

GENERAL REGULATIONS
FOR THE TECHNICAL SUPERVISION OF CONTAINERS

RULES
FOR THE MANUFACTURE OF CONTAINERS

RULES
FOR THE APPROVAL OF CONTAINERS
FOR THE TRANSPORT
OF GOODS UNDER CUSTOMS SEAL

RULES
FOR TECHNICAL SUPERVISION
DURING MANUFACTURE OF CONTAINERS

RULES
FOR TECHNICAL SUPERVISION
OF CONTAINERS IN SERVICE



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The present documents have been approved in accordance with the established approval procedure. The present documents come into force since the date of publication and apply to freight containers of 10 t gross mass and above intended for the carriage of goods by water, rail and road, as well as to offshore containers of other gross mass.

The present edition is based on the 2006 edition taking into account the amendments developed immediately before publication.

The requirements of the International Convention for Safe Containers, 1972, as amended in 1981, 1983, 1991, 1992 and 1993, the Customs Convention on Containers, 1972, Regulations for the Transportation of Dangerous Goods by Sea, IACS Unified Requirements, ISO standards, European standards, IMO resolutions, and UN Recommendations on the Transport of Dangerous Goods as well as the national standards and rules have been taken into account in the present documents.

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**GENERAL REGULATIONS
FOR THE TECHNICAL SUPERVISION
OF CONTAINERS**

1 GENERAL

1.1 DEFINITIONS AND EXPLANATIONS

1.1.1 For the purpose of the Rules the following definitions and explanations have been adopted.

Additional requirements are requirements not contained in the Rules and set forth by Russian Maritime Register of Shipping ¹ in carrying out technical supervision.

Product means a machinery, an appliance, a pressure vessel, an apparatus, a device, an item of equipment or outfit to which the requirements of the Rules are applicable.

Rules mean the rules stated in 1.3.

Standard is a term which, for the purpose of the Rules, means all kinds of standards or technical and normative documents of any country approved or recognized by the Register.

The definitions for the types of containers are given in GOST R 52202 and ISO 830 standards.

1.2 THE REGISTER ACTIVITY ON TECHNICAL SUPERVISION

1.2.1 The Register is a state body of technical supervision of freight containers. Being a member of the International Association of Classification Societies (IACS), the Register follows IACS decisions and the provisions of IACS Code of Ethics. The Register Quality System complies with IACS requirements and applicable requirements of ISO 9001 standard, which is confirmed by IACS Certificate issued on the basis of results of the appropriate audits.

1.2.2 The Register is authorized to exercise on behalf of the Government technical supervision of implementation of the provisions of internal conventions and agreements to which the Russian Federation or any other State the Government of which has authorized the Register to conduct this kind of activities is a party, in so far as matters within the Register scope are concerned.

1.2.3 The Register establishes technical requirements for containers guided by the provisions of the International Convention for Safe Containers, 1972, as amended in 1981, 1983, 1991, 1992 and 1993² and the Customs Convention on Containers, 1972³, Rules for the Transport of Dangerous Goods by Sea (MOPOG Rules), the International Maritime Dangerous Goods Code (IMDG Code), the national and

international standards and performs technical supervision of these requirements being acted along.

1.2.4 Technical supervision is performed according to the Rules issued by the Register, and is aimed to determine whether the containers liable to technical supervision of the Register, as well as the materials and products, meet the provisions of the Rules and the additional requirements.

The requirements of the Rules and additional requirements are obligatory for design offices, manufacturers of containers, container owners, firms supplying materials and equipment for containers and those engaged in the repair and maintenance of containers subject to technical supervision of the Register.

Technical supervision of the Register do not supersede the quality control services of the container owners and manufacturers.

1.2.5 The Register performs technical supervision of the containers, materials and products during design, manufacture and service.

1.2.6 The Register considers and approves the draft standards and normative documents related to its activities.

1.2.7 The Register may participate in investigations of matters lying within its scope.

1.2.8 The fees for the performed work are charged by the Register according to the Register scale of fees. Additional fees are charged by the Register in the case of additional expenses incurred in the course of rendering of service (for instance, traveling expenses, services rendered out of hours etc.).

1.3 RULES

1.3.1 Applicable Rules.

1.3.1.1 The Rules used by the Register in technical supervision of containers under manufacture and in service are:

.1 General Regulations for the Technical Supervision of Containers;

.2 Rules for the Manufacture of Containers, consisting of the following parts:

I "Basic Requirements",

II "General Cargo Containers",

III "Thermal Containers",

IV "Tank Containers",

V "Platform Containers",

VI "Non-Pressurized Bulk Containers",

VII "Offshore containers";

.3 Rules for the Approval of Containers for the Transport of Goods under Customs Seal;

¹ Hereinafter called "the Register".

² Hereinafter called "the CSC Convention".

³ Hereinafter called "the CCC Convention".

.4 Rules for Technical Supervision during Manufacture of Containers;

.5 Rules for Technical Supervision of Containers in Service;

.6 Rules for the Classification and Construction of Gas Carriers as applied to containers;

.7 Rules for the Classification and Construction of Sea-Going Ships as applied to containers;

.8 Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

1.3.1.2 In addition to the Rules stated in 1.3.1.1, the Procedures for the Design, Manufacture, Service and Repair of Pressure Vessels for the Storage and Transport of Dangerous Goods are used by the Register in performing technical supervision.

1.3.2 Application of the Rules to containers under manufacture and to products intended for containers.

1.3.2.1 Newly published Rules, as well as amendments introduced in the Rules, come into force from the date specified in the annotation to the publication, unless other terms are fixed in particular cases. Until the date of entry into force, they shall be considered as recommendation.

