Tensile strength $R_m$ (N/mm <sup>2</sup> )	Minimum yield strength $R_{eH}$ (N/mm <sup>2</sup> )	Minimum elongation $A_5$ (%)	Minimum reduction of area (%)	Minimum Charpy V [1] notch impact absorbed energy at -20°C (J)
430÷600	220	25	40	27

[1] Average value of 3 specimens having standard dimensions 10x10 mm; one individual value may be below the average value, but not lower than 70% of the average.

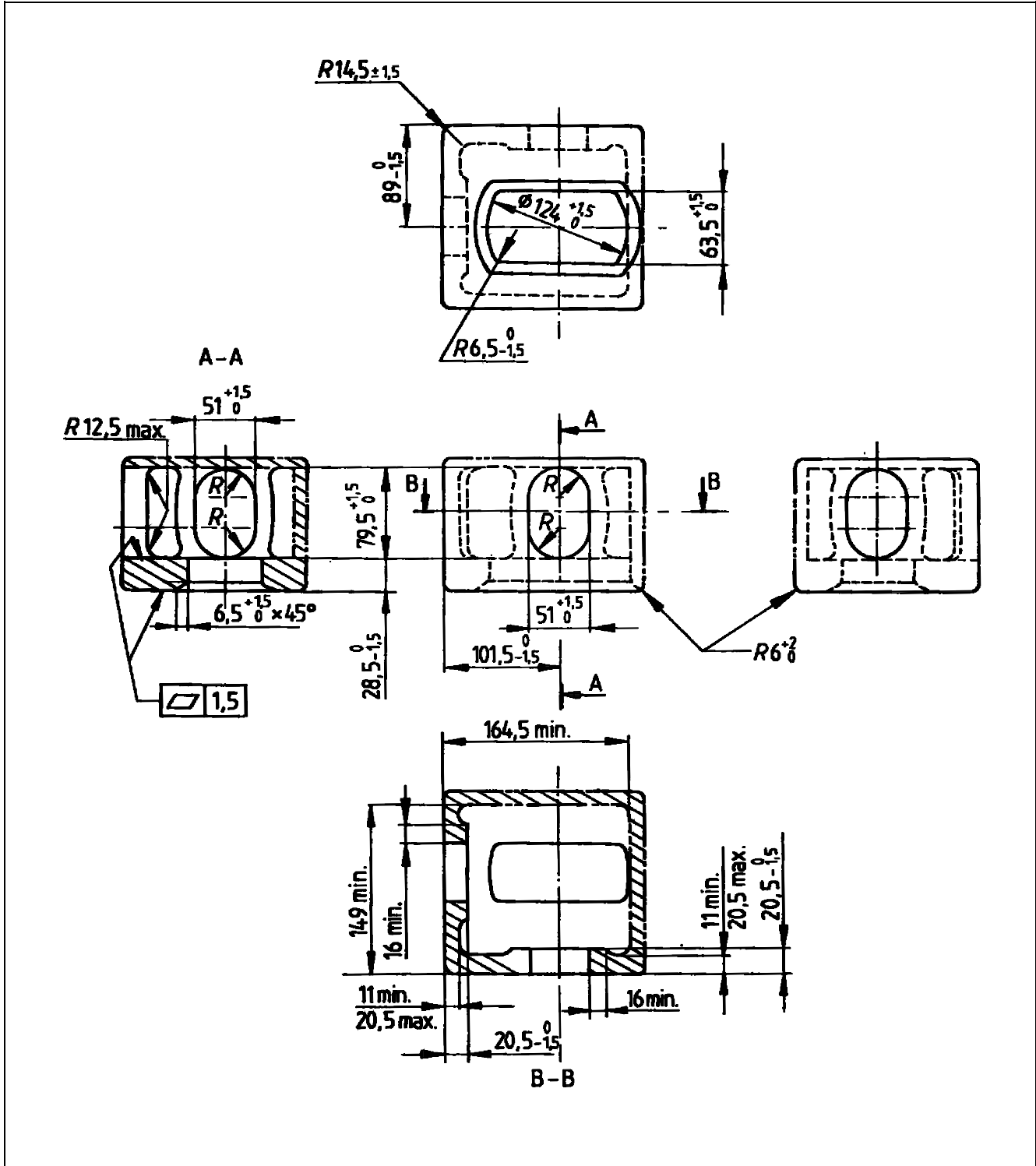
PLATE 3.1  
TOP CORNER FITTINGS  
(dimensions in mm)



NOTES:

- [1] Solid and broken lines indicate the surfaces and contours which shall be reproduced on the item.
- [2] Dash-and-dot broken lines indicate optional walls in the case of box-shaped items.

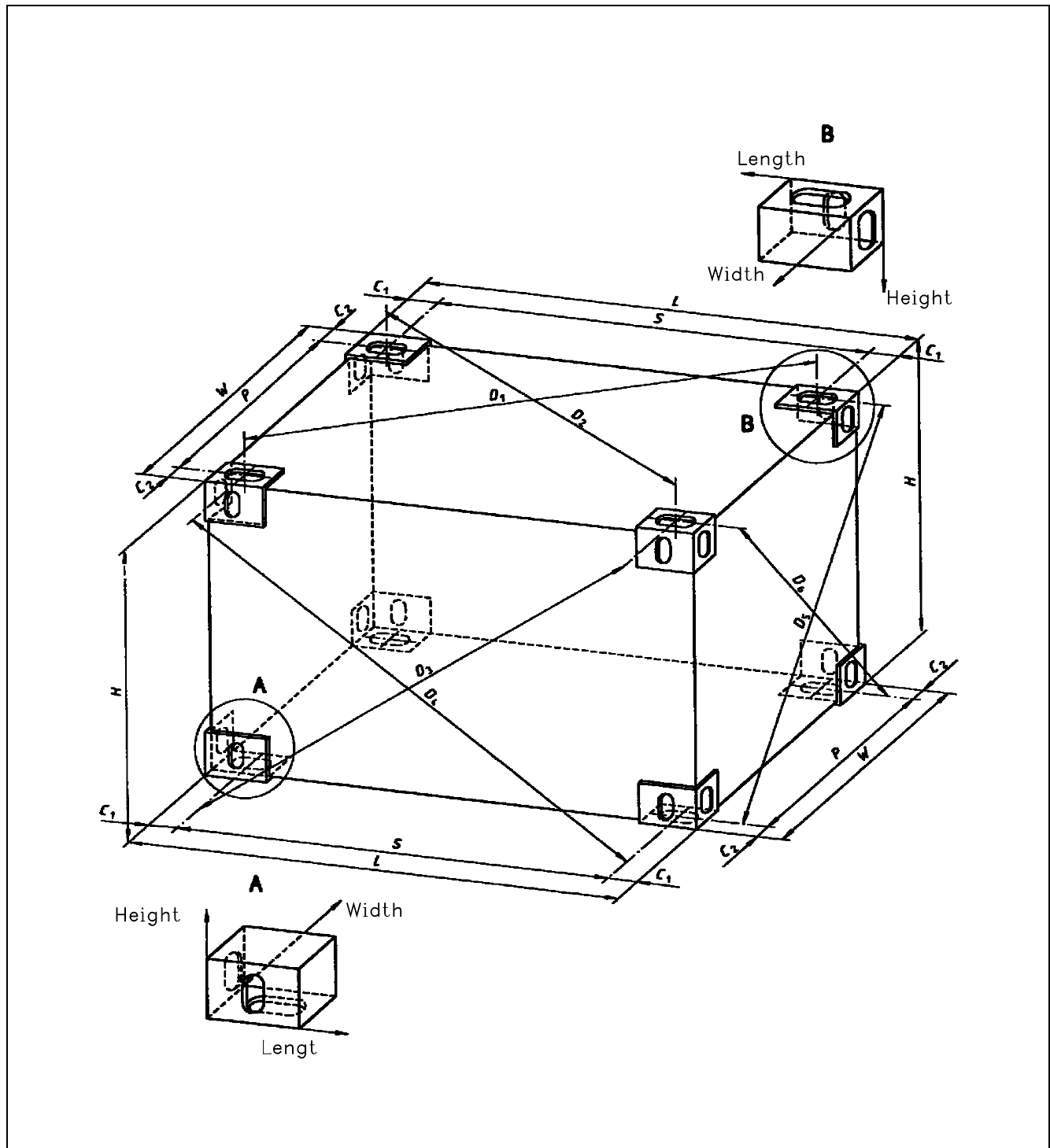
PLATE 3.2  
 BOTTOM CORNER FITTINGS  
 (dimensions in mm)



NOTES:

- [1] Solid and broken lines indicate the surfaces and contours which shall be reproduced on the item.
- [2] Dash-and-dot broken lines indicate optional walls in the case of box-shaped items.

PLATE 3.3 (Sheet 1 of 2)  
CORNER FITTING LOCATIONS



## PLATE 3.3 (Sheet 2 of 2)

## DIMENSIONS AND TOLERANCES RELEVANT TO CORNER FITTING LOCATIONS

Freight container designation	S mm	P mm	K <sub>1</sub> max mm	K <sub>2</sub> max mm	C <sub>1</sub> mm	C <sub>2</sub> mm
1AAA, 1AA, 1A, 1AX	11985	2259	19	10	101,5 <sup>0</sup> <sub>-1,5</sub>	89 <sup>0</sup> <sub>-1,5</sub>
1BBB, 1BB, 1B, 1BX	8918	2259	16	10	101,5 <sup>0</sup> <sub>-1,5</sub>	89 <sup>0</sup> <sub>-1,5</sub>
1CC, 1C, 1CX	5853	2259	13	10	101,5 <sup>0</sup> <sub>-1,5</sub>	89 <sup>0</sup> <sub>-1,5</sub>
1D, 1DX	2787	2259	10	10	101,5 <sup>0</sup> <sub>-1,5</sub>	89 <sup>0</sup> <sub>-1,5</sub>

$$K_1 = |D_1 - D_2| \text{ or } K_1 = |D_3 - D_4|$$

$$K_2 = |D_5 - D_6|$$

## Chapter 4 - Freight containers for general purposes

### 4 FREIGHT CONTAINERS FOR GENERAL PURPOSES

#### 4.1 PREAMBLE

This chapter indicates the specifications relevant to freight containers for general purposes, which include:

- closed type containers;
- open top containers;
- platform containers;
- platform based containers;
- open side containers.

#### 4.2 DIMENSIONS

External dimensions and ratings of ISO Series 1 freight containers are indicated in Table 4.1.

#### 4.3 CONSTRUCTION FEATURES

Containers shall be of such strength as to withstand the tests specified in [4.9].

Any closure in a container, which if unsecured could lead to a hazardous situation, shall be provided with an adequate securing system having external indication of the positive securement of that closure in the appropriate operating position, in particular:

- end doors shall be capable of being securely fastened in the open or closed position;
- any removable roof or roof section shall be fitted with locking devices such that an observer at ground level can check (when the container is on a road or rail carrying vehicle) that its roof is secured.

All closed containers and all open containers fitted with covers, which were designed for them, shall withstand the weatherproofness test specified in [4.9.14].

#### 4.4 CORNER FITTINGS

All containers shall be equipped with top and bottom corner fittings in the positions indicated in Plate 3.3.

The upper faces of the top corner fittings shall protrude of the top of the roof or cover of the container by a minimum of 6 mm; however, when doubler plates adjacent to the top corner fittings are provided, they shall not protrude above the upper face of the top corner fittings; these plates shall not extend more than 750 mm from either end of the container but may extend the full width.

#### 4.5 BASE STRUCTURE

The base structure shall be such that:

- all containers shall be capable of being supported by the bottom corner fittings only;
- all containers, other than 1D and 1DX, shall also be capable of being supported only by load transfer areas in their base structure.

Consequently, the base of containers shall have end transverse members and sufficient intermediate load transfer areas (or a flat underside) of sufficient

strength to permit vertical load transfer from the container to the longitudinal member of a carrying vehicle, or vice versa. Such longitudinal members are assumed to lie within the zones indicated in Figure 4.1.

The lower faces of the load transfer areas, including those of the end transverse members, shall be in one plane located 12,5 (+5; -1,5) mm above the plane of the lower faces of the bottom corner fittings of the container. Apart from the bottom corner fittings and bottom longitudinals, no part of the container shall project below this plane; however, doubler plates may be provided in the vicinity of the bottom corner fittings, at the following conditions:

- such plate shall not extend longitudinally more than 550 mm from the outer end of the bottom corner fitting;
- such plate shall not extend transversely more than 470 mm from the side face of the bottom corner fitting;
- the lower face of such plate shall be at least 5 mm above the plane of the lower faces of the bottom corner fittings.

The above requirements do not apply to 1D and 1DX containers.

The location of load transfer areas is indicated in Figures 4.2, 4.3, 4.4, 4.5 and 4.6, which do not apply only in the following cases:

- containers having a flat underside
- containers having intermediate transverse members of the underside spaced 1000 mm apart or less.

With the container having a uniformly distributed load in such a way that the gross mass of the container is 1,8R, no part of the base of the container shall deflect more than 6 mm below the base plane (lower faces of the bottom corner fittings).

#### 4.6 END AND SIDE STRUCTURES

For all containers, other than 1D and 1DX, at the time they are under full transverse rigidity test conditions, the deformation of the end frame shall not cause the sum of the changes in length of the two diagonals to exceed 60 mm.

For all containers, other than 1D and 1DX, at the time they are under full longitudinal rigidity test conditions, the longitudinal deflection of the top of the container with respect to the bottom of the container shall not exceed 25 mm.

#### 4.7 DOORS

Each container shall be provided with a door at least at one end.

All doors shall be as large as possible, preferably having dimensions equal to those of the internal cross section of the container; the minimum width shall be 2261 mm, and the minimum heights shall be the following ones:

- 2134 mm, for 1A, 1B, 1C and 1D containers;
- 2261 mm, for 1AA, 1BB and 1CC containers;

## Chapter 4 - Freight containers for general purposes

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- 2566 mm, for 1AAA and 1BBB containers.

### 4.8 MISCELLANEOUS FEATURES

#### 4.8.1 Fork-lift pockets

This optional handling arrangement is only permitted for 1CC, 1C, 1CX, 1D and 1DX containers, either in the loaded or unloaded condition. The arrangement of fork lift pockets is not permitted in 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB and 1BX containers. At Tasneef judgement and request of the Purchaser empty use pockets may be accepted.

1CC, 1C and 1CX containers fitted with a set of fork lift pockets may be provided with a second set for empty handling only.

The fork-lift pockets shall comply with the locations and dimensions indicated in Plate 4.1 and shall pass completely through the base structure of the container so that lifting devices may be inserted from either side; however, it is not necessary for the base of the fork-lift pocket structure to be the full width of the container, but it shall be provided, anyway, in the vicinity of each end of the fork-lift pockets.

#### 4.8.2 Grappler arms lifting

For this optional handling system, lifting areas having the locations and dimensions indicated in Plate 4.2 are provided.

#### 4.8.3 Gooseneck tunnel

A gooseneck tunnel shall always be provided as mandatory feature in 1AAA containers and may be provided as optional feature in 1AA, 1A and 1AX containers; the dimensions are indicated in Plate 4.3. The base structure shall, anyhow, be as specified in [4.5].

#### 4.8.4 Cargo securing devices

All containers for general use may be provided with cargo securing devices; their arrangement and working load shall be considered on a case by case basis.

### 4.9 TESTING

#### 4.9.1 General

Containers shall be subjected to the tests specified in [4.9.2] to [4.9.14], inclusive, as far as applicable, in the condition in which they are designed to be operated, in particular, containers equipped with removable structural items shall be tested with these items in position. The weatherproofness test specified in [4.9.14] shall be carried out last.

#### 4.9.2 Test No.1 - Stacking

The stacking test is intended to prove the ability of a container to support a total superimposed mass of containers, in the acceleration conditions aboard ships at sea, taking into account relative eccentricities between superimposed containers.

The testing procedure is the following one.

The container shall be placed on four level pads, centralized under the bottom corner fittings and having the same plan dimensions as the fittings; then it shall be loaded by a load uniformly distributed over the floor equal to 1,8R-T and subjected to a vertical force of 941,5 kN acting simultaneously on each of the four top corner fittings or to a force of 1883 kN acting on each pair of end corner fittings; for 1D and 1DX containers, vertical forces shall be 224 and 448 kN, respectively.

Other vertical forces may be considered by Tasneef. Such forces shall be applied through a test fixture equipped with corner fittings as specified in ISO 1161, or equivalent fittings which have imprints of the same geometry (i.e. with the same external dimensions, chamfered apertures and rounded edges) as the lower face of the bottom corner fitting. The forces shall be applied in such a manner that rotation of the planes through which the forces are applied and on which the container is supported is minimized. The test shall be carried out with the test fixture, or equivalent fittings, arranged in such a way as to give rise to a 25,4 mm transverse eccentricity and 38 mm longitudinal eccentricity, and shall be repeated to include all possible eccentricity positions.

#### 4.9.3 Test No.2 - Lifting from the four top corner fittings

This test is intended to prove the ability of the container to withstand being lifted, from the four top corner fittings by methods foreseen and the ability of the floor and base structure to withstand forces caused by payload during lifting operations.

The testing procedure is the following one. The container shall have a load uniformly distributed over the floor equal to 2R-T and shall be carefully lifted in order not to give rise to appreciable accelerations or decelerations. The lifting forces shall be applied vertically, except for 1D and 1DX containers for which lifting shall be carried out by lifting devices applied at a 60° angle to the horizontal.