1.3.2.2 Interpretation of the requirements of the Rules and other normative documents of the Register is within the Register competence only.

1.3.2.3 The containers and products whose designs are submitted for approval of the Register after the entry into force of the Rules, or amendments introduced in the Rules, shall satisfy the requirements of these Rules and amendments.

To the containers and products whose technical documentation was submitted for approval prior to the entry into force of the Rules, those Rules are applicable which were in force on the date of approving that documentation.

1.3.3 Deviations from the Rules.

1.3.3.1 The Register may allow to use materials, structures or separate devices and items of the container, other than those specified in the Rules, provided they are at least as effective as those required by the Rules; deviations from the Rules, which are covered by the international conventions and agreements, may be permitted by the Register only if the latter is satisfied that such deviations are permissible under these conventions and agreements. In this case the Register shall be supplied with information enabling to ascertain that the materials, structures and products meet the requirements which ensure trouble-free handling of the container and safe carriage of goods.

1.3.3.2 If the design of the container, its separate machinery, devices, units, equipment and outfit or the materials used cannot be regarded as sufficiently proved in service, the Register may require additional tests to be made during manufacture of the container

and in the case of containers in service, may reduce the intervals between periodical surveys or increase the extent of such surveys.

1.4 DOCUMENTS

1.4.1 In the course of technical supervision the Register issues the appropriate documents.

1.4.2 Based on the results of technical supervision of containers, the following documents provided for by the List of Forms of the Register documents are issued during technical supervision:

.1 Certificate of Freight Container Safety Approval by Design Type which certifies the compliance of the freight container design type with the requirements of the International Convention for Safe Containers and the Register rules;

.2 Certificate of Thermal Container Safety Approval by Design Type which certifies the compliance of the thermal container design type with the requirements of the International Convention for Safe Containers and the Register rules;

.3 Certificate of Tank Container Safety Approval by Design Type which certifies the compliance of the tank container design type with the requirements of the International Convention for Safe Containers and the Register rules;

.4 Certificate of Compliance for Prototype Tank Container which certifies the compliance of the prototype tank container with the requirements of international conventions, agreements, rules for the carriage of dangerous goods and the Register rules;

.5 Certificate of Container Approval at a Stage Subsequent to Manufacture which certifies the compliance of the container design with the requirements of the Customs Convention on Containers and the Register rules;

.6 Certificate of Container Approval by Design Type which certifies the compliance of the container design type with the requirements of the Customs Convention on Containers and the Register rules;

.7 Type Approval Certificate for Offshore Container which certifies the compliance of the offshore container design type with the requirements of the Register rules and other normative documents;

.8 Type Approval Certificate which certifies the compliance of the types of materials, products or groups of products, type production processes with the requirements of the Register rules;

.9 Certificate for Freight Container(s) which certifies the compliance of specific freight containers with the requirements of the International Convention for Safe Containers, Customs Convention on Containers and the Register rules;

.10 Certificate for Thermal Containers which certifies the compliance of specific thermal containers with the requirements of the International Convention for Safe Containers, Customs Convention on Containers and the Register rules;

.11 Certificate for Tank Container which certifies the compliance of the specific tank container with the requirements of the International Convention for Safe Containers, Customs Convention on Containers, other international normative documents and the Register rules;

.12 Certificate for Offshore Container which certifies the compliance of a specific offshore container with the requirements of the Register rules and other normative documents;

.13 Certificate for Offshore Tank Container which certifies the compliance of a specific offshore tank container with the requirements of the Register rules and other normative documents;

.14 Recognition Certificate for Manufacturer which certifies the Register recognition of a manufacturer as the manufacturer of materials and products which are under the Register technical supervision;

.15 Recognition Certificate which certifies the recognition of a service supplier rendering services (carrying out works) in compliance with the Register requirements;

.16 Recognition Certificate of Testing Laboratory which certifies the laboratory competence in the performance of certain types of tests of materials, products and containers;

.17 Recognition Certificate for Container Repairs which certifies the Register recognition of the works repairing containers in compliance with the Register requirements;

.18 Recognition Certificate for Container Manufacturer which certifies the Register recognition of the container manufacturer carrying out works in accordance with the Register requirements;

.19 Welder Approval Test Certificate which certifies the welder competence and confirms his approval for welding the structures surveyed by the Register under certain conditions (material, welding procedure, welding position, etc.);

.20 Welding Procedure Approval Test Certificate which certifies the compliance of the welding procedure with the Register requirements;

.21 Certificate which certifies the compliance of specific materials, products or groups of products with the requirements of the Register rules and normative documents;

.22 Reports.

1.4.3 The validity period of the certificates and reports specified in 1.4.2.1 to 1.4.2.7, 1.4.2.21, 1.4.2.22 is not specified.

1.4.4 The validity period of the Type Approval Certificate shall not exceed 5 years. The validity period of the Certificate shall not exceed the approval period of technical documentation for an item of technical supervision. Upon expiry of the validity period, the certificates are renewed on request of the firm.

1.4.5 The validity period of the certificates specified in 1.4.2.9 to 1.4.2.10 shall not exceed 5 years.

1.4.6 The validity period of the Certificate for Tank Container shall not exceed 2,5 years.

1.4.7 The validity period of the certificates specified in 1.4.2.12 to 1.4.2.13 shall not exceed 1 year.

1.4.8 The validity period of the certificates specified in 1.4.2.14 to 1.4.2.18 shall not exceed 5 years. Certificates are subject to endorsement not less than once every 2,5 years. Endorsement shall be carried out within the period limited by one month before and one month after the date of the subsequent endorsement of the certificates. Upon expiry of the validity period, the certificates are renewed on request of the firm.

1.4.9 The documents are issued by the Register on the basis of satisfactory technical condition determined for the supervised item by means of surveys and tests.

1.4.10 The Register documents wherein an owner or an applicant is specified, do not confirm the right of ownership of the item of technical supervision.

1.4.11 The Register shall be notified of all the modifications (introduction of alterations to the design) of the surveyed containers. Such containers may be tested to the necessary extent, if required by the Register.

1.4.12 The Register may fully or partly recognize the documents issued by other classification societies, technical technical supervision bodies and other organizations.

1.4.13 In particular circumstances, the Register may give notification of its documents having ceased to be valid.

1.4.14 The validity of such documents may be restored, if the Register is satisfied that the grounds, which caused the loss of validity have been eliminated.

1.5 THE REGISTER RESPONSIBILITIES

1.5.1 The Register entrusts the performance of inspections to adequately qualified experts performing their functions with proper diligence.

The Register is responsible for failure to perform or for improper performance of its commitments only in case of established fault and the cause-effect relation between the injury caused and the Register activity.

2 TECHNICAL SUPERVISION

2.1 GENERAL

2.1.1 The scope of technical supervision includes:

.1 consideration of technical documentation;

.2 technical supervision during manufacture of materials and products, specified in the Rules, intended for subsequent manufacture of items of technical supervision;

.3 technical supervision during manufacture of containers;

.4 technical supervision of containers in service including repair of containers;

.5 issuance of the Register documents;

.6 recognition of manufacturers, repair shops, other organizations involved in operation of containers, recognition of laboratories for testing containers, materials and products intended for containers.

2.1.2 The nomenclature of items of the Register technical supervision, works and tests performed under the Register technical supervision with regard to containers is given in Table 2.1.2.

2.1.3 The basic method used by the Register in exercising technical supervision is random inspection, unless some other procedure has been adopted.

2.1.4 For the technical supervision to be carried out, container owners and manufacturers shall ensure that the representatives of the Register all afforded the possibility of conducting surveys of containers, free access to all places where materials or products subject to the Register technical supervision are manufactured and tested and shall provide all conditions for the technical supervision to be performed.

2.1.5 Container owners, design offices and the manufacturers of containers shall fulfil the requirements set forth by the Register in performing technical supervision.

2.1.6 Any alterations relating to materials and the structural design of containers and products to which the requirements of the Rules apply, planned by container owners and manufacturers shall be approved by the Register before they are made.

2.1.7 Controversial issues arising in the course of technical supervision may be transferred by container owners, manufacturers and other interested organizations directly to the higher Register Branch Office. The judgement of the Register Head Office is final.

2.1.8 The Register may refuse from the technical supervision in case when the manufacturer systematically violates the Rules or contract on technical supervision concluded with the Register.

Table 2.1.2

Code of item of technical supervision	Item of technical supervision	Document issued	Branding
30000000MK	Containers		
30010000MK	Assembled general cargo containers	C	K
30010100MK	Swap bodies	C	K
30020000MK	Assembled thermal containers	C	K
30030000MK	Assembled tank containers	C	K
30040000MK	Assembled platform containers	C	K
30050000MK	Assembled non-pressurized dry bulk containers	C	K
30060000MK	Assembled named-cargo containers	C	K
30070000MK	Assembled offshore containers	C	K
30070100MK	Assembled offshore tank containers	C	K
30080000MK	Materials		
30080100MK	Sheet and plate steel for tanks	C/C3	K
30080200MK	Rolled metal for manufacturing elements of tank container framework ¹	C/C3	—
30090000MK	Products		
30090100MK	Corner and intermediate fittings	C/C3	K ²
30090200MK	Tanks of tank containers	C	K
30090210MK	Heads of tanks	C	K
30090220MK	Shells of tanks	C	K
30090300MK	Manholes of tanks	C/C3	—
30090410MK	Frangible discs	CTO	—
30090420MK	Fusible elements	CTO	—
30090430MK	Pressure-relief valves	C/C3	—
30090500MK	Vacuum valves	C/C3	—
30090600MK	Stop valves	C/C3	—
30090700MK	Pressure units, cooling and heating appliances	C	K
30090810MK	Covers for containers	CTO	—
30090820MK	Ropes for fastening a cover to a container	CTO	—
30090900MK	Lifting set of offshore containers	CTO	—
30091000MK	Refrigerating and/or heating appliances of a container	C	K
30091100MK	Electrical equipment for containers	CTO	—
30091200MK	Sources of electrical power	C/C3	—
40000000	Works, tests		
40000001	Manufacture of containers, materials and products therefor		—
40000002	Repair of containers		—
40000003	Tests of containers		—
¹ Thickness of rolled metal is 6 mm and over. ² See 2.3.2 of Appendix 1 to the Rules for Technical Supervision during Manufacture of Containers. Symbols: C — Certificate filled-in and signed by the Register surveyor; C3 — Certificate filled-in by the manufacturer and certified by the Register surveyor; CTO — Type Approval Certificate; K — the Register brand; COCM — Certificate of Approval for Welding Consumables.			

2.1.9 In case of revealing defects in a material or a product, which holds a valid document, the Register may require additional tests or appropriate corrections to be made, and if the defect cannot be remedied, may cancel this document.

2.2 TECHNICAL SUPERVISION OF MATERIALS AND PRODUCTS DURING MANUFACTURE

2.2.1 Relevant parts of the Rules contain the lists of materials and products subject to the Register technical supervision during manufacture.