The container shall be suspended for 5 minutes and then lowered to the ground.

#### 4.9.4 Test No.3 - Lifting from the four bottom corner fittings

This test is intended to prove the ability of the container to withstand being lifted, from its four bottom corner fittings by means of lifting devices bearing on same fittings and attached to a single transverse central spreader, above the container. The testing procedure is the following one.

The container shall have a load uniformly distributed over the floor equal to 2R-T and shall be carefully lifted in order not to give rise to appreciable accelerations and decelerations. Lifting forces shall be applied to the side apertures of the bottom corner fittings in such a way that their line of action and the outer face of the corner fitting shall be no farther



## Chapter 4 - Freight containers for general purposes

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apart than 38 mm and the angle of each force to the horizontal is the following one:

- 30° for 1AAA, 1AA, 1A and 1AX containers;
- 37° for 1BBB, 1BB, 1B and 1BX containers;
- 45° for 1CC, 1C and 1CX containers;
- 60° for 1D and 1DX containers.

The lifting shall be carried out in such a manner that the lifting devices bear on the four bottom corner fittings only.

The container shall be suspended for 5 minutes and then lowered to the ground.

### 4.9.5 Test No.4 - Restraint (compression and tension of the bottom longitudinals)

This test is intended to prove the ability of the container to withstand longitudinal external restraint under dynamic conditions of railway operations, which implies acceleration of 2g.

The testing procedure is the following one.

The container shall have a load uniformly distributed over the floor equal to R-T, and it shall be secured longitudinally to anchor points through the bottom apertures of the bottom corner fittings at one end of the container, and then, at the end opposite to the secured one, a force of 2Rg shall be applied horizontally, in the longitudinal direction, through the bottom apertures of the other bottom corner fittings, first towards (compression) and then from the anchor points (tension).

### 4.9.6 Test No.5 - Strength of end walls

This test is intended to prove the ability of the end walls of a container to withstand the dynamic forces specified in [4.9.5].

The testing procedure is the following one.

The end wall of the container shall be subjected to a uniformly distributed loading of 0,4Pg and shall be allowed to deflect freely.

The test shall be carried out on both end walls when one end is blind and the other equipped with a door; in the case the two ends are equal, one end only need be tested.

### 4.9.7 Test No.6 - Strength of side walls

This test is intended to prove the ability of the side walls of the container to withstand the dynamic forces due to ship motions at sea.

The testing procedure is the following one.

The side wall of the container shall be subjected to a uniformly distributed loading of 0,6Pg (ISO) in such a way as to allow free deflection of the side wall and the longitudinal members of the roof and bottom.

The test shall be carried out to each wall separately, however, in the case of symmetrical construction, one end only need be tested.

Open-top containers fitted with roof-bows shall be tested with roof-bows in position.

### 4.9.8 Test No.7 - Strength of the roof

This test is intended to prove the ability of the rigid roof, where fitted, to withstand the loads imposed by persons working on it.

The testing procedure is the following one.

A load of 300 kg shall be uniformly distributed over an area of 600x300 mm located at the weakest area of the rigid roof of the container.

### 4.9.9 Test No.8 - Floor strength

This test is intended to prove the ability of a container floor to withstand the concentrated dynamic loading imposed during loading and unloading operations by fork-trucks or similar devices.

The testing procedure is the following one.

The container shall rest on four level supports under its four bottom corner fittings, with its base structure free to deflect; a test vehicle with two wheels equipped with tyres shall be manoeuvred over the floor of the container; the test vehicle shall have the following characteristics:

- axle load: 7620 kg (3630 kg on each wheel);
- distance between wheel centres: 760 mm;
- nominal width of each wheel: 180 mm;
- contact surface of each wheel lying within a rectangular envelope of 185x100 mm;
- contact surface area of each wheel not exceeding 142 cm<sup>2</sup>.

### 4.9.10 Test No.9 - Transverse rigidity

This test is intended to prove the ability of a container to withstand the transverse racking forces resulting from ship movement. This test is not required for 1D and 1DX containers.

The testing procedure is the following one.

The container shall be placed, unloaded, on four level supports, one under each bottom corner fitting, and shall be restrained by them through the bottom apertures of the bottom corner fittings; in this condition, a force equal to 150 kN, acting horizontally in the transverse direction, shall be applied to each of the top corner fittings on one side of the container, first towards and then away from the top corner fittings; this force may be applied either simultaneously or separately to each of the corner fittings; horizontal [lateral] restraint shall be provided only at a bottom corner fitting diagonally opposite to [and in the same end frame] as the top corner fitting to which force is applied.

In the case of a container with identical ends, only one end need be tested; where an end is not essentially symmetrical about its own vertical centreline, both sides of that end shall be tested.

The deformations under test conditions shall comply with the requirements of [4.6].

### 4.9.11 Test No.10 - Longitudinal rigidity

This test is intended to prove the ability of a container to withstand the longitudinal racking forces resulting

## Chapter 4 - Freight containers for general purposes

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from ship movement. This test is not required for 1D and 1DX containers.

The testing procedure is the following one.

The container shall be placed, unloaded, on four level supports, one under each bottom corner fitting and shall be restrained by them through the bottom apertures of the bottom corner fittings; in this condition, a force equal to 75 kN, acting horizontally in the longitudinal direction, shall be applied to each of the top corner fittings on one side of the container, first towards and then away from the top corner fittings; this force may be applied either simultaneously or separately to each of the corner fittings; horizontal [longitudinal] restraint shall be provided only at a bottom corner fitting diagonally opposite [and in the same side frame] as the top corner fitting to which force is applied.

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 centreline, both ends of that side shall be tested.

The deflections under test conditions shall comply with the requirements of [4.6].

### 4.9.12 Test No.11 - Lifting from fork-lift pockets

This test is relevant to 1CC, 1C, 1CX, 1D or 1DX containers fitted with appropriate pockets.

The testing procedure is the following one.

The container shall have a load uniformly distributed over the floor equal to 1,6R-T and it shall be supported on two horizontal bars, each 200 mm wide, projecting 1828±3 mm into the fork-lift pockets, measured from the outside face of the side of the container; the bars shall be centred within the pockets. The container shall be supported for 5 minutes and then lowered to the ground.

For 1CC, 1C or 1CX containers fitted with two sets of fork-lift pockets, the above-mentioned procedure shall be applied to the outer pockets, whilst, for inner pockets, a second test shall be carried out, with the same procedure, but with a test load equal to 0,625R-T, and with the bars placed in the inner pockets.

### 4.9.13 Test No.12 - Lifting from the base at grappler arm positions

This test is relevant to containers fitted with appropriate areas.

The testing procedure is the following one.

The container shall have a load uniformly distributed over the floor equal to 1,25R-T and it shall be supported at the four positions where provision has been made, over an area of 32x254 mm centrally located below each of the four positions inside and clear of the safety lips. The container shall be supported for 5 minutes and then lowered to the ground.

### 4.9.14 Test No.13 - Weatherproofness

The weatherproofness test is intended to prove the waterproofness of the container in respect of possible water ingress due to outside weather conditions.

The testing procedure is the following one.

A stream of water shall be applied on all joints and edges of the openings, duly closed, according to the following specification:

- nozzle diameter: 12,5 mm;
- nozzle distance from tested surface: 1,5 m;
- water outlet pressure: 100 kPa (about 10 m of water head);
- traverse speed of the jet: 100 mm/s.

Procedures involving the use of more than one water stream are acceptable, provided that all joints and edges of openings are subjected to a water loading no less than that which would be given by a single stream.

## 4.10 ACCEPTANCE CONDITIONS

On completion of the tests [4.9.2] to [4.9.13], inclusive, the freight container shall not show permanent deformations or other abnormality which will render it unsuitable for use and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

On completion of the weatherproofness test, the freight container shall not present water infiltrations inside.

A Guide Line for criteria of acceptability of frame during and after testing is on Annex 2.

## 4.11 PRODUCTION TESTING

### 4.11.1 General

The operations to be carried out on mass produced containers shall be determined by the type of control required, which may be individual or by lot, according to what is specified in Chapter 2.

### 4.11.2 Individual check

- (a) On each container:
  - visual examination;
  - door weatherproofness test;
- (b) on 1 container out of 10:
  - weatherproofness test according to [4.9.14];
- (c) on 1 container out of 50:
  - lifting from the top corner fittings [4.9.3] or equivalent test;
  - floor strength test [4.9.9];
- (d) on 1 container out of 100:
  - stacking test [4.9.2];
- (e) on 1 container out of 1000 and at least every year:
  - repetition of all tests [4.9.2] to [4.9.14], inclusive).

### 4.11.3 Check by lot

- (a) On 1 container out of 10:

## Chapter 4 - Freight containers for general purposes

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- visual examination;
  - door weatherproofness test;
  - (b) on 1 container out of 50:
    - lifting from the top corner fittings [4.9.3] or equivalent test;
    - floor strength test [4.9.9];
    - weatherproofness test according to [4.9.14];
  - (c) on 1 container out of 100:
    - stacking test [4.9.2];
  - (d) on 1 container out of 1000 and at least every year:
    - repetition of all tests [4.9.2] to [4.9.14], inclusive);
  - (e) other possible tests or ascertainments judged necessary by the Tasneef surveyor depending on the outcome of the above-mentioned checks.
- The frequency of the above-mentioned operations may be changed, at Tasneef judgement, taking account of the factory's production and number of freight containers belonging to the same series.

### 4.12 MARKING

#### 4.12.1 General

The freight containers shall be provided with the following types of marking, as far as applicable:

- identification and operation marks, according to ISO 6346;
- testing marks;
- competent Authority's approval marks or plates.

Marks shall be durable and conspicuous and well distinguishable from each other.

#### 4.12.2 Identification and operation marks

Identification marks include:

- Owner's code, three letters;
- Category of unit, for freight containers: letter **U**;
- Serial number of the container, 6 figures;
- Control figure;
- Dimension and type code, 4 alpha-numerical characters, two for the dimensions and two for the type.

The owner's code is assigned by BIC (Bureau International des Conteneurs, 167 rue de Courcelles, 75017, Paris); the dimension and type code is compulsory for ISO containers and shall be in conformity with ISO 6346.

Operation marks include:

- Maximum gross mass (rating) (MAX GROSS), in kg and lbs;
- Tare (TARE), in kg and lbs;
- Maximum net mass (NET), in kg and lbs, optional.

The value of the maximum gross mass (rating) shall be equal to the value **R**, used for the tests specified in [4.9] and, where applicable, equal to the one indicated on the CSC approval plate specified in [4.12.4].

Other operation marks are those relevant to electrical shock hazard, for freight containers fitted with ladder,

and to indication of height, when exceeding 2,6 m (8'6").

#### 4.12.3 Testing marks

On each container, the self-sticking Tasneef sticker emblem, represented in Annex 3, shall be applied.

#### 4.12.4 Competent Authority's approval marks or plates

Freight containers approved in conformity with CSC 72 Convention shall be fitted with a plate conforming with what is specified in Annex 1.

Freight containers approved for railway transport conforming to IRS requirements shall bear the marks required by the applicable IRS rule.

Freight containers with wood floor treated according to particular requirements, such as e.g. Australian regulations, shall be provided with the relevant plate.

**Chapter 4 - Freight containers for general purposes**

**TABLE 4.1**  
**EXTERNAL DIMENSIONS AND RATINGS FOR ISO SERIES 1 FREIGHT CONTAINERS**

Freight container designation	Length L mm	Width W mm	Height H mm	Gross mass (Rating) R kg
1AAA	12192 <sup>0</sup> <sub>-10</sub>	2438 <sup>0</sup> <sub>.5</sub>	2896 <sup>0</sup> <sub>.5</sub>	30480
1AA			2591 <sup>0</sup> <sub>.5</sub>	
1A			2438 <sup>0</sup> <sub>.5</sub>	
1AX			< 2438	
1BBB	9125 <sup>0</sup> <sub>-10</sub>	2438 <sup>0</sup> <sub>.5</sub>	2896 <sup>0</sup> <sub>.5</sub>	25400
1BB			2591 <sup>0</sup> <sub>.5</sub>	
1B			2438 <sup>0</sup> <sub>.5</sub>	
1BX			< 2438	
1CC	6058 <sup>0</sup> <sub>-10</sub>	2438 <sup>0</sup> <sub>.5</sub>	2591 <sup>0</sup> <sub>.5</sub>	24000
1C			2438 <sup>0</sup> <sub>.5</sub>	
1CX			< 2438	
1D	2991 <sup>0</sup> <sub>-10</sub>	2438 <sup>0</sup> <sub>.5</sub>	2438 <sup>0</sup> <sub>.5</sub>	10160
1DX			< 2438	

**Chapter 4 - Freight containers for general purposes**

**FIGURE 4.1**  
**ZONES FOR LONGITUDINAL MEMBERS**  
(dimensions in mm)

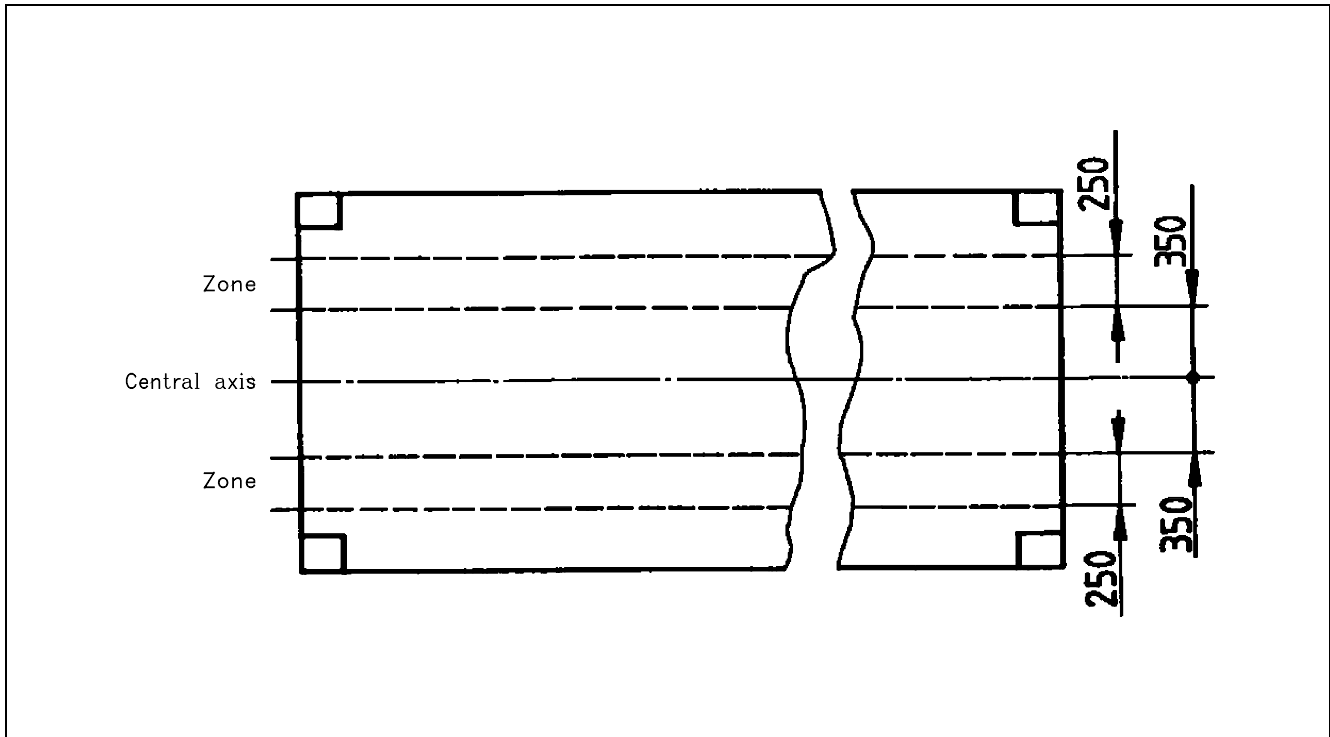
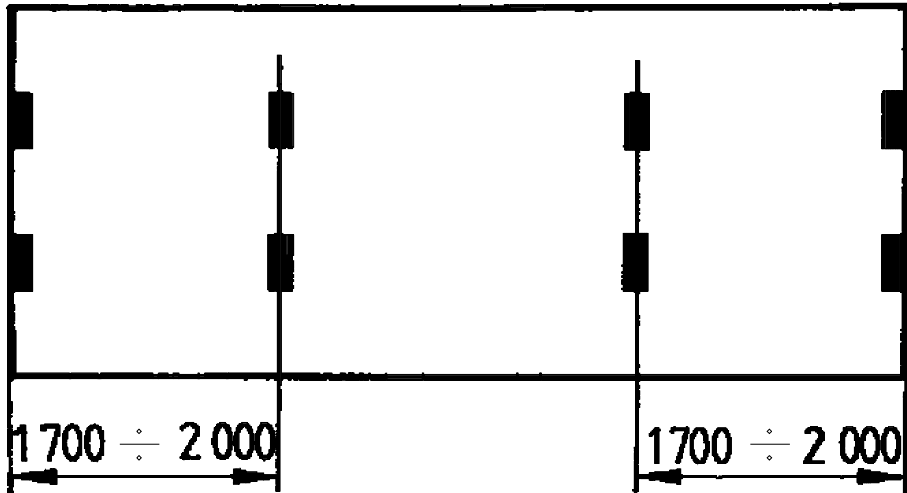