If considered necessary, the Register may require that such materials and products, which are not covered by the said lists, be also manufactured under its technical supervision.

2.2.2 The materials and products subject to the Register technical supervision shall be manufactured according to technical documentation approved by the Register.

2.2.3 A container manufactured in conformity with the approved technical documentation shall undergo the appropriate tests according to the procedures set out in the relevant parts of the Rules for the Manufacture of Containers.

2.2.4 If, as a result of testing the prototype, the design of type-series containers, the associated equipment or the process of manufacture shall be changed as compared with the approved documentation of the prototype, the manufacturer shall submit for consideration of the Register the documentation for series production of the containers, inclusive of the changes proposed.

3 TECHNICAL DOCUMENTATION

3.1 GENERAL

3.1.1 Prior to the commencement of the manufacture of containers, materials and products, subject to the Register technical supervision, the appropriate technical documentation shall be submitted to the Register in the scope specified in the relevant parts of the Rules for the Manufacture of Containers.

If necessary, the Register may require the scope of documentation to be increased.

Standards for certain materials and products agreed with the Register may be substituted for the documentation as a whole or for a part thereof.

Standards not agreed with the Register may be submitted within the technical documentation of the container or product and are regarded as a constituent part thereof, while the possibility of their use in this particular case is confirmed by approval of the technical documentation without the standards themselves being agreed with the Register, to which effect a note is made in the letter of conclusion to be submitted by the Register to the author of the documentation (designer).

The documents to be submitted may be originals, duplicates or copies drawn up in Russian or in English.

Where the documents are submitted in an electronic form, their format and the method of transfer shall be agreed with the Register in each particular case.

Where landmark decisions are taken, the performance specification, concept design, preliminary design, as well as the research and development results may be submitted to the Register for review.

Such documents are not subject to approval (agreement) and their review results are reported in a written conclusion (reference).

3.1.2 The changes which are introduced in the approved technical documentation in respect of the elements and structures, covered by the Rules, shall be submitted for consideration of the Register before proceeding with such changes.

3.1.3 The technical documentation submitted for consideration to the Register shall be drawn up in such a way, or is to supply such particulars, so as to afford clear evidence that the requirements of the Rules are met.

3.1.4 The calculations necessary for determining parameters and values regulated by the Rules shall be prepared according to the requirements of these Rules and according to procedures approved by the Register. The calculation procedures shall ensure sufficient accuracy of solving the problem, which is confirmed by prototype tests carried out under the appropriate provisions.

The Register does not verify the accuracy of calculations, including those obtainable from the computer, while taking into account their results during the consideration of the technical documentation.

Check calculations may be prepared under any program, if required by the Register.

3.1.5 The approval of technical documentation shall be confirmed by the stamps of the Register.

The approval does not apply to the elements and structures which are not covered by the Rules.

The documents contradicting the Register requirements are returned with comments to the designer for updating and/or correcting.

3.2 DURATION OF VALIDITY OF APPROVED TECHNICAL DOCUMENTATION

3.2.1 The Register approval of the technical documentation is valid for the period of 6 years.

The approval of the Register ceases to be valid if the above requirement is not fulfilled.

3.2.2 In justified cases, when serial products are manufactured, the validity term of the approved technical documentation specified in accordance with 3.2.1, may be extended by the Register for a period

not longer than that required to manufacture (order) a lot of products.

3.2.3 The standards on the containers and associated materials and products shall be approved for a period of their validity.

3.2.4 Notwithstanding the terms of approval, the technical documentation on containers, materials and products shall be subjected to compulsory correction to take into account the adopted amendments to the international conventions and agreements, and the requirements of the Register circular letters.

4 KEEPING RECORD OF CONTAINERS

4.1 GENERAL

4.1.1 The Register Head Office keeps records of: certificates of approval issued for all types of cargo containers;

certificates of approval, certificates and reports on surveys of tank containers under manufacture and in service;

certificates of approval issued for all types of thermal containers;

recognition certificates of firms and organizations.

**RULES
FOR THE MANUFACTURE OF CONTAINERS**

PART I. BASIC REQUIREMENTS

1 GENERAL

1.1 APPLICATION

1.1.1 The requirements of the Rules for the Manufacture of Containers¹ apply to freight containers intended for the carriage of goods by water, rail and road and for interchange between these modes of transport, unless expressly provided otherwise in the present Rules.

1.2 DEFINITIONS AND EXPLANATIONS

1.2.1 For the purpose of the present Rules the following definitions and explanations have been adopted.

Cargo container means transport equipment:

of a permanent character and accordingly strong enough to be suitable for repeated use;

specially designed to facilitate the transport of goods by one or more modes of transport without intermediate reloading;

designed to be secured and/or readily handled, and having corner fitting for these purposes;

of a size such that the area enclosed by the four outer bottom corners is at least 14 m², or at least 7 m² if it is fitted with top corner fittings.

Note. The term "container" includes neither vehicles, nor packaging; however, containers when carried on chassis are included.

Swap body means transport equipment having sufficient strength, designed, normally, for rail and road vehicle transportation on land or by water, having unified dimensions, unified means of securing and handling, and a width and/or a length exceeding those of ISO series 1 containers.

Offshore container means transport equipment having sufficient strength, designed for use in the transport of goods or equipment, capable of being handled in open seas, to, from, and between fixed or floating facilities and ships.

Maximum gross mass *R* means the maximum allowable combined mass of the container and its cargo.

Tare mass *T* means the mass of the empty container including permanently affixed ancillary equipment.

Maximum permissible payload *P* means the difference between maximum gross mass *R* and tare mass *T*.

Note. In case when during testing gravitational forces are used the inertial forces of the above values are denoted respectively by: *Rg*, *Tg*, *Pg*. For the purpose of the present Rules $g = 9,81 \text{ m/s}^2$.

Type of container means the design type of container complying with requirements of the present Rules and approved by the Register.

Type-series container means any container manufactured in accordance with the approved design type.

Prototype means a container representative of those manufactured or intended to be manufactured in a definite design type-series.

Corner fittings mean the structural elements with apertures and faces, arranged at the top and bottom corners of a container for the purposes of handling, stacking and/or securing.

1.3 APPROVAL OF CONTAINERS

1.3.1 Approval of containers means the decision of the Register that a design type or an individual container is safe within the terms of the present Rules and is suitable for the transportation of cargoes according to designation.

1.3.2 The container, being manufactured and tested in accordance with the requirements of the present Rules, is considered to be approved under the terms of the CSC Convention and the CCC Convention.

1.3.3 For approval of container by design type or individually an application in writing shall be submitted to the Register.

1.3.4 The application for approval shall for each design type of container be accompanied by the following documentation:

.1 design or technical specifications of the container with description of its purpose, construction, technical characteristics, mechanical and chemical properties of materials involved, with indication of manufacturers of the components purchased from external suppliers, adopted welding procedures as well as methods of assembling, finish and painting;

.2 general view drawings, sectional views with scantlings, assemblies and separate elements as well as the materials involved, drawings of marking and convention plates;

.3 test program indicating internal loads and external forces with methods of their application.

Technical documentation, as a rule, shall be submitted in triplicate.

¹ Hereinafter referred to as "the present Rules".

Additional technical documentation may be required by the Register if considered necessary.

Note. The test program of a prototype may be submitted by a testing laboratory during preparations for testing the prototype.

1.3.5 A prototype or an individual container shall be manufactured in accordance with the technical documentation approved by the Register and under the Register technical supervision. The scope of supervision is set forth in the Rules for Technical Supervision during Manufacture of Containers. A prototype or an individual container shall be subjected to testing in accordance with the Rules in a laboratory recognized by the Register in the presence of the Register surveyor. In exceptional cases, tests may be conducted by a laboratory not having a Recognition Certificate, however this shall be subject to special consideration by the Register.

Containers tested in accordance with the provisions of ISO 1496 series standards are regarded as tested in compliance with the requirements of the CSC Convention.

1.3.6 With satisfactory results obtained in testing and surveying a prototype or an individual container, the Register issues to the applicant a Certificate of Container Safety Approval by Design Type.

1.3.7 The Certificate of Approval shall entitle the applicant to affix a Safety Approval Plate¹ (see 4.1) to every type-series and individual container, manufactured under the Register technical supervision to the approved design type.

1.3.8 The Register may approve for service containers manufactured as modifications of the approved design type, if satisfied that the modifications do not affect the results of tests made in the course of approval by design type.

1.4 TECHNICAL SUPERVISION DURING MANUFACTURE OF TYPE-SERIES CONTAINERS

At any stage during manufacture of type-series containers and equipment of the approved design type, the Register may examine or test such number of containers and equipment, as it deems necessary. The scope of technical supervision during manufacture of type-series containers and equipment, the extent of tests and their periodicity, unless otherwise provided in the present Rules, are specified in the Rules for Technical Supervision during Manufacture of Containers.

1.4.1 General.

1.4.1.1 The requirements of the present Chapter apply to the manufacturers of containers, materials and products therefor (hereinafter referred to as "the manufacturers") which manufacture containers or materials and products therefor in series under the Register technical supervision and are subject to the audit.

1.4.1.2 The audit of conformity of the manufacturer by the Register includes:

.1 review of the documents confirming compliance of the manufacturer with the Register requirements;

.2 survey of the manufacturer.

Note. The welders' certification shall be carried out prior to the commencement of the prototypes manufacture under the Register technical supervision.

1.4.1.3 The manufacturer shall inform the Register of the types and dimensions of the containers manufactured or planned to be manufactured thereat specifying the models (if any) approved by the Register, of the manufacturer's planned annual capacity, planned number of containers of each type and dimension to be manufactured, and shall also submit for review:

.1 documents or their copies confirming compliance with the requirements of 1.4.2.1, 1.4.2.2, 1.4.2.6, 1.4.2.7 and 1.4.2.8.3;

.2 list of the manufactured container types, materials and products therefor, particulars of tests which may be carried out at the manufacturer's;

.3 lists of personnel with information on its compliance with the requirements of 1.4.2.2;

.4 lists of equipment and facilities specified in 1.4.2.3 and 1.4.2.4.1, as well as of welding and testing equipment;

.5 lists of documents specified in 1.4.2.4.3 and 1.4.2.5.1;

.6 information on the quality assurance system implemented at the manufacturer's;

.7 information on availability of container manufacture procedure;

.8 welding procedures to be approved (requirements of Section 6, Part XIV "Welding" of the Rules for the Classification and Construction of Sea-Going Ships, as applicable to containers, shall be used for approval of welding procedures) or the copies of approved welding procedures, if any;

.9 program of welder's certification complying with the requirements of Appendix 3 to the Rules for Technical Supervision during Manufacture of Containers, if welders certified by the Register are missing;

.10 copies of certificates and licences issued previously to products or production (if any).

¹ Hereinafter called "the CSC Plate".

1.4.1.4 Survey of the manufacturer is carried out to confirm compliance of the manufacturer with the requirements of 1.4.2.