FIGURE 4.2  
1C,1CC, 1CX FREIGHT CONTAINERS  
(dimensions in mm)

With 4 pairs of load transfer areas



With 5 pairs of load transfer areas

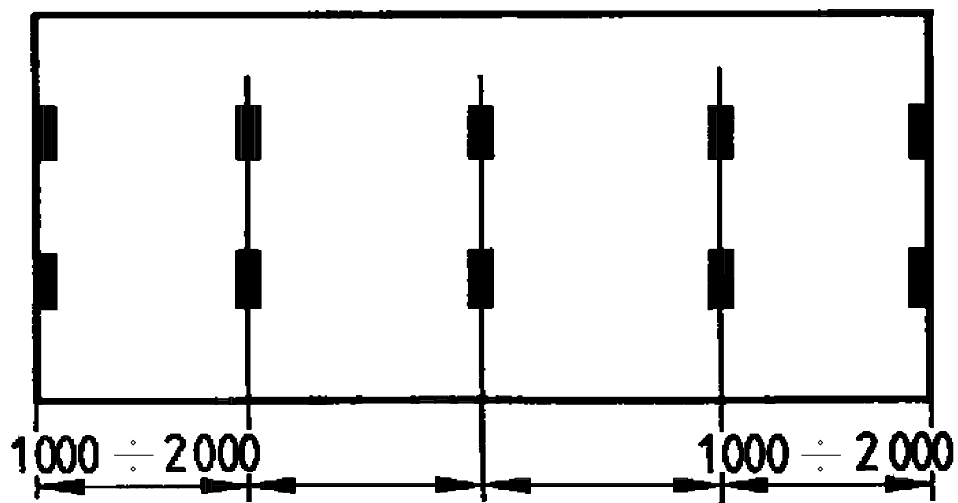
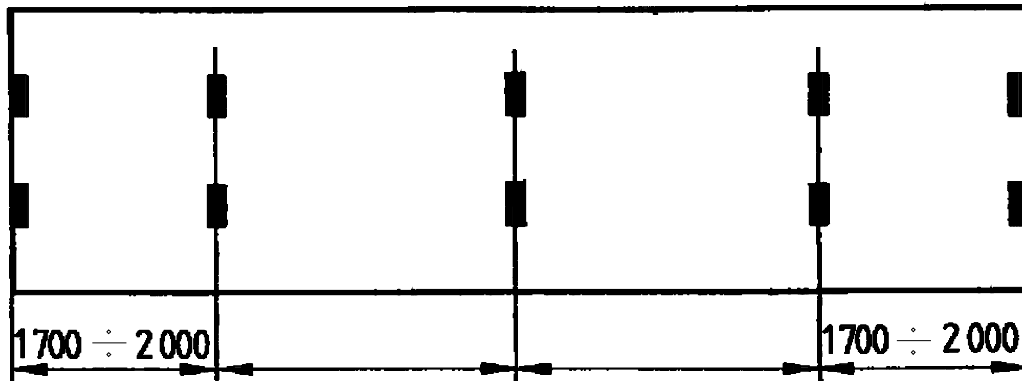


FIGURE 4.3  
1B,1BB, 1BX FREIGHT CONTAINERS  
(dimensions in mm)

With 5 pairs of load transfer areas



With 6 pairs of load transfer areas

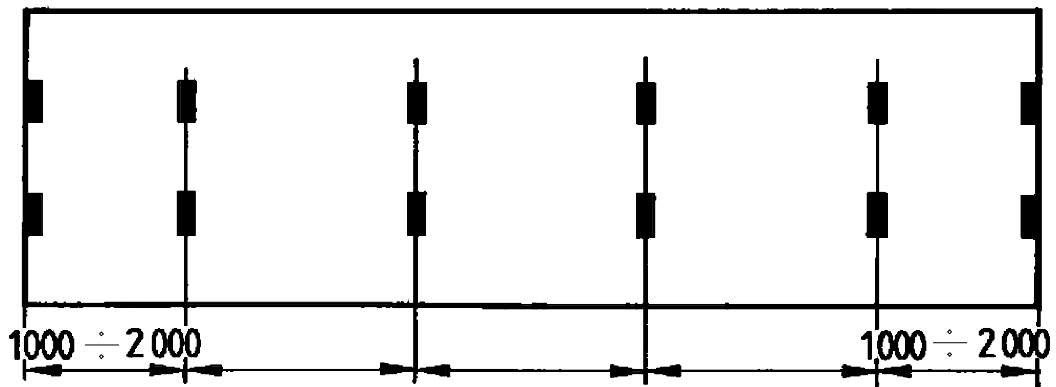
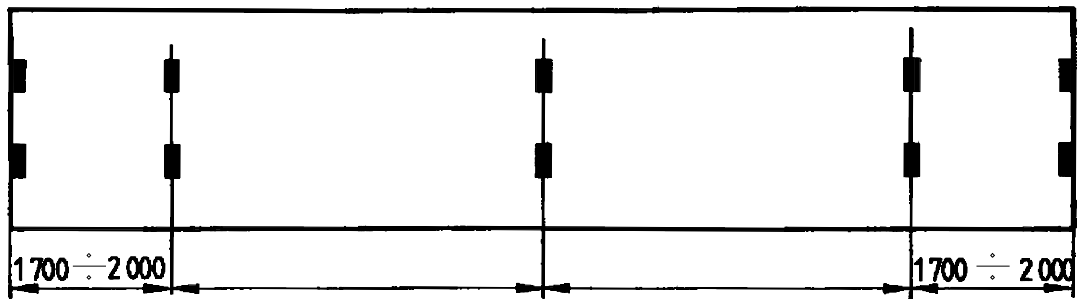


FIGURE 4.4  
1A,1AA, 1AX FREIGHT CONTAINERS WITHOUT GOOSENECK TUNNEL  
(dimensions in mm)

With 5 pairs of load transfer areas



With 6 pairs of load transfer areas

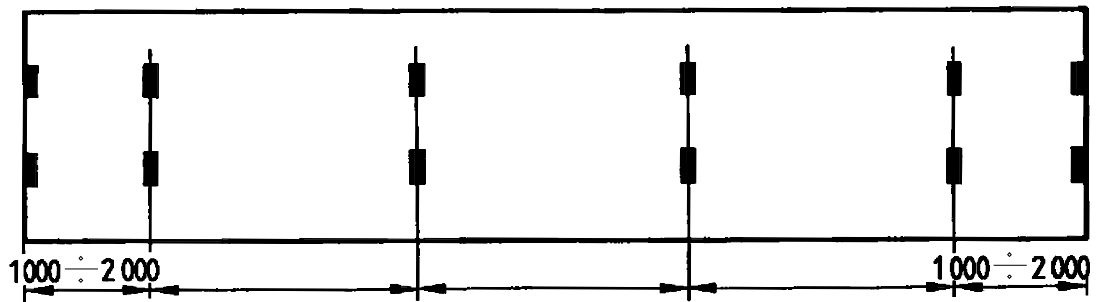
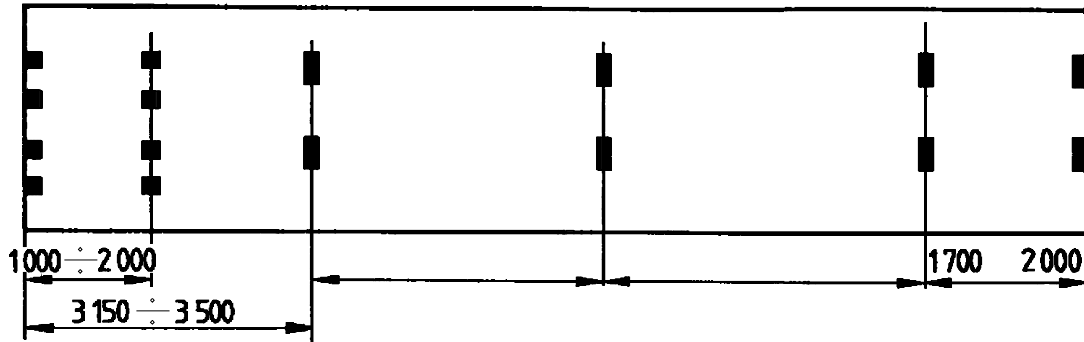




FIGURE 4.5  
1A,1AA, 1AX FREIGHT CONTAINERS WITH GOOSENECK TUNNEL  
(dimensions in mm)

With 6 pairs of load transfer areas



With 7 pairs of load transfer areas

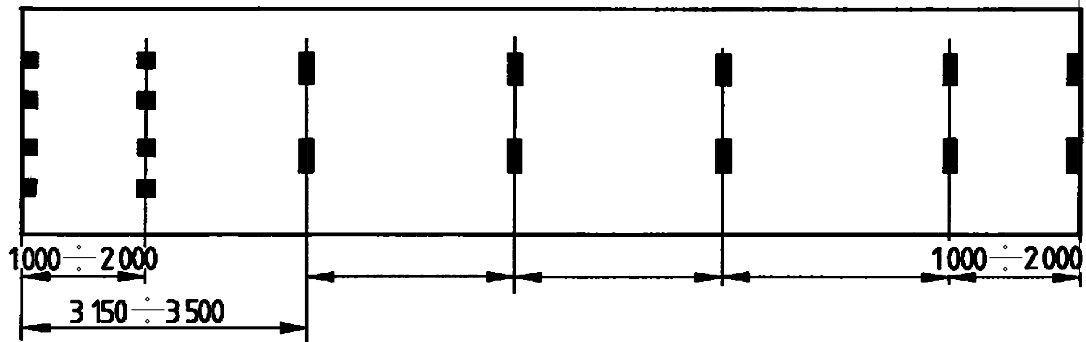


FIGURE 4.6  
LOAD TRANSFER AREAS IN THE VICINITY OF THE GOOSENECK TUNNEL  
(dimensions in mm)

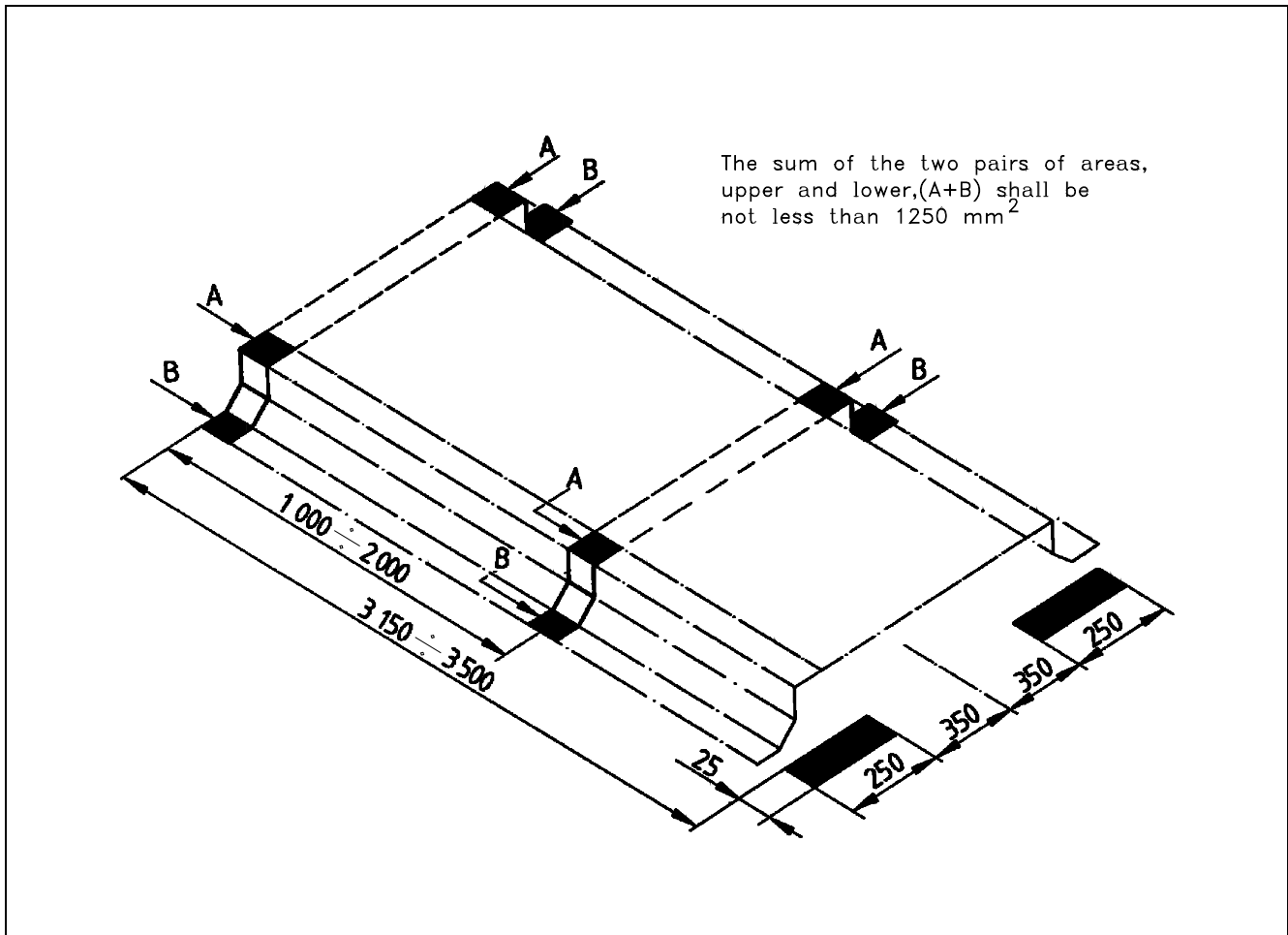
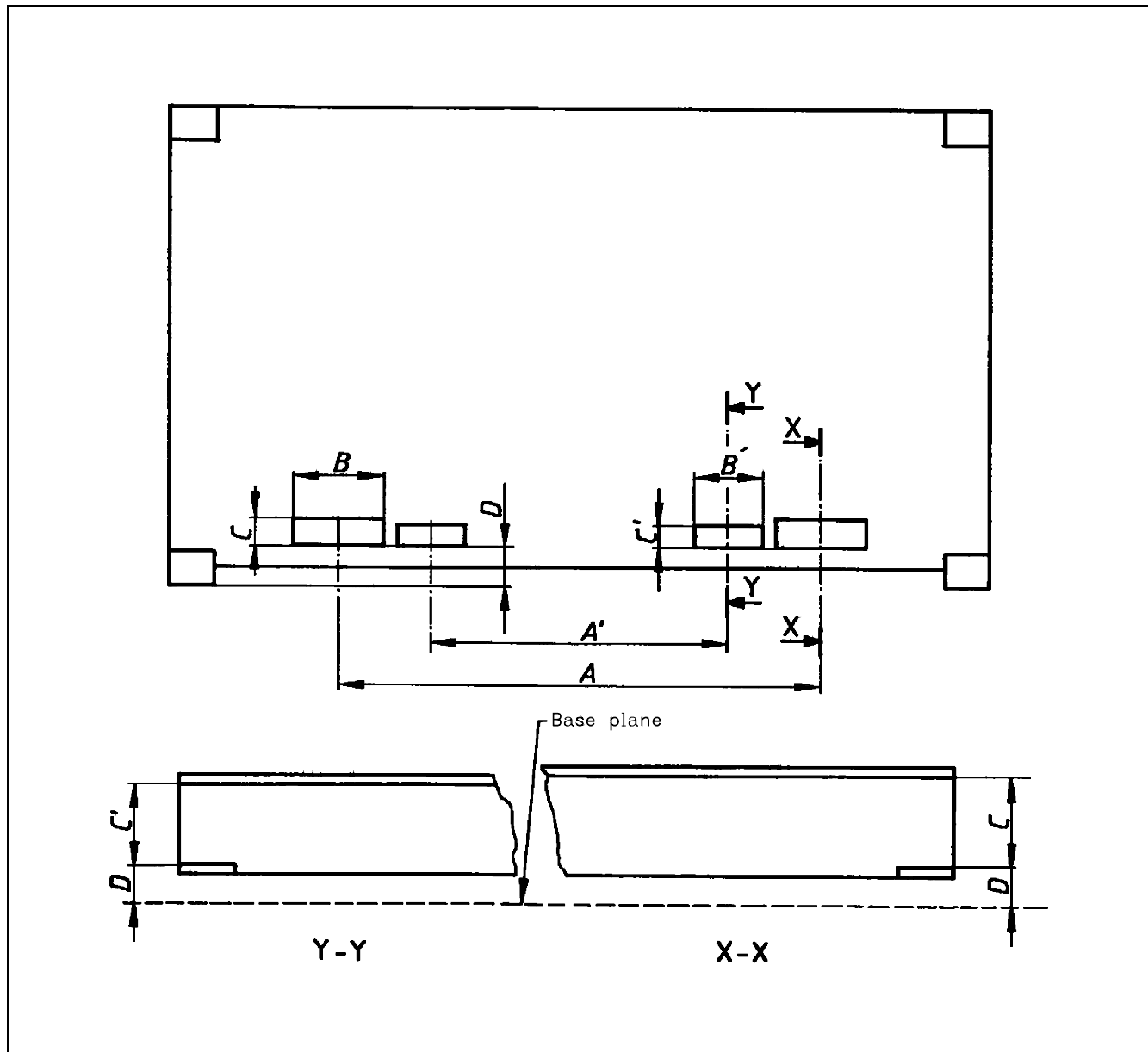