1.4.1.5 The Report on Survey of due form shall be drawn up resulting the survey of the manufacturer.

1.4.2 Requirements.

1.4.2.1 Legal status.

Legal status of the manufacturer shall comply with the current legislation.

The manufacturer shall have organizational structure and the Head.

1.4.2.2 Personnel.

Personnel of the manufacturer shall have the appropriate education, vocational and special training, qualification and experience required for the manufacture of containers, materials and products therefor.

Welders shall be certified by the Register. In manufacturing tank containers, the manufacturer shall have specialists in non-destructive testing.

The manufacturer is responsible for the qualification and vocational training of its personnel in compliance with national, international and branch standards; in case of absence of these standards — in compliance with the standards of the manufacturer. This requirement shall be specified in the manufacturer's documents.

1.4.2.3 Technique.

The manufacturer shall have the technique required for serial manufacture and tests of containers, materials and products therefor including stands for assembly and welding of units, appropriate equipment, spaces and areas for storage of materials, accessories and finished containers and equipment, as well as the necessary facilities for moving containers across the territory of the manufacturer.

The manufacturer shall provide maintenance of equipment and facilities in compliance with their operating and maintenance documentation.

Note. Tests may be carried out at third-party testing laboratories recognized by the Register.

1.4.2.4 Measurement assurance.

1.4.2.4.1 The manufacturer shall have and apply the necessary measurement assurance, namely:

.1 measuring equipment checked (calibrated) in accordance with the established procedure;

.2 testing equipment certified in accordance with the established procedure;

.3 references and type specimens;

.4 appropriate consumables (chemicals, substances, etc.).

1.4.2.4.2 The manufacturer shall provide the maintenance of measuring and testing equipment in compliance with their operating and maintenance documentation.

1.4.2.4.3 The manufacturer shall have and adhere to the procedures approved by the Register for:

.1 testing of containers and accessories with the required accuracy;

.2 handling of specimens.

1.4.2.5 Files of the manufacturer's documents.

1.4.2.5.1 The manufacturer shall have valid normative and technical documents necessary to manufacture containers, materials and products therefor, including:

.1 documents containing requirements for items of technical supervision, including the Register rules;

.2 technical documentation on containers and equipment approved by the Register;

.3 process documentation (procedure) on manufacture of containers, materials and products, checking and control;

.4 welding procedures approved by the Register.

1.4.2.5.2 The documentation shall be available for the manufacturer's personnel where necessary.

1.4.2.6 Reporting.

1.4.2.6.1 The form and content of reports shall be acceptable for the Register.

1.4.2.6.2 Reports on the manufacture of containers shall include:

.1 name and address of the manufacturer;

.2 identification of the report (e.g. report number);

.3 name and address of the customer;

.4 reference to the documents in compliance with which the container or equipment was manufactured;

.5 manufacturer's number of the container or equipment, or code and number of the container owner;

.6 date of launching the production;

.7 marks on passing operation checking with the signatures of responsible persons;

.8 sheets of containers measurement to the extent specified in the Register rules;

.9 entry that the manufacture was carried out under the Register technical supervision;

.10 full name, position and signature of the person who approved the report;

.11 number of every page and the total number of pages in the report.

1.4.2.6.3 The manufacturer shall keep records (databases) of the containers and/or equipment manufactured and delivered to customers.

1.4.2.6.4 The reports shall be stored at the manufacturer for not less than five years on a confidentiality basis. This requirement shall be specified in the manufacturer's documents.

1.4.2.7 Checking and control.

The manufacturer shall carry out checking and control of the compliance of materials and accessories with the approved documentation, as well as

control of the process of manufacture and testing of containers and equipment.

The manufacturer shall take measures on the elimination and prevention of non-conformities and claims against its activity in the area indicated in the request. This requirement shall be specified in the manufacturer's documents.

1.4.2.8 Subcontractors.

1.4.2.8.1 The subcontractors recruited by the manufacturer for activity in the area indicated in the request shall meet the requirements of the present Chapter.

1.4.2.8.2 The manufacturer shall provide the audit of subcontractors' activity in the area indicated in the request.

1.4.2.8.3 The manufacturer shall have agreements with subcontractors in the area indicated in the request.

1.5 RECOGNITION OF MANUFACTURERS AND TESTING LABORATORIES

1.5.1 Recognition of manufacturers.

1.5.1.1 General.

1.5.1.1.1 Recognition of the manufacturer means the Register confirmation of the manufacturer's capability to manufacture products (perform works) with sustained quality of adequate level.

1.5.1.1.2 The manufacturer shall meet the requirements of 1.4.2 and of the present Chapter.

1.5.1.1.3 Recognition of the manufacturer by the Register is confirmed by issuing the Recognition Certificate of due form.

Note. For the manufacturers newly entering the manufacture of containers, the Register Head Office determines for the manufacturer the batch size to be manufactured prior to the commencement of the recognition procedure.

1.5.1.2 Requirements.

1.5.1.2.1 Personnel.

1.5.1.2.1.1 The manufacturer shall have documents on the personnel containing the following information:

- .1** duty regulations;
- .2** personnel training and its terms of validity;
- .3** certification and terms of its performance.

1.5.1.2.1.2 The manufacturer shall have the regular staff of specialists.

1.5.1.2.1.3 The manufacturer shall have and adhere to the plans (schedules) for:

- .1** training and re-training of the personnel;
- .2** certification of the personnel with respect to certain activities.