PLATE 4.1  
 FORK-LIFT POCKETS



Container designation	Dimensions (mm)						
	Fork-lift pockets for loaded and unloaded containers				Fork-lift pockets for unloaded containers only		
	A	B	C	D	A'	B'	C'
1CC, 1C, 1CX	2050 ±50	355 min	115 min	20 min	900 ±50	305 min	102 min
1D, 1DX	900 ±50	305 min	102 min	20 min			

PLATE 4.2  
 GRAPPLER ARM FITTING AREAS  
 (dimensions in mm)

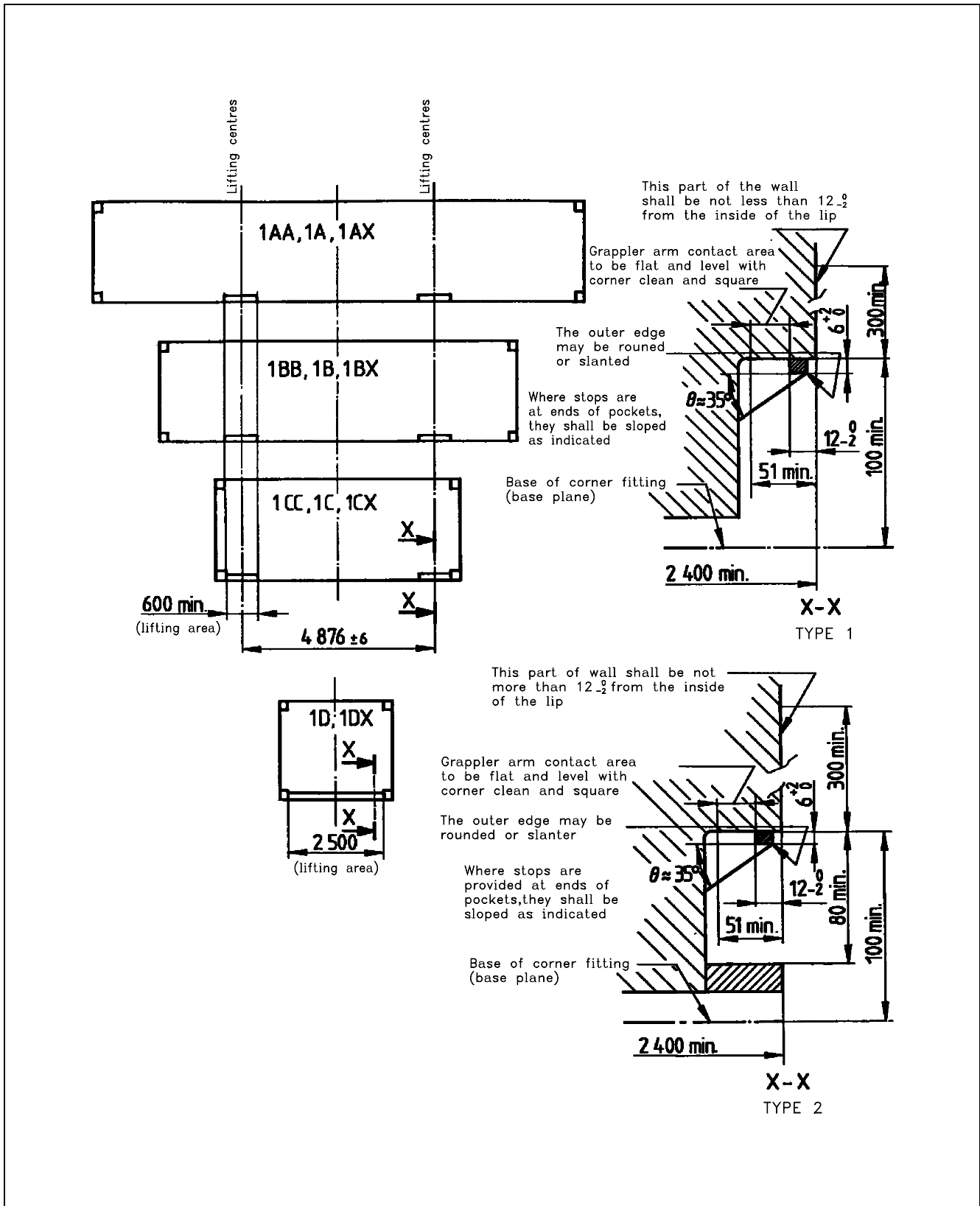
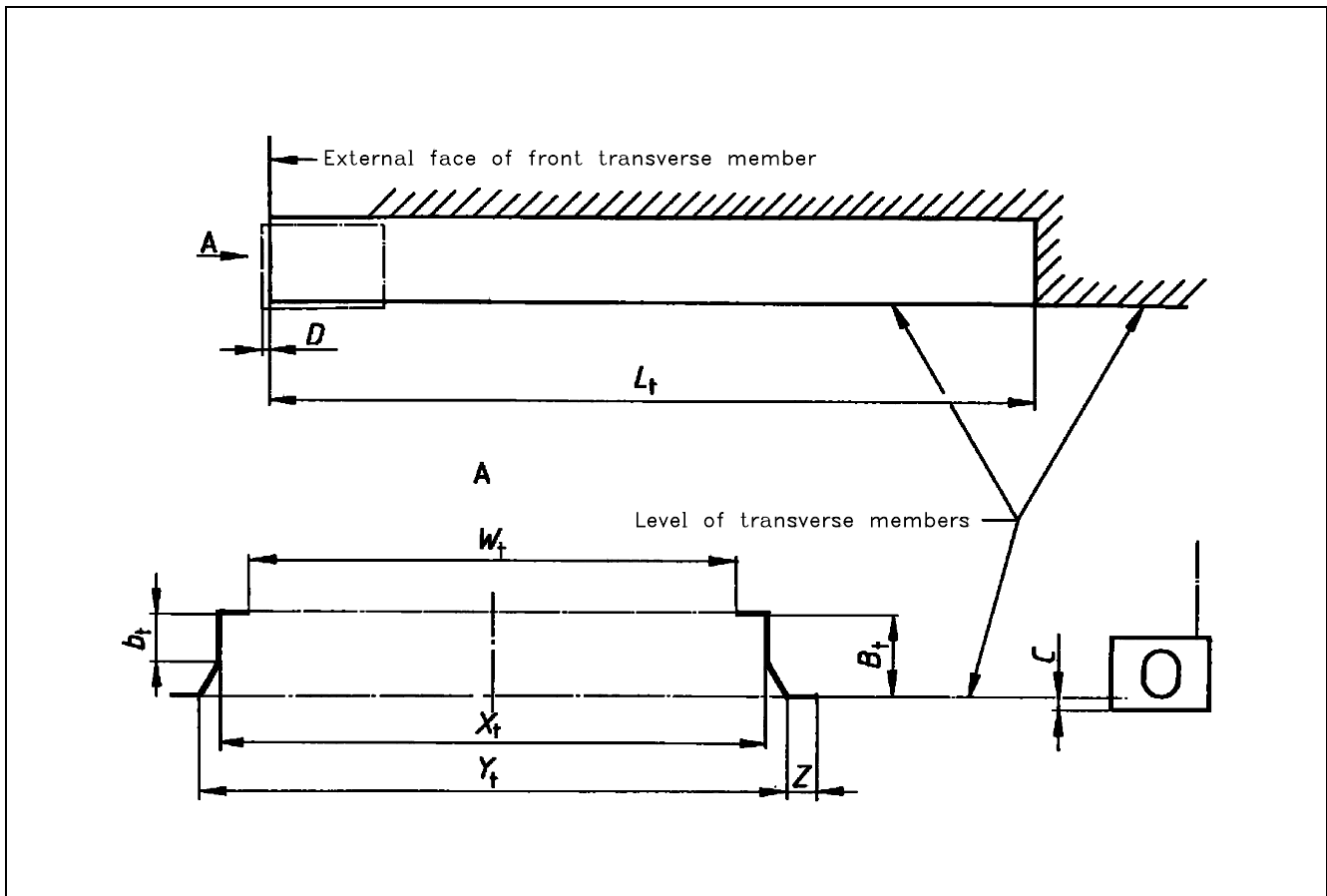


PLATE 4.3  
GOOSENECK TUNNEL



	Dimensions (mm)	
	Length	$L_t$
$D$		$6^{+1}_{-2}$
Width	$W_t$	930 max
	$X_t$	$1029^{+3}_0$
	$Y_t$	1070 to 1130
	$Z$	25 min
Height	$B_t$	$120^0_{-3}$
	$b_t$	35 to 70
	$C$	$12,5^{+5}_{-1,5}$

## Chapter 5 - Tank containers

### 5 TANK CONTAINERS

#### 5.1 PREAMBLE

This chapter indicates the specifications relevant to containers constituted by a framework and one or more tanks secured thereto.

Tank containers include:

- tank containers for liquids;
- tank containers for gases;
- pressurized tank containers for dry bulk.

Tank containers carrying dangerous goods shall comply, in addition, with the national and international requirements applicable to this transport and with what is required in [5.14].

#### 5.2 DIMENSIONS

The external dimensions and ratings of ISO Series 1 tank containers are indicated in Table 4.1. However, taking account of the high density of many fluid cargoes, the rating **R** of 1BBB, 1BB, 1B, 1CC and 1C tank containers may be higher than those specified in Table 4.1, but, in general, shall not exceed 30480 kg.

#### 5.3 DEFINITIONS

For the purposes of this chapter, the following definitions apply:

**Framework:** Tank mountings, end structures and all load-bearing elements not present for the purposes of containing cargo, which transmit static and dynamic forces arising out of the lifting, handling, securement and transporting of the tank container as a whole;

**Tank:** Vessel and associated piping and fittings which are designed to contain the cargo carried;

**Compartment:** Any section of the tank, tight to the fluid substance carried, formed by the shell, ends or complete bulkheads;

**Gas:** Fluid substance having a vapour pressure greater than an absolute pressure of 300 kPa at 50°C;

**Liquid:** Fluid substance having a vapour pressure not greater than an absolute pressure of 300 kPa at 50°C;

**Dry bulk:** Assemblies of separate solid particles in contact with one another which are, or may be rendered, capable of fluid flow;

**Dangerous goods:** Those substances classified as dangerous by the United Nations “Committee of experts on the transport of dangerous goods” or by the competent Authority;

**Competent Authority:** The authority or authorities designated as such in each country or in each specific case by the governments concerned for the approval of tank containers;

**Maximum allowable working pressure:** That pressure assigned for operation by either the competent Authority or the designer to a tank, above which that tank shall not be operated;

**Test pressure:** The gauge pressure at which the tank is tested;

**Total capacity:** That volume of water which will completely fill the tank at 20°C;

**Ullage:** The percentage of the total capacity not occupied by cargo.

#### 5.4 CONSTRUCTION FEATURES

Tank containers shall have such strength as to withstand the tests specified in [5.10] and shall be designed to withstand the effects of inertia forces due to tank contents resulting from transport motions: for design purposes, these effects may be taken to be equivalent to uniformly distributed loadings, acting through the centre of gravity of the tank, and equal to:

- 2Rg longitudinally;
- Rg laterally;
- 2Rg vertically.

Any closure in a tank container, which if unsecured could lead to a dangerous situation, shall be provided with an adequate securing system having external indication of the positive securement of that closure in the appropriate operating position.

Fork-lift pockets shall not be provided in tank containers.

The designer of tank containers of types 1AAA and 1BBB shall take into special account the possible instability due to their height, when operating in the road/rail environment in a partially laden condition.

#### 5.5 CORNER FITTINGS

Tank containers shall be equipped with top and bottom corner fittings in the positions indicated in Plate 3.3.

The upper faces of the top corner fittings shall protrude above the highest point of the tank container, including components attached to its shell, by a minimum of 6 mm; however, where doubler plates are provided in the vicinity of the top corner fittings, such plates shall not protrude above the upper faces of the top corner fittings; these plates shall not extend more than 750 mm from either end of the container but may extend the full width.

#### 5.6 BASE STRUCTURE

The base structure is to be such that:

- the tank container shall be capable of being supported by their bottom corner fittings only;
- all tank containers, other than 1CC, 1C, 1CX, 1D and 1DX, shall also be capable of being supported only by load transfer areas, their base structure shall be provided with. 1CC, 1C and 1CX tank containers may have such load-transfer

## Chapter 5 - Tank containers

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areas as an optional feature, provided they are arranged according to Plate 5.1.

Consequently, the base of the tank containers shall have end transverse members and sufficient intermediate load transfer areas (or a flat underside) of sufficient strength to permit vertical load transfer from the tank container to the longitudinal members of a carrying vehicle or vice versa. Such longitudinal members are assumed to lie within the zones indicated in Figure 5.1.

The lower faces of the load transfer areas, including those of the end transverse members, shall lie in one plane located 12,5 (+5; -1,5) mm above the plane of the lower faces of the bottom corner fittings of the tank container (base plane). Apart from the bottom corner fittings and bottom longitudinals, no part of the tank container shall project below this plane; however, doubler plates may be provided in the vicinity of the bottom corner fittings, at the following conditions:

- such plate shall not extend longitudinally more than 550 mm from the outer end of the bottom corner fitting;
- such plate shall not extend transversely more than 470 mm from the side face of the bottom corner fitting;
- the lower face of such plate shall be at least 5 mm above the plane of the lower faces of the bottom corner fittings (base plane of the container).

The above requirements do not apply to 1D and 1DX containers.

The location of load transfer areas is indicated in Table 5.1, which does not apply only in the following cases:

- tank containers having a flat underside;
- tank containers having intermediate transverse members of the underside spaced 1000 mm apart or less.

With the tank container having a uniformly distributed load in such a way that the gross mass of the tank container is 1,8 R, no part of the base of the tank container shall deflect more than 6 mm below the base plane (lower faces of the bottom corner fittings).

### 5.7 END AND SIDE STRUCTURE

For all tank containers other than 1D and 1DX, at the time they are under full transverse rigidity test conditions, the deformation of the end frame shall not cause the sum of the changes in length of the two diagonals to exceed 60 mm.

For all tank containers other than 1D and 1DX, at the time they are under full longitudinal rigidity test conditions, the longitudinal deflection of the top of the tank container with respect to the bottom of the tank container shall not exceed 25 mm.

## 5.8 TANK

### 5.8.1 Main features

Tanks shall be designed and constructed to good technical practice; each tank shall be firmly secured to the tank framework and shall be capable of being filled and emptied without removal from the framework.

Tanks or tank compartments without vacuum relief devices shall be designed to withstand an external pressure of at least 40 kPa above the internal pressure; tanks equipped with vacuum relief valves shall be designed to withstand an external overpressure of 21 kPa or greater.

The tank material is to be compatible with the carried cargo and with the environmental operation conditions; where necessary, a corrosion allowance shall be taken into consideration.

### 5.8.2 Fittings and openings

All tank openings shall be provided with adequate closures to prevent accidental escape of the contents.

Tank nozzles and outlet fittings shall be substantially made and attached to the tank in such a manner as to minimize the risk of breakage; where necessary, protective covers or housings shall be used. All valves, whether fitted internally or externally shall be located as close to the tank shell as practicable.

Stop valves with screwed spindles shall be closed by clockwise motion of the handwheel; all fittings connected to the tank shall be clearly marked to indicate their appropriate functions.

Tanks shall, in general, be provided with manholes for inspection and maintenance, having diameter not less than 500 mm.

Gauging devices which may be in direct communication with the contents of the tank shall not be made of easily destructible material.

### 5.8.3 Pressure and vacuum relief devices

Each tank or compartment thereof shall be fitted with a pressure relief device set at the test pressure. Such devices shall be located as near to the top of the tank and as near to the tank's [or tank compartment's] mid-length as practicable and shall be connected to the vapour space. These devices, in order to insure protection against overpressures in normal operating conditions, shall have a relief capacity not less than 0,05 m<sup>2</sup>/s of standard air (at an absolute pressure of 100 kPa at 15°C); this relieving capacity shall not be considered as adequate protection against excessive overpressure under full fire exposure conditions, explosion or higher pressurization of the contents.

## Chapter 5 - Tank containers

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Each tank, or compartment thereof, with an external design pressure of less than 40 kPa shall be equipped with a vacuum relief device set to relieve at an absolute pressure not exceeding 79 kPa and having a minimum through area not less than 285 mm<sup>2</sup>; the use of combination pressure/vacuum relief devices is allowed.

Each device shall be marked with the pressure at which it is set to operate.

### 5.9 MISCELLANEOUS DEVICES

#### 5.9.1 Gooseneck tunnel

A gooseneck tunnel shall be provided as a mandatory feature in 1AAA tank containers and may be provided as optional feature in 1AA, 1A and 1AX tank containers; the dimensions are indicated in Plate 4.5.

The base structure shall, anyhow, be as specified in [5.5].

#### 5.9.2 Walkways

Where provided, walkways shall have a minimum width of 400 mm and shall be capable of withstanding a loading of not less than 3 kN uniformly distributed over an area of 600x300 mm.

#### 5.9.3 Ladders

Where provided, ladders shall be designed to withstand a load of not less than 200 kg on any rung.

#### 5.9.4 Particular installations

When a thermal insulation is provided around a tank, it shall not impinge on the specified requirements of the tank container and in particular shall not interfere with the proper function of the tank fittings.

When heating or refrigeration is provided, particular consideration shall be given to the safety of the tank and its contents, to avoid excessive temperatures and pressures.

Where electrical equipment is fitted on the tank container, the installation is to be inspected and found satisfactory.

### 5.10 TESTING

#### 5.10.1 General

Tank containers shall be subjected to the tests specified in [5.10.2] to [5.10.12], inclusive. The pressure test specified in [5.10.13] shall be carried out last.

Alternative test procedures will be accepted if considered equivalent. The test procedure will be modified as appropriate to cater for special features of tank containers and special handling arrangements. In such cases, the general principles outlined herein will be maintained. The required loads in each test are to be applied in such a manner as to allow free deflection of the container section under test.

The tank container, where required, shall be loaded with a suitable substance to achieve the test load or loading specified; if necessary, supplementary loads or loadings shall be applied as to simulate a uniformly distributed loading; variations in respect of the bending moment diagram calculated with a uniformly distributed load shall not exceed 20%.

#### 5.10.2 Test No.1 - Stacking

The stacking test is the same as specified in [4.9.2], with the difference that the tank container may be empty.

#### 5.10.3 Test No.2 - Lifting from the four top corner fittings

This test is the same as specified in [4.9.3].

#### 5.10.4 Test No.3 - Lifting from the four bottom corner fittings

This test is the same as specified in [4.9.4].

#### 5.10.5 Test No.4 - Restraint (compression and tension of the bottom longitudinal)

This test is the same as specified in [4.9.5].

#### 5.10.6 Test No.5 - Strength in respect of longitudinal inertia forces

This test is intended to prove the ability of the tank itself and of the tank-to-framework connections to withstand the effects of inertia forces envisaged in [5.4].

The testing procedure is the following one.

The tank container, loaded to reach a gross mass equal to **R**, shall be positioned with its longitudinal axis vertical (a tolerance of 3° is acceptable) and held in this position for 5 min acting on the corner fittings of the base structure.

In particular cases of tank-to-framework connection it may be accepted that the tank container, positioned as above, be supported by the four corner fittings of the downward-facing end framework.

Tank containers which are not structurally symmetrical with respect to internal divisions or tank-to-framework connections shall be tested at both ends.

#### 5.10.7 Test No.6 - Strength in respect of transverse inertia forces

This test is intended to prove the ability of the tank itself and of the tank-to-framework connections to withstand the effects of inertia forces envisaged in [5.4].

The testing procedure is the following one.

The tank container, loaded to reach a gross mass equal to **R**, shall be positioned with its transverse axis vertical (a tolerance of 3° is acceptable) and held in this position for 5 min acting on the corner fittings of the base structure.

In particular cases of tank-to-framework connection it may be accepted that the tank container, positioned



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as above, be supported by the four corner fittings of the downward-facing side structure.

### 5.10.8 Test No.7 - Transverse rigidity

This test is the same as specified in [4.9.10]. The deflections under test conditions shall comply with the requirements of [5.7].

### 5.10.9 Test No.8 - Longitudinal rigidity

The test is the same as specified in [4.9.11]. The deflections under test conditions shall comply with the requirements of [5.7].

### 5.10.10 Test No.9 - Load transfer area test

This test simulates, statically, the known dynamic condition when the load transfer areas are only partially in contact with the carrying vehicle, within the space provided between the twistlock and the bottom corner fitting and is intended to prove the static load carrying ability of the structure.

The testing procedure is the following one.

The tank container shall be loaded until a gross mass equal to 2R is reached, and it shall be supported by means of four supports, each with a supporting area of 150x150 mm, positioned at the inner ends of the load-transfer areas, and shall remain supported in this way for a minimum of 5 min; then the test shall be repeated with the supports positioned at the outer ends of the load-transfer area.

In the case of tank containers with symmetrical load transfer areas, only one end need be tested, otherwise both ends shall be tested.

### 5.10.11 Test No.10 - Walkways (where provided)

This test is intended to prove the ability of walkways, where provided, to withstand the loads imposed by persons working thereon.

The testing procedure is the following one.

A load of 300 kg, uniformly distributed over an area of 600x300 mm, shall be applied on the weakest area of the walkway.

### 5.10.12 Test No.11 - Ladders (where provided)

This test is intended to prove the ability of ladders, where provided, to withstand the loads imposed by persons working thereon.

The testing procedure is the following one.

A load of 200 kg shall be positioned at the centre of the widest rung.

### 5.10.13 Test No.12 - Pressure test

This test is intended to prove the ability of the tank to withstand the specified internal pressure; the test shall be performed before the addition of thermal insulation, if any, and after shot blasting or other preparations normally required.

The pressure at which the tank and the compartments are tested shall be selected with regard to the intended use of the tank and shall be in accordance with the applicable regulations and requirements.

The testing procedure is the following one.

The tank shall be hydraulically tested at the specified pressure; if the tank is provided with compartments, each compartment shall be tested separately with the adjacent compartments empty and at atmospheric pressure.

Relief devices shall be rendered inoperative or removed for the purpose of this test.

The test pressure shall be measured at the top of the tank, with the tank container in its normal position and shall be maintained for as long as is necessary to enable a complete examination of the tank and its fittings to be made, but in any case for not less than 30 min.

Test procedures other than the above may be accepted by Tasneef following appraisal of the applicable requirements.

## 5.11 ACCEPTANCE CONDITIONS

On completion of the tests from [5.10.2] to [5.10.13], inclusive, the tank container shall not show leakage or permanent deformation or other abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

During the pressure test, the tank shall not show leakage.

A Guide Line for criteria of acceptability of frame during and after testing is on Annex 2.

## 5.12 PRODUCTION TESTING

### 5.12.1 Application for testing

The manufacturer shall state that the tank containers have been manufactured and subjected by the internal control service to the checks for conformity with the approved prototype and, in particular, that each container has been subjected to:

- dimensional check;
- tare check;
- operation test of all fittings, valves, various piping
- lifting from the four top corner fittings (see [5.10.3]) or equivalent test;
- pressure test (see [5.10.13]).

### 5.12.2 Checking operations

- (a) On each tank container:
  - visual examination;
- (b) on 1 container out of 10:
  - pressure test according to [5.10.13];
- (c) on 1 tank container out of 50:
  - lifting from the four top corner fittings (see [5.10.3]) or equivalent test;
- (d) on 1 tank container out of 100:
  - stacking test ([5.10.2]);
- (e) on 1 tank container out of 1000 and at least every year:

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- repetition of all tests ([5.10.2] to [5.10.13], inclusive);
- (f) other possible tests or ascertainments judged necessary by the Tasneef surveyor depending on the outcome of the above-mentioned checks.

The frequency of the above-mentioned operations may be changed, at Tasneef judgement, taking account of the factory production and number of tank containers belonging to the same series.

### 5.13 MARKING

In addition to what is specified in [4.12], tank containers shall bear an identification plate of the tank, with the following data:

- date of original hydraulic test, month and year;
- test pressure, in kPa and bar;
- total capacity, in litres;
- dates of hydraulic re-tests, year and month, where applicable.

Marking of tank containers for dangerous goods is dealt with in [5.14.5].

### 5.14 TANK CONTAINERS FOR DANGEROUS GOODS

#### 5.14.1 General

Tank containers intended for carrying dangerous goods in liquid or liquefied gas form may be approved based upon the following national and international requirements:

- I. Italian Ministry of Infrastructures and Trasports:
  - A. DPR 6 June 2005, no. 134 “Requirements for merchant ships concerning the loading, transport and unloading of dangerous goods”;
- II. International Maritime Dangerous Good Code (IMDG Code):
  - A. Sub-chapter 6.7.2 “Provisions for the design, construction, inspection and testing of portable tanks intended for the transport of substances of Class 1 and Classes 3 to 9”;
  - B. Sub-chapter 6.7.3 “Provisions for the design, construction, inspection and testing of portable tanks intended for the transport of non-refrigerated liquefied gases of Class 2”;
  - C. Sub-chapter 6.7.4 “Provisions for the design, construction, inspection and testing of portable tanks intended for the transport of refrigerated liquefied gases of Class 2”;
- III. Agreement Concerning the International Carriage of Dangerous Goods by Road:
  - A. Sub-chapter 6.7.2 “Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of substances of Class 1 and Classes 3 to 9”;

B. Sub-chapter 6.7.3 “Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of non-refrigerated liquefied gases of Class 2”;

C. Sub-chapter 6.7.4 “Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of refrigerated liquefied gases of Class 2”;

IV. Regulations Concerning The International Carriage Of Dangerous Goods By Rail (RID):

A. Sub-chapter 6.7.2 “Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of substances of Class 1 and Classes 3 to 9”;

B. Sub-chapter 6.7.3 “Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of non-refrigerated liquefied gases of Class 2”;

C. Sub-chapter 6.7.4 “Requirements for the design, construction, inspection and testing of portable tanks intended for the transport of refrigerated liquefied gases of Class 2”;

#### 5.14.2 Application for approval

The application for approval shall be submitted to Tasneef Office, enclosing the following documents:

- main technical data of the tank container, including the tank type and the list of products to be carried;
- calculations of the pressure vessel carried out according to a pressure vessel code;
- calculation of the discharge capacity of the relief devices;
- certification of the discharge capacity of the relief valves;
- assembly drawing, in triplicate, of the tank container;
- working drawing, in triplicate, of the load bearing structure;
- working drawing, in triplicate, of the pressure vessel, including the ends;
- working drawing, in triplicate, of the manhole and fittings, if any;
- working drawing, in triplicate, of relief devices
- working drawing of the IMO plate (where applicable), in triplicate.

#### 5.14.3 Manufacture

The manufacture of containers shall be carried out under the surveillance of a Tasneef surveyor, who shall ascertain, in particular, the following:

- compliance with approved drawings;
- characteristics of materials employed;

**Chapter 5 - Tank containers**

- employ of authorized welders and qualified welding procedures;
- carrying out of post-weld heat treatments;
- carrying out of non-destructive tests as required on the approved drawings;
  - carrying out of the pressure test.

**5.14.4 Testing**

**a) Tests on the prototype**

On a prototype manufactured according to what is established in [5.14.3], all the tests specified in [5.10.2] to [5.10.5], inclusive, and in [5.10.7] to [5.10.11], inclusive, or by the applicable requirements, according to the features of the proposed prototype, shall be carried out in the presence of a Tasneef surveyor.

Test No. 5 specified in [5.10.6] shall be replaced by a dynamic test to be carried out at a recognized laboratory, with the following procedure.

The tank container, loaded to a gross mass (rating) equal to R and secured on a railroad car through the

bottom corner fittings, is subjected to a 4g acceleration obtained by making the car bearing the tank container to collide, at a speed of about 11 km/h with another still car.

Testing procedures equivalent to the required ones and additional tests may be accepted by Tasneef on a case by case basis.

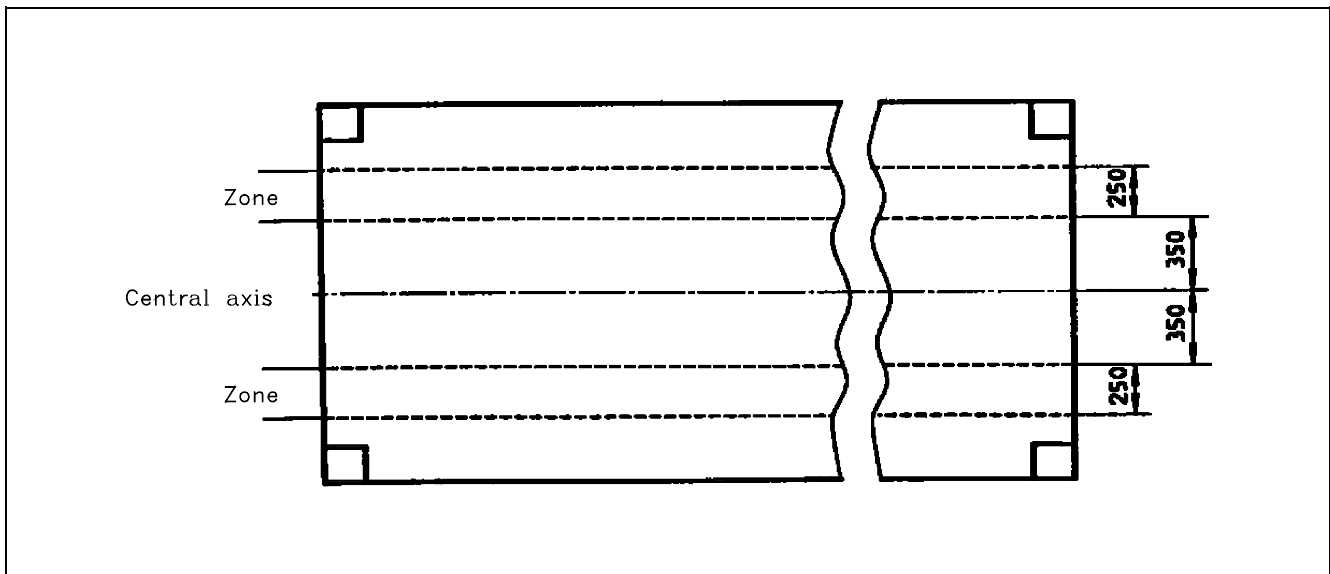
**b) Production testing**

What is established in [5.12] applies, except that each tank shall be manufactured according to what is established in [5.14.3].

**5.14.5 Marking**

Tank containers conforming with the requirements of the IMDG Code/ADR/RID shall be fitted with a plate bearing the information required by the applicable regulation/s.

**FIGURE 5.1**  
**ZONES FOR LONGITUDINAL MEMBERS**  
(dimensions in mm)



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PLATE 5.1 (Sheet 1 of 2)

MINIMUM NUMBER OF PAIRS OF LOAD-TRANSFER AREAS FOR 1CC, 1C, 1CX, 1BBB, 1BB AND 1BX CONTAINERS  
(dimensions in mm)

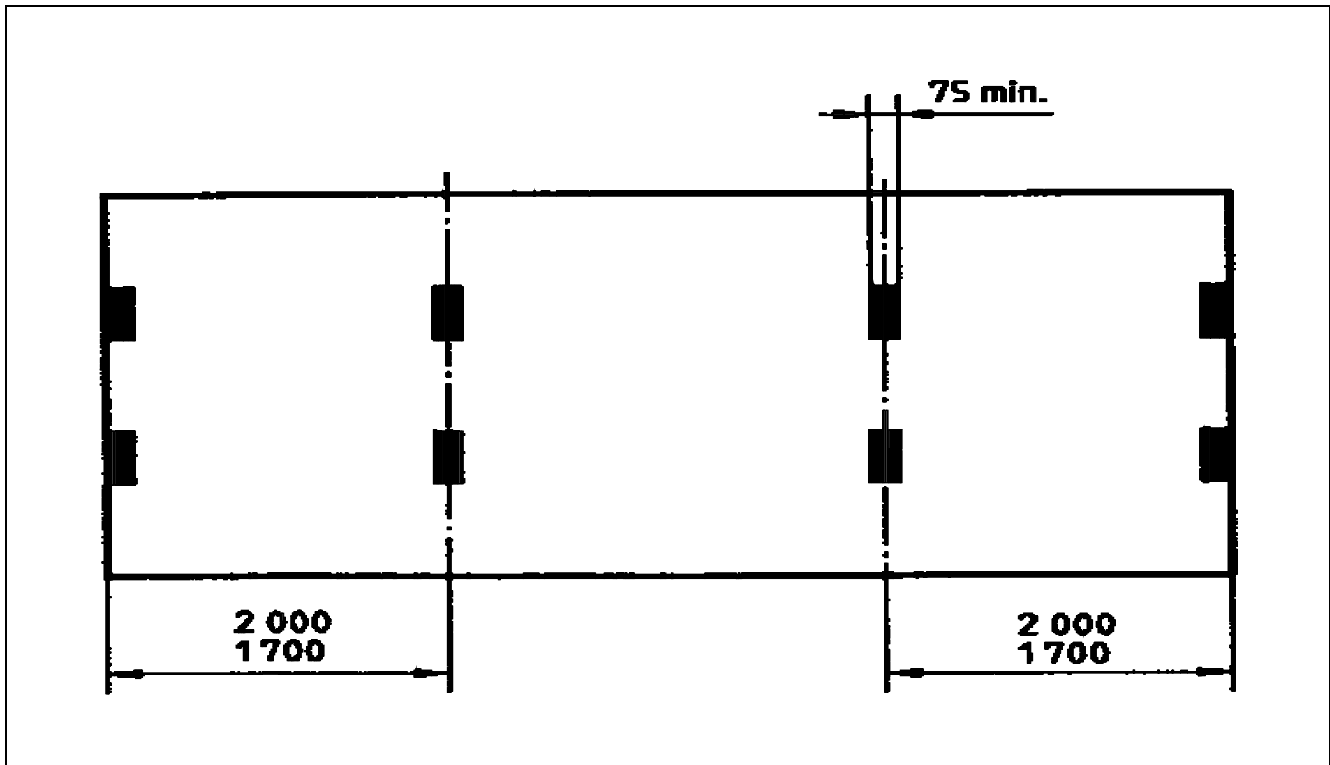
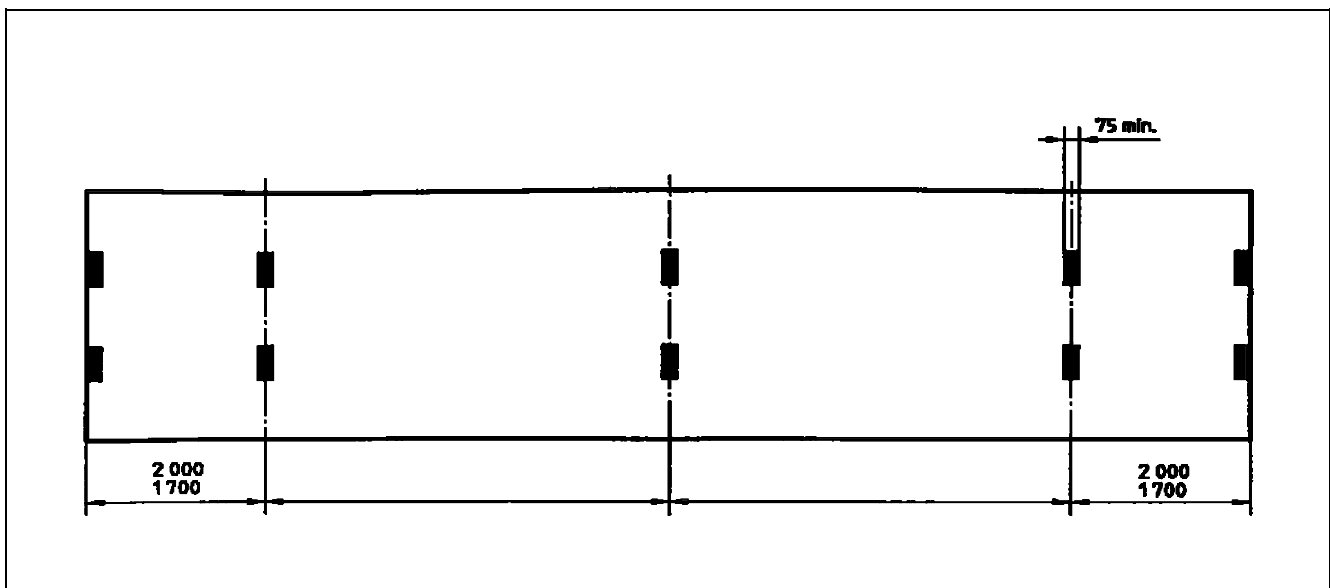