1.5.1.2.2 Files of the manufacturer's documents.

1.5.1.2.2.1 The manufacturer shall have valid normative and technical documents necessary for

performance of activity in the area indicated in the request, including:

- .1** documents on records keeping and archives maintenance;
- .2** the description of the operation checking system of the manufacture of containers and/or equipment;
- .3** the description of the periodical monitoring system for production processes;
- .4** the recording system for claims and non-conformities and for implementing effective corrective actions.

1.5.2 Recognition of testing laboratories.

1.5.2.1 General.

1.5.2.1.1 The present requirements apply to testing laboratories conducting tests of containers and equipment thereof.

1.5.2.1.2 The testing laboratory shall meet the requirements of the present Chapter.

1.5.2.1.3 Recognition of the testing laboratory by the Register is confirmed by issuing the Recognition Certificate of Testing Laboratory. The validity period of the Certificate is not more than 5 years. The Certificate is subject to confirmation at least once every 2,5 years. Upon expiry of the validity period the Certificate is renewed on request of the testing laboratory.

1.5.2.1.4 The Recognition Certificate of Testing Laboratory is not issued to the manufacturers recognized by the Register and incorporating the testing laboratory.

1.5.2.1.5 In individual cases, at the discretion of the Register, tests may be conducted at the testing laboratories not recognized by the Register. In so doing, prior to the tests performance, the compliance of the testing laboratory with the requirements of 1.5.2.2.2.1, 1.5.2.2.3.1, 1.5.2.2.3.2, 1.5.2.2.5.1, 1.5.1.2.5.2, 1.5.2.2.6, 1.5.2.2.7 and 1.5.2.3 shall be verified.

1.5.2.1.6 Audit of conformity or recognition of the testing laboratory by the Register includes:

- .1** review of the documents confirming compliance of the testing laboratory with the Register requirements;
- .2** survey of the testing laboratory and participation in check tests.

1.5.2.1.7 The testing laboratory shall submit for review:

- .1** documents or their copies confirming fulfillment of the requirements of 1.5.2.2.1, 1.5.2.2.2, 1.5.2.2.5, 1.5.2.2.6 and 1.5.2.2.8.3;
- .2** list of types of tests performed;
- .3** lists of personnel containing information on compliance of the personnel with the requirements of 1.5.2.2.2.1;
- .4** lists of equipment and facilities specified in 1.5.2.2.3.1 and 1.5.2.2.3.2;

.5 lists of documents specified in 1.5.2.2.4.1 and 1.5.2.2.4.2.

1.5.2.1.8 Survey of testing laboratories and participation in check tests are carried out to confirm compliance of the testing laboratory with the requirements of 1.5.2.2.

1.5.2.2 Requirements.

1.5.2.2.1 Legal status.

The legal status of the testing laboratory shall comply with the current legislation.

The testing laboratory shall have organizational structure and the Head.

1.5.2.2.2 Personnel.

1.5.2.2.2.1 Personnel of the testing laboratory shall have the appropriate education, vocational and special training, qualification and experience required for performing activity in the area indicated in the request.

The testing laboratory is responsible for the qualification and vocational training of its personnel. The personnel of the testing laboratory shall have the work experience of at least 2 years.

1.5.2.2.2.2 The testing laboratory shall have documents on the personnel containing the following information:

- .1 functional duties;
- .2 education;
- .3 experience;
- .4 re-training and its terms of validity;
- .5 certification and terms of its performance.

1.5.2.2.2.3 The testing laboratory shall have the regular staff of specialists.

1.5.2.2.2.4 The testing laboratory shall have and adhere to the plans for:

- .1 training and re-training of the personnel;
- .2 refresher training of the personnel;
- .3 certification of the personnel with respect to carrying out certain tests.

1.5.2.2.3 Technique.

1.5.2.2.3.1 The technique of the testing laboratory shall comply with the test procedures used for carrying out the tests specified in the Register requirements for items of technical supervision.

1.5.2.2.3.2 Tests shall be carried out according to the appropriate test procedures considering also the environmental conditions corresponding to each type of tests in the area indicated in the request. Use shall be made of:

- .1 measuring equipment checked (calibrated) in accordance with the established procedure;
- .2 certified testing equipment;
- .3 ancillary equipment;
- .4 references and type specimens for maintenance and measurement assurance of measuring equipment;
- .5 appropriate consumables (chemicals, substances, etc.).

1.5.2.2.3.3 The testing laboratory shall have valid contracts for rented testing and measuring equipment.

1.5.2.2.3.4 The testing laboratory shall have the lists of:

- .1 measuring equipment including that for certification of testing equipment;
- .2 testing and ancillary equipment;
- .3 references and type specimens.

1.5.2.2.3.5 The testing laboratory shall have and adhere to the schedules for:

- .1 maintenance of measuring and testing equipment;
- .2 checking (calibration) of measuring equipment;
- .3 certification of testing equipment.

1.5.2.2.3.6 The maintenance of measuring and testing equipment shall be carried out in compliance with their operating and maintenance documentation.

1.5.2.2.4 Files of the testing laboratory documents.

The testing laboratory shall have valid normative and technical documents necessary to carry out tests in the area indicated in the request, including:

- .1 valid test procedures for testing items of technical supervision with the required accuracy;
- .2 documents containing requirements for testing items of technical supervision, including the Register rules;
- .3 technical documentation on items of technical supervision;
- .4 list of the activities performed (area of recognition);
- .5 Quality Manual or another similar document;
- .6 duty regulations;
- .7 operating and maintenance documentation on measuring and testing equipment;
- .8 documents on records keeping and archives maintenance.

The documentation shall be available for the testing laboratory personnel where necessary.