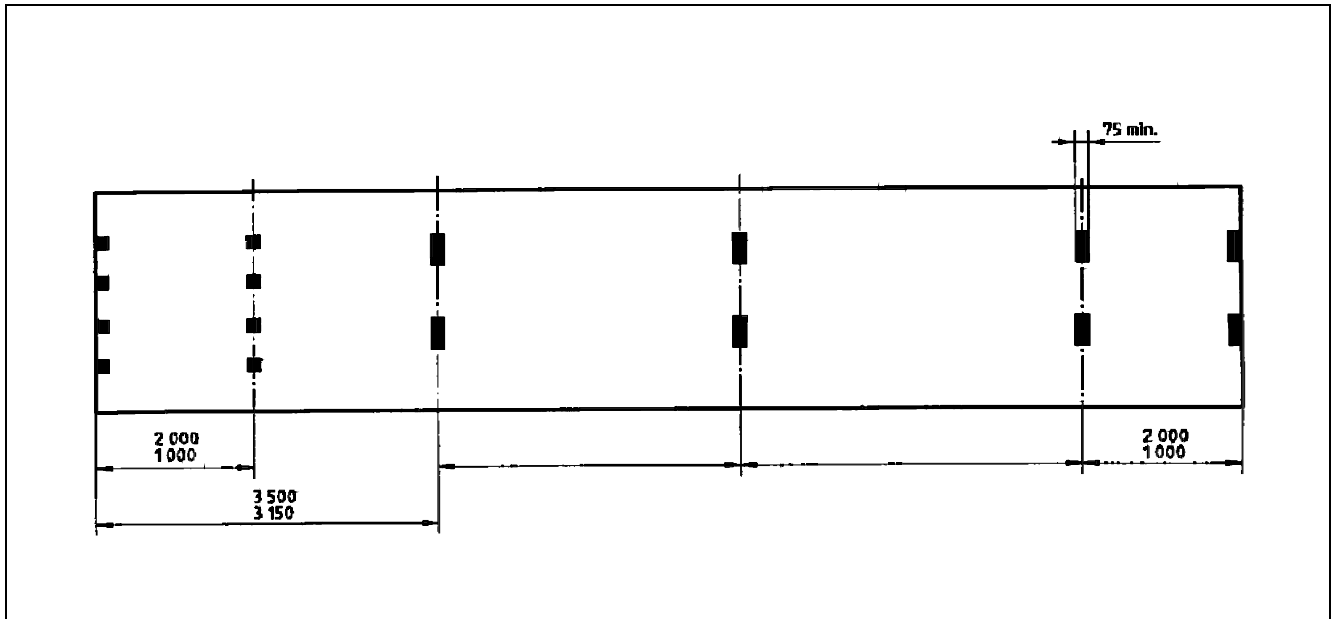
PLATE 5.1 (Sheet 2 of 2)

MINIMUM NUMBER OF LOAD TRANSFER AREAS FOR 1AA, 1A AND 1AX CONTAINERS WITHOUT GOOSENECK TUNNEL  
(dimensions in mm)



Chapter 5 - Tank containers

MINIMUM NUMBER OF LOAD TRANSFER AREAS FOR 1AAA, 1AA, 1A AND 1AX CONTAINERS WITH GOOSENECK TUNNEL  
(dimensions in mm)



## Chapter 6 - Thermal containers

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### 6 THERMAL CONTAINERS

#### 6.1 PREAMBLE

This chapter indicates the specifications relevant to thermal containers, which are freight containers which generally have walls, doors, floor and roof adequately protected by a thermal insulation so as to retard the rate of heat transmission between the inside and the outside of the container.

Thermal containers include:

- insulated containers;
- refrigerated containers;
- mechanically refrigerated containers;
- heated containers;
- refrigerated or mechanically refrigerated and heated containers.

These containers shall comply with the requirements specified in Chapter 4 for freight containers for general purposes, with the modifications specified in this chapter.

#### 6.2 DEFINITIONS

For the purposes of this chapter, the following definitions apply:

**Insulated container:** Thermal container having no devices for internal cooling or heating.

**Refrigerated container:** Thermal container which does not require external power and uses a means of cooling such as:

- ice;
- dry ice, with or without sublimation control;
- liquefied gases, with or without evaporation control.

**Mechanically refrigerated container:** Thermal container served by heat-producing appliance.

**Heated container:** Thermal container served by heat-producing appliance.

**Refrigerated or mechanically refrigerated and heated container:** Thermal container served by refrigeration appliance (mechanical or expendable refrigerant) and heat-producing appliance.

#### 6.3 INTERNAL DIMENSIONS AND DOORS

The internal dimensions of the thermal containers shall be as large as possible and in particular their width shall be not less than 2220 mm. Doors shall be as large as possible and their clear opening shall have the same dimensions as the internal cross-section of the container.

#### 6.4 SANITARY AND TAINT-FREE REQUIREMENTS

Attention is drawn to the need for the proper choice of materials for the container and relevant appliances to prevent adverse effects in cargo, especially

foodstuffs and any relevant national or international requirements shall also be complied with.

The interior surface and container structure shall be so constructed as to facilitate cleansing, and the structure and the insulation shall not be functionally affected by cleansing methods, for example steam cleaning and detergents normally used.

No pockets shall exist inside the container that cannot be reached by conventional cleaning methods.

If drains are fitted, adequate provision shall be made to ensure that cleaning water can drain satisfactorily to the outside of the container.

#### 6.5 MISCELLANEOUS DEVICES (OPTIONAL)

##### 6.5.1 Drains

When drains are required to be provided to drain from the interior of the container when carrying cargo, they shall be protected by fittings which open automatically above normal internal operating pressure.

If drains are required for cleaning the interior of the container, they shall be provided with manual closures.

##### 6.5.2 Water connections

For appliances requiring water connections, the inlet and outlet interfaces shall conform to Plates 6.1, 6.2 and 6.3.

##### 6.5.3 Air inlets and outlets

Thermal containers designed for ducted air systems and for use with externally located removable equipment shall be fitted with air inlet and outlet openings conforming to Plates 6.4, 6.5 and 6.6.

##### 6.5.4 Intermediate sockets for clip-on units

Where thermal containers are fitted with intermediate sockets for use of clip-on units, they shall be arranged conforming to Plates 6.7 and 6.8.

#### 6.6 TESTING

##### 6.6.1 General

Thermal containers shall be subjected to the tests specified in 6.6.2 to 6.6.16, inclusive, in the design operating conditions, in particular, for containers fitted with refrigeration, or heating equipment which can contribute to the strength of the container, tests shall be carried out with the above-mentioned equipment, or equivalent structures, in place in their operating position.

The airtightness test, specified in [6.6.15], shall be carried out after all structure tests are performed and before the thermal insulation test, specified in [6.6.16].

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### 6.6.2 Test No.1 - Stacking

The stacking test is the same as specified in [4.9.2].

### 6.6.3 Test No.2 - Lifting from the four top corner fittings

This test is the same as specified in [4.9.3].

### 6.6.4 Test No.3 - Lifting from the four bottom corner fittings

This test is the same as specified in [4.9.4].

### 6.6.5 Test No.4 - Restraint (compression and tension of the bottom longitudinals)

This test is the same as specified in [4.9.5].

### 6.6.6 Test No.5 - Strength of end walls

This test is the same as specified in [4.9.6].

### 6.6.7 Test No.6 - Strength of side walls

This test is the same as specified in [4.9.7].

### 6.6.8 Test No.7 - Strength of the roof

This test is the same as specified in [4.9.8].

If the roof is designed to carry a hanging cargo, this test shall be followed by a test to prove the ability of the container to carry a minimum total hanging load of 1490 kg/m of usable inside container length, taking into account a vertical acceleration of 2g.

The testing procedure is the following one.

The container shall rest on four level supports, under its four corner fittings, with its base structure free to deflect; a load equal to the greater of the following two shall be attached to the roof supports:

- 2 times the payload;
- 2980 kg/m of usable inside container length.

### 6.6.9 Test No.8 - Floor strength

This test is the same as specified in [4.9.9].

### 6.6.10 Test No.9 - Transverse rigidity

This test is the same as specified in [4.9.10].

### 6.6.11 Test No.10 - Longitudinal rigidity

This test is the same as specified in [4.9.11].

### 6.6.12 Test No.11 - Lifting from fork-lift pockets

This test is the same as specified in [4.9.12].

### 6.6.13 Test No.12 - Lifting from the base at grapple arm positions

This test is the same as specified in [4.9.13].

### 6.6.14 Test No.13 - Weatherproofness

This test is the same as specified in [4.9.14], with the difference that the test shall be carried out on door seals, exterior gasketed joints and other openings which are fitted with closing devices. If a refrigeration unit is fitted, the test shall be carried out on all exposed components, either electrical or not.

### 6.6.15 Test No.14 - Airtightness

This test is intended to prove the airtightness of the container, and in particular of its means of closure.

The testing procedure is the following one.

The container shall be in its normal operating condition and shall be closed in the normal manner; if the container is fitted with air inlets and drains, these shall be closed; the internal and external temperature shall be stabilized to a value between 288K (15°C) and 298K (25°C), with a maximum difference of 3K between inside and outside temperature; an air supply pipe, through a flow-measuring device accurate to  $\pm 3\%$  shall be connected to the container by a leakproof connection; the container shall be fitted with a manometer accurate to  $\pm 5\%$ ; air shall be admitted to the container to raise the internal pressure to  $250 \pm 10$  Pa and the air supply shall be regulated to maintain this pressure for at least 30 minutes.

### 6.6.16 Test No.15 - Thermal insulation test (Heat leakage test)

This test is intended to establish the heat leakage through the insulation covering of the container. The test shall be performed in a recognized laboratory fitted with an isothermic chamber by the electrical heating method or other method recognized as suitable.

The testing procedure, by the electrical heating method, is the following one.

The container shall be empty and in the normal operating condition; the heating devices shall be adequately screened not to cause radiation and shall be located, with their fans, in the geometric centre of the container; all measuring instruments and devices shall be selected and set with the following accuracies:

- temperature-measuring instruments:  $\pm 0,5K$ ;
- power-measuring devices:  $\pm 2\%$  of the quantity measured;
- flowmeter devices:  $\pm 3\%$ .

This test shall be conducted in stationary conditions, which shall be maintained, for at least 8 hours, within the limits set out below, which conditions are deemed to have been attained when the electric power supply to maintain the equilibrium conditions of internal temperature remains constant:

- mean wall temperature: 293K to 305K (20°C to 32°C);
- minimum temperature difference between inside and outside: 20K;
- maximum temperature difference between two inside points at the same time: 3K;
- maximum temperature difference between two outside points at the same time: 3K;
- maximum difference between any two average inside temperatures at different times: 1,5K;
- maximum difference between any two average outside temperatures at different times: 1,5K;

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- maximum percentage difference between the highest and lowest value of power dissipation (W-h)/h: 3% of the lowest figure.

Sets of readings shall be recorded at intervals of not more than 30 minutes.

Temperatures shall be measured at a distance of 100 mm from inside and outside surfaces, at least at the following points:

- at the eight inside corners;
- at the eight outside corners;
- at the centre of the inside and outside surfaces of side walls;
- at the centre of inside and outside surfaces of the floor;
- at the centre of the inside and outside surfaces of the roof.

The total heat leakage rate  $U_{\theta}$ , in W/K, is given by:

$$U_{\theta} = Q/(\theta_i - \theta_e)$$

where:

$\theta_i$  is the average inside temperature, which shall be the arithmetic mean of the inside temperatures, measured as specified above;

$\theta_e$  is the average outside temperature, which shall be the arithmetic mean of the outside temperatures, measured as specified above.

The mean wall temperature is  $(\theta_i + \theta_e)/2$ .

**6.6.17 Test No.16 - Mechanical refrigeration unit test**

This test is intended to prove the ability of a container when fitted with a mechanical refrigeration unit to maintain a given inside temperature  $\theta_i$  at a given outside temperature  $\theta_e$ . This test shall be carried out, as the previous one, inside an isothermic chamber.

The testing procedure is the following one.

The container, placed in a test chamber maintained at a constant temperature equal to the value of the outside design temperature  $\theta_e$  is cooled down internally, by means of its mechanical refrigeration unit, until the inside design temperature  $\theta_i$  is reached; this temperature shall be maintained for 8 hours, then a heating device shall be operated; the heating device shall be placed internally and suitably screened not to cause radiation, and it shall have a capacity not less than 25% of the total heat leakage rate established by the thermal insulation test specified in 6.6.16; the test shall be continued for further four hours; during this test, the outside and inside temperatures and the power absorbed by the heating devices shall be measured.

**6.7 ACCEPTANCE CONDITIONS**

On completion of the tests [6.6.2] to [6.6.13], inclusive, the container shall show neither permanent deformation nor other abnormality which will render it unsuitable for use, and the dimensional requirements affecting handling, securing and interchange shall be satisfied.

On completion of the weatherproofness test [6.6.14], no water shall have leaked into the container or into any electrical enclosures, and the refrigeration unit shall function properly.

The airtightness test [6.6.15] is complied with when the air supply necessary to maintain the internal pressure in the container without additional door openings results not to exceed 10 m<sup>3</sup>/h; for each additional door opening (e.g. side doors) provided, an extra rate of 5 m<sup>3</sup>/h.

The thermal insulation test [6.6.16] is complied with when the value of the total heat leakage rate  $U_e$  does not exceed the value specified by the following table or the design value.

Container designation	Type with mechanical refrigeration unit $U_e$ (W/K)	Insulated type $U_e$ (W/K)
1D	15	26
1C, 1CC	26	46
1B, 1BB	37	66
1A, 1AA	48	86

The mechanical refrigeration unit operation test is complied with if for its whole duration (12 hours in total) the average inside temperature of the container does not exceed the design value (typical temperature values are:  $\theta_e = 311K$  and  $\theta_i = 255K$  for mechanically refrigerated containers, and  $\theta_e = 253K$  and  $\theta_i = 289K$  for heated containers).

**6.8 PRODUCTION TESTING**

**6.8.1 Application for testing**

The manufacturer shall state that the thermal containers have been manufactured and subjected by the internal control service to the checks for conformity to the approved prototype and, in particular, that each container has been subjected, as far as applicable, to:

- dimensional check;
- insulation resistance measurement;
- earth connection check;
- operation test and setting of safety, regulation and automatic control devices;
- pressure test of piping and coils;
- lifting from top corner fittings (see [5.9.3]) or equivalent test;
- weathertightness test [6.6.15].

The manufacturer shall, in addition, supply the identifying data relevant to the testing of the insulating panels and mechanical refrigeration unit.

**6.8.2 Checking operations**

- (a) On each container:
  - visual examination;
  - simplified airtightness test by fitting smoke-producers inside the container maintained at a pressure not less than 100 Pa and



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- employing detecting lamps to check absence of smoke leakage;
- operating test;
- (b) on 1 container out of 10:
  - airtightness test [6.6.15];
- (c) on 1 container out of 50:
  - lifting from top corner fittings [6.6.3] or equivalent test;
- (d) on 1 container out of 100:
  - stacking test [6.6.2];
  - thermal insulation test [6.6.16] followed by the mechanical refrigerating unit test [6.6.17];
- (e) on 1 container out of 1000 and at least every year:
  - repetition of all tests ([6.6.2] to [6.6.17], inclusive);
- (f) further possible tests or ascertainties judged to be necessary by the Tasneef surveyor

depending on the result of the above-mentioned tests.

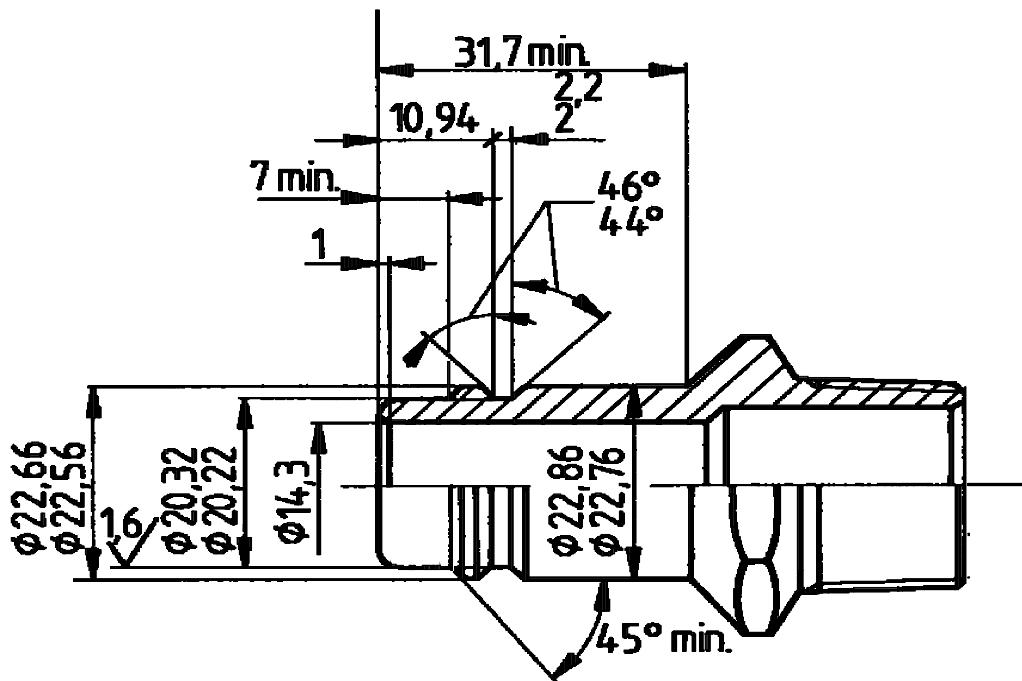
The frequency of the above-mentioned operations may be changed, at Tasneef judgement, taking into account the factory's production and the number of containers belonging to the same series.

**6.9 MARKING**

In addition to what is specified in [4.12], thermal containers shall have one or more plates indicating the following data:

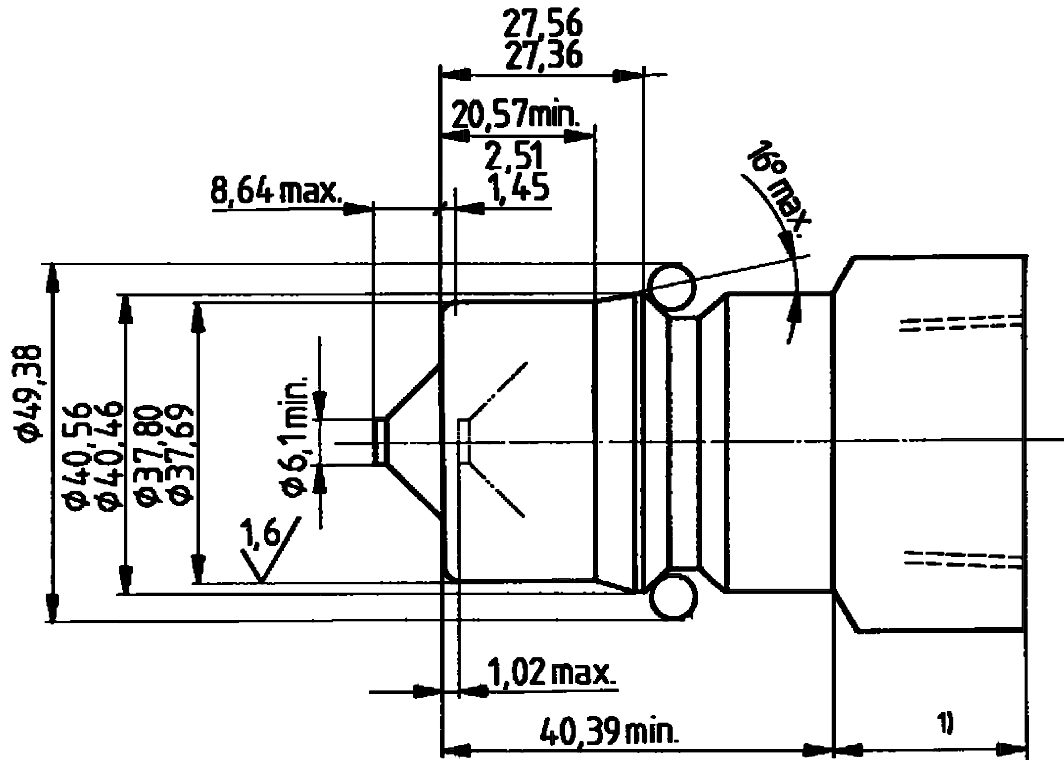
- reference temperatures  $\theta_e$  and  $\theta_i$ ;
- manufacturer of the mechanical refrigerating unit, model and main characteristics;
- absorbed power and type of electrical installation;
- identification of external connections.

**PLATE 6.1**  
**COOLING WATER INLET CONNECTION**  
 (dimensions in mm, roughness in  $\mu\text{m}$ )



Operating pressure: 1 MPa  
 Bursting pressure: 4 MPa

PLATE 6.2  
COOLING WATER OUTLET CONNECTION  
(dimensions in mm, roughness in  $\mu\text{m}$ )

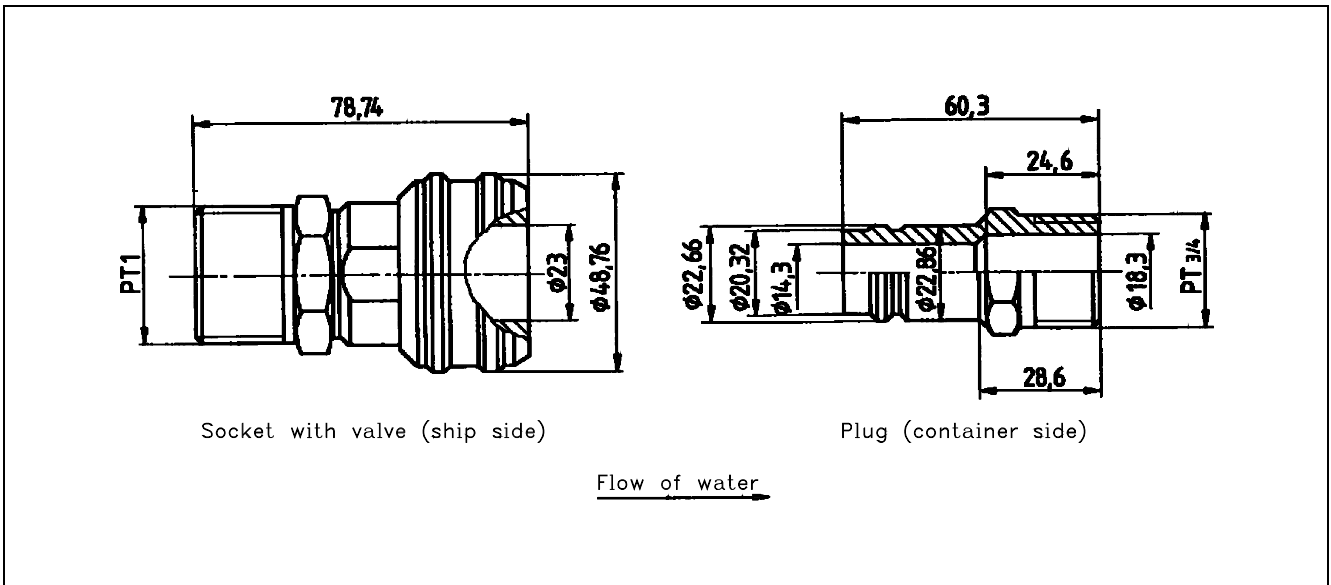


Operating pressure: 1 MPa  
Bursting pressure: 4 MPa

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PLATE 6.3

EXAMPLE OF COOLING WATER INLET CONNECTION (SINGLE SHUT-OFF)  
(dimensions in mm)



EXAMPLE OF COOLING WATER OUTLET CONNECTION (DOUBLE SHUT-OFF)  
(dimensions in mm)

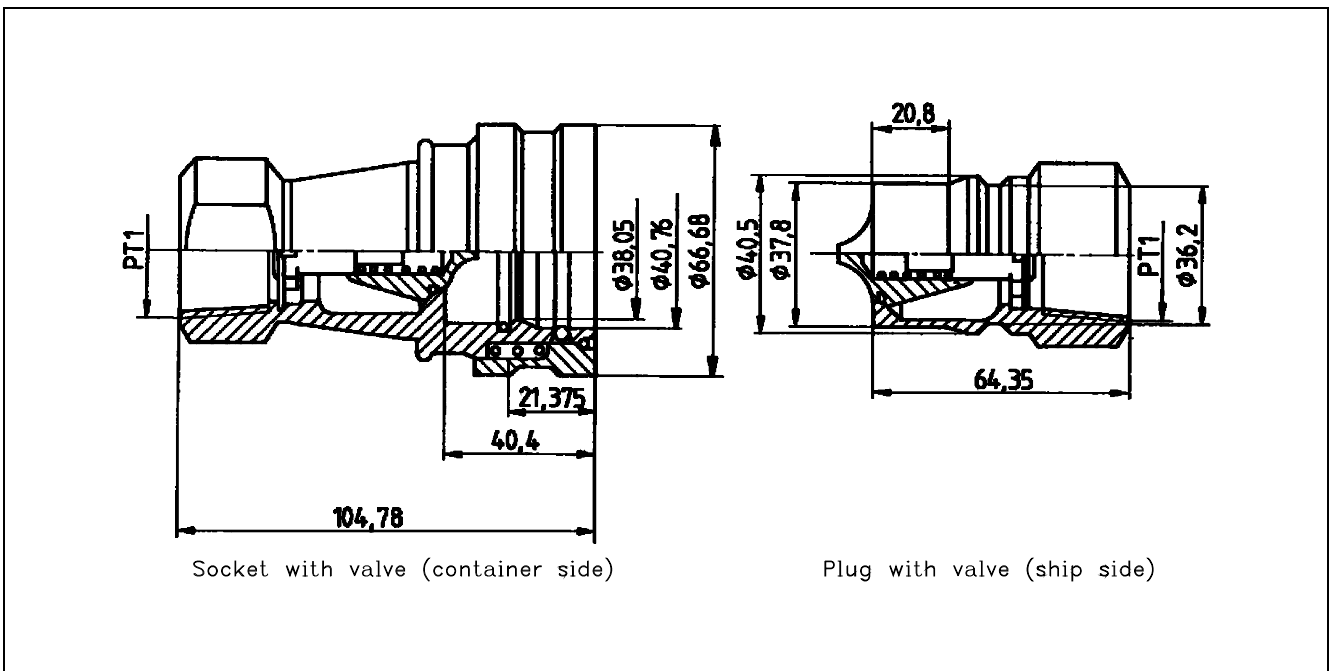


PLATE 6.4

AIR INLET AND OUTLET APERTURES OF 1AA THERMAL CONTAINERS  
(dimensions in mm)

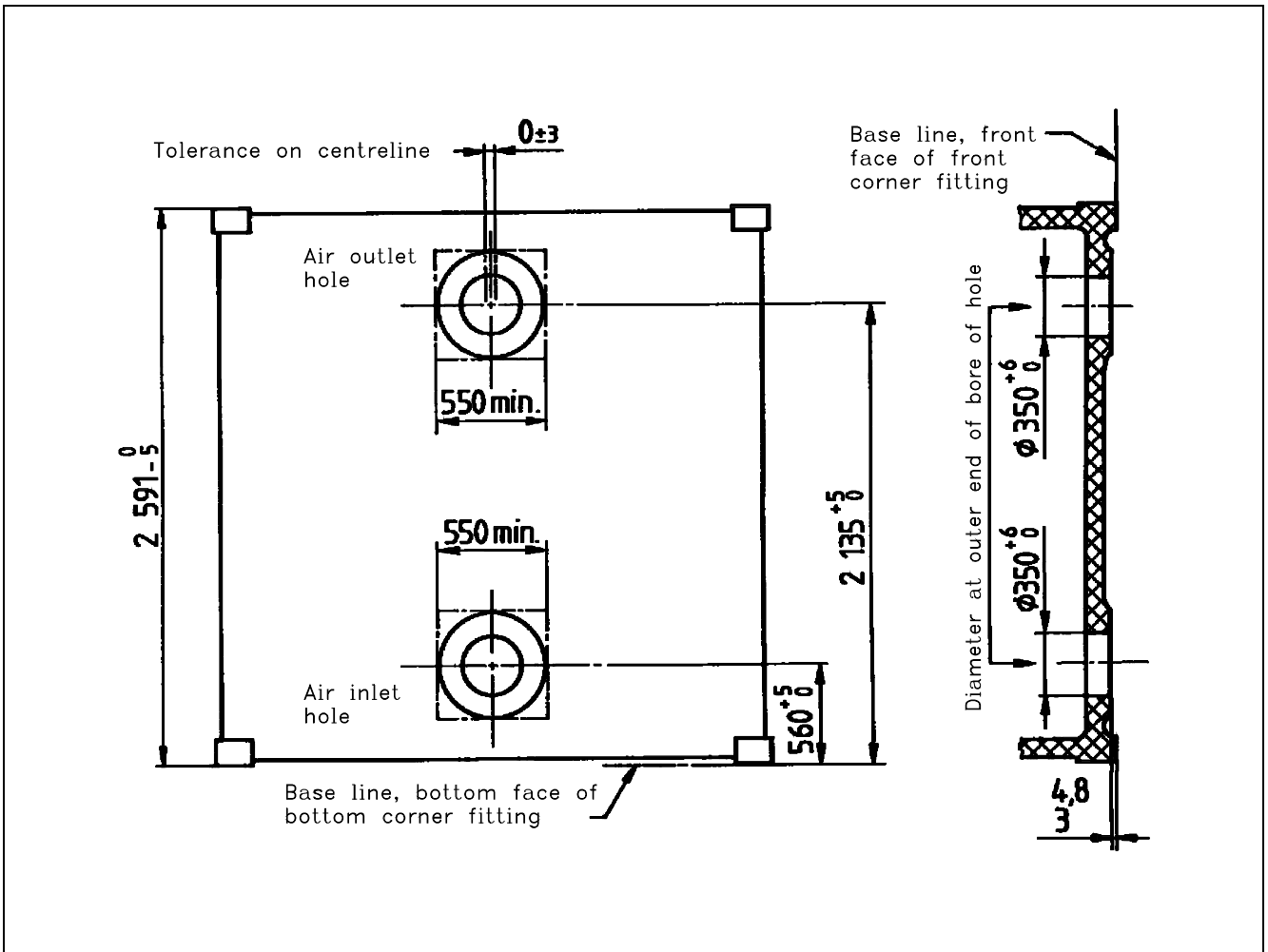
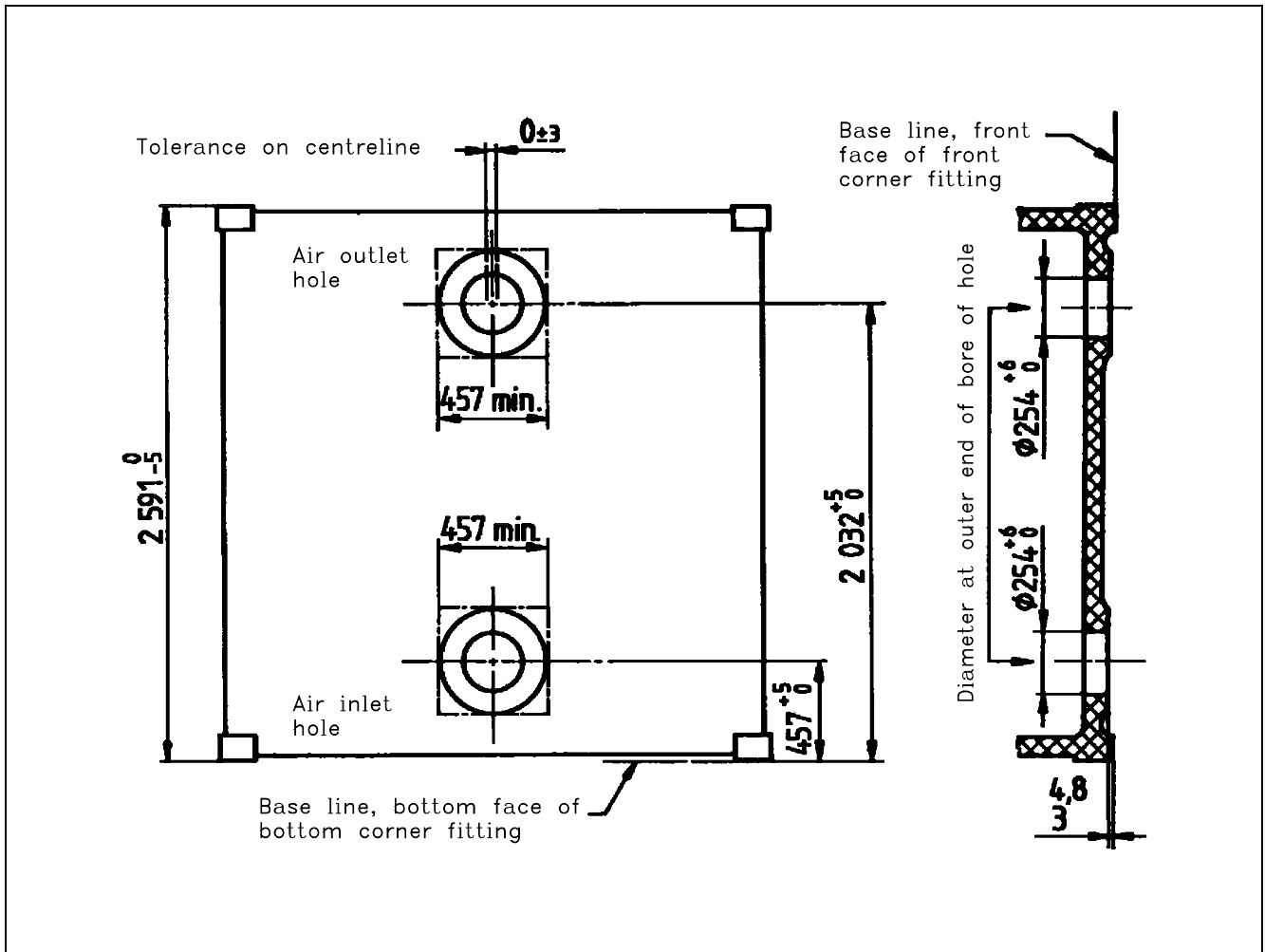


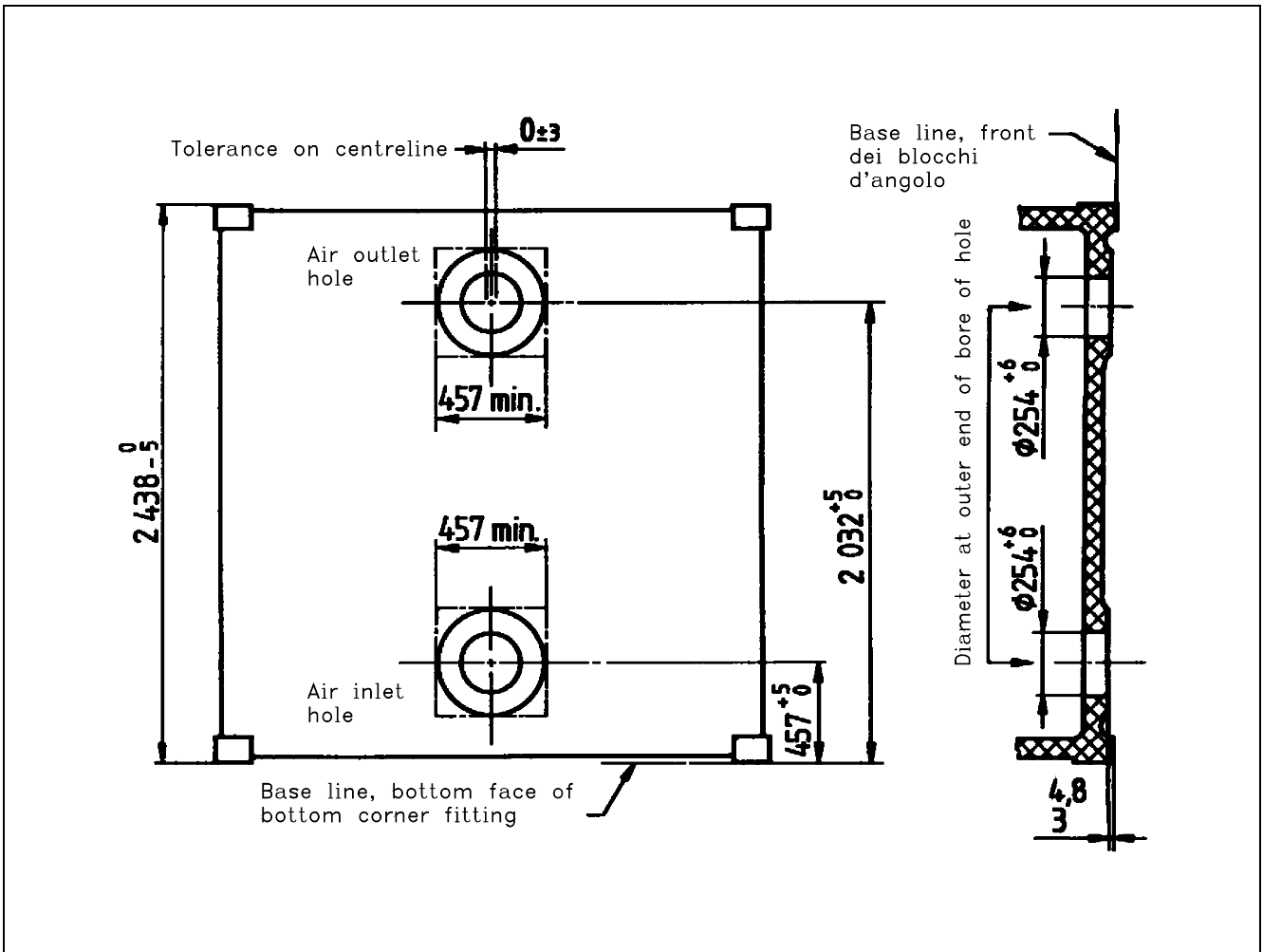
PLATE 6.5  
AIR INLET AND OUTLET APERTURES OF 1CC THERMAL CONTAINERS  
(dimensions in mm)



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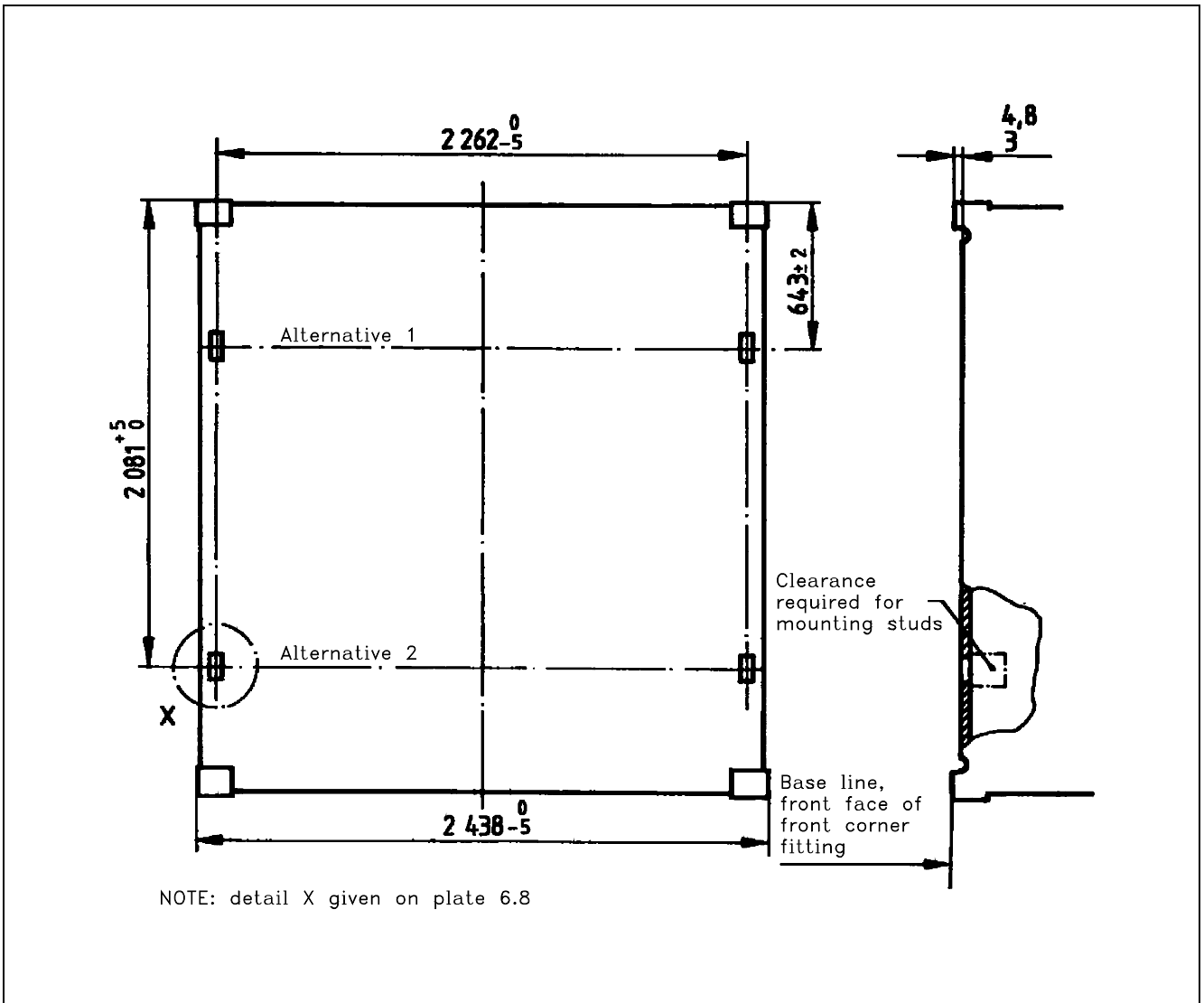
PLATE 6.6

AIR INLET AND OUTLET APERTURES OF 1C THERMAL CONTAINERS  
(dimensions in mm)



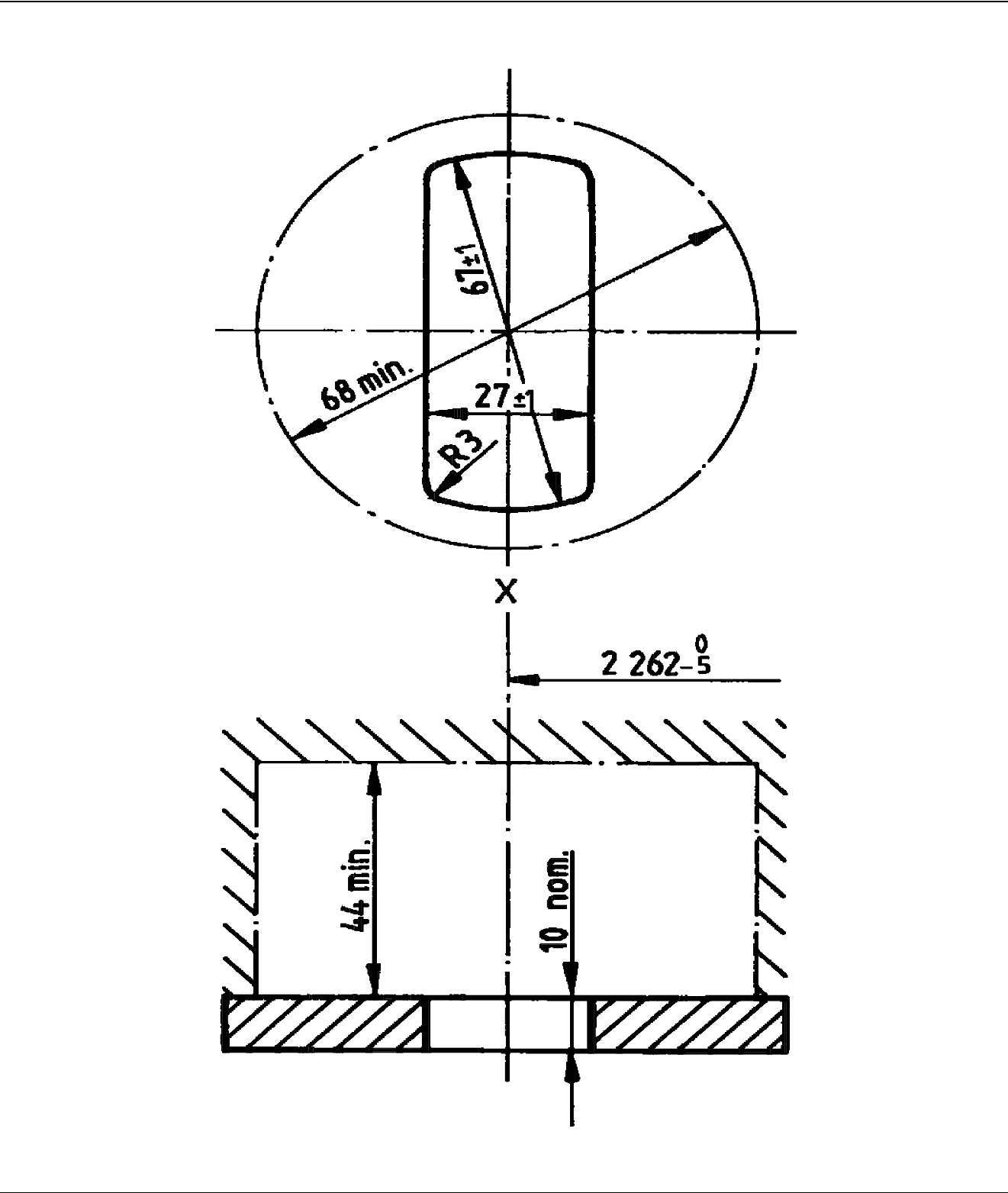
Chapter 6 - Thermal containers

PLATE 6.7  
INTERMEDIATE SOCKETS FOR CLIP-ON UNITS  
(dimensions in mm)



Chapter 6 - Thermal containers

PLATE 6.8  
DETAIL X (SEE PLATE 6.7)  
(dimensions in mm)





**Annex 1 - CSC approval plate**

The CSC approval plate, conforming to the specimen hereinafter, shall be a permanent rectangular plate, of material not prone to corrosion and fire-resistant, having dimensions not less than 200x100 m. The words “CSC SAFETY APPROVAL”, at least 8 mm in height and all other words and numbers, at least 5 mm in height, shall be stamped, embossed or indicated on the plate surface by any other permanently legible way.

	<b>CSC SAFETY APPROVAL</b>	
1. ....	★ I ★ RI ★ ..... ★	
2. ....	<b>DATE MANUFACTURED</b> .....	
3. ....	<b>IDENTIFICATION N°</b> .....	
4. ....	<b>MAXIMUM OPERATING GROSS MASS</b> .....	<b>kg</b> ..... <b>lb</b>
5. ....	<b>ALLOWABLE STACKING LOAD FOR 1.8 g</b> .....	<b>kg</b> ..... <b>lb</b>
6. ....	<b>TRANSVERSE RACKING TEST FORCE</b> .....	<b>Newtons</b>
7. ....		
8. ....		
9. ....		

1. Identifying data of the approval.
2. Date (month and year) of manufacture.
3. Fabrication number identifying the container.
4. Gross mass (rating) of employ (kg and lb).
5. Maximum allowable stacking load (kg and lb); this value is obtained dividing by 1,8 the total load to which the container has been subjected during the stacking test.
6. Value of load to which the container has been subjected during the transverse rigidity test (Newtons).
7. Strength of end walls, to be indicated on the plate only if the walls have been designed and tested to withstand a load less or greater than 0,4 times the maximum allowable payload, i.e. 0,4 Pg.
8. Strength of side walls, to be indicated on the plate only if the walls have been designed and tested to withstand a load less or greater than 0,6 times the maximum allowable payload, i.e. 0,6 Pg.
9. Date (month and year) on which the first inspection for new containers shall take place and, if the plate is used for this purpose, dates (month and year) on which the subsequent inspections shall take place

**Annex 2 - Guide Line for criteria of acceptability of frame during and after testing**

TEST	COMPONENT	MAX DEFLECTION DURING TEST [mm]	MAXIMUM PERMANENT DEFORMATION [mm]
Stacking	Corner post	4,5	2
	Transverse member	6**	3
	Bottom side rail	6**	40' length: 4 30' length: 3 20' length: 3
Lifting from the 4 top corner fittings	Transverse member		3
	Bottom side rail		40' length: 4 30' length: 3 20' length: 3
Lifting from the 4 top corner fittings	Transverse member		3
	Bottom side rail		40' length: 4 30' length: 3 20' length: 3
Restraint test (longitudinal)	Bottom side rail		Vertical: 40' length: 4 30' length: 3 20' length: 3 10' length: 2  Horizontal: Acc. to ISO 668
Strength of end walls including doors	Front end panel	60	9*
	Doors		6*
Strength of side walls	Side panel	80	40' length: 9* 30' length: 9* 20' length: 7* 10' length: 7*
Strength of roof	Weakest part of roof	40	3
Strength of floor	Transverse members including side rails		4
	Gooseneck-tunnel		5
Transverse rigidity	End frame diagonally	60	10
Longitudinal rigidity	Side frame at top fittings	25	40' length: 9 30' length: 8 20' length: 6
Lifting from fork-lift pockets (where provided)	Transverse member		3
	Bottom side rail		40' length: 5 30' length: 4 20' length: 3 10' length: 3
Lifting at base of grapple arm contact area (where provided)	Transverse member		3
	Bottom side rail		40' length: 5 30' length: 4 20' length: 3 10' length: 3
Weather-proofness	All joints and seams	Water must not penetrate into the container	
<p>* The permissible values for permanent deformations shall be applied only if the returns are adequate, i.e. the standard external dimensions are not exceeded.  ** Maximum permissible deflection below the plane of the corner fittings supports.</p>			

**Annex 3 - Facsimile of Tasneef sticker emblem to be applied on each**

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**container**