1.5.2.2.5 Reporting.

1.5.2.2.5.1 The form and content of reports on the activity indicated in the request shall be acceptable for the Register and shall include:

- .1 name and address of the testing laboratory;
- .2 identification of the test report (e.g. number);
- .3 name and address of the customer;
- .4 reference to the documents in compliance with which the tests were carried out;
- .5 reference to the Sampling Report, if applicable;
- .6 description (name) of the item the activity was aimed at;
- .7 location of test performance;
- .8 date of test performance;

- .9 particulars on conditions of test performance;
- .10 particulars on departures from the requirements of the documents in compliance with which the tests were performed;
- .11 full name, position and signature of the person who approved the report;
- .12 number of every page and the total number of pages in the report;
- .13 test results with indication of units of measurements in accordance with test procedures;
- .14 indication that the test results are valid only for the products tested;
- .15 entry that the tests were witnessed by the Register representative.

1.5.2.2.5.2 Sampling reports, where applicable, shall contain:

- .1 date of specimens selection (sampling);
- .2 information allowing unambiguous identification of specimens (samples) selected;
- .3 location of specimens selection (sampling);
- .4 information on conditions of specimens selection (sampling);
- .5 reference to the documents in compliance with which the specimens (samples) were selected.

1.5.2.2.5.3 Data (documents) confirming test performance (sampling reports, test reports, etc.), shall be kept at the testing laboratory for not less than five years on a confidentiality basis. This requirement shall be specified in the testing laboratory's documents.

1.5.2.2.6 Checking and control.

The testing laboratory shall conduct checking and control over the performance of tests and their results.

The personnel of the testing laboratory responsible for checking (control) shall have the work experience of at least two years as a performer in the area of activity indicated in the request.

The testing laboratory shall conduct check tests in compliance with the area of recognition indicated in the request witnessed by the Register representative.

1.5.2.2.7 Conditions of selection, transport and storage of specimens.

The conditions of selection, transport and storage of specimens shall meet the requirements of test procedures.

The testing laboratory shall identify the specimens.

1.5.2.2.8 Subcontractors.

1.5.2.2.8.1 The subcontractors recruited by the testing laboratory for activity in the area indicated in the request shall meet the requirements of the present Chapter.

1.5.2.2.8.2 The testing laboratory shall provide the audit of subcontractors' activity in the area indicated in the request.

1.5.2.2.8.3 The testing laboratory shall have agreements with subcontractors in the area indicated in the request.

1.5.2.3 Special requirements for testing laboratories engaged in dye penetrant examination, radiographic examination, ultrasonic examination, magnetic particle examination of welds quality and thickness measurements of tank materials.

1.5.2.3.1 Reporting.

1.5.2.3.1.1 The testing laboratory shall have and maintain test logs.

1.5.2.3.2.2 The Statement (Test Report), in addition to the specified in 1.5.2.2.5.1, and test logs shall contain:

- .1 reference to the Register rules or another normative document on agreement with the Register Head Office regarding the application of criteria for assessing the quality of welds at radiographic examination;
- .2 reference to normative documents regarding the application of criteria for assessing the quality of welds at ultrasonic examination, dye penetrant examination and magnetic particle examination;
- .3 thicknesses of components at ultrasonic examination and radiographic examination, and at thickness measurements;
- .4 description of defects in accordance with applicable national or international standards.

1.5.2.3.2.3 The designation of controlled lengths at duplicating radiographic examination shall correspond to the designation of controlled lengths at ultrasonic examination.

1.5.2.3.2 Files of the testing laboratory documents.

1.5.2.3.2.1 The testing laboratory shall have instructions on performing assessment of the welds quality and thickness measurements considering the Register requirements.

1.5.2.3.2.2 Recognition Certificates of Testing Laboratory are subject to endorsement at least once a year.

2 GENERAL TECHNICAL DATA

2.1 DIMENSIONS, RATINGS AND MASS

2.1.1 The dimensions, ratings and mass as well as the specific structural details of containers shall comply with the international standards or national standards recognized by the Register.

2.1.2 External dimensions and tolerances as well as the maximum gross mass R of ISO series 1 containers are shown in Table 2.1.2. The dimensions and tolerances cited correspond to the measurements obtained at a temperature of 20 °C. If the measurements are taken at another temperature an appropriate tolerance will be introduced.

2.1.3 Recognizing the continual demand for special containers for particular types of transport, containers may differ from ISO series 1 containers in dimensions and exceed the maximum gross masses specified in Table 2.1.2. Operation of such containers may require special arrangements and agreements.

2.1.4 Containers differing in design and dimensions from the requirements set out in this Section are subject to special consideration by the Register in each particular case.

ISO series 1 containers shall comply with valid ISO 1161 and GOST R 51891 standards. These parameters are given in Figs 2.2.1-1 to 2.2.1-6 and in Table 2.1.2.

Fittings other than those above are subject to special consideration by the Register.

2.2.2 Fittings shall be designed and manufactured considering the requirements of valid standards like ISO 1161, ISO series 1496 and GOST R 51891, so that they are capable to withstand loads arising during operation and testing of containers.

2.2.3 The upper faces of top corner fittings shall protrude above the top of the container by a minimum of 6 mm. By the top of the container the highest point of the container roof is meant with no allowance made for thickness of doubler plates of top rails and the roof.

2.2.4 Each fitting manufactured under the Register technical supervision shall have, as a minimum, the following marking: the manufacturer's mark, heat number, the Register abbreviation (RS) and abbreviation of the fitting position on the container. Marking shall be located so that it is clearly visible after assembly of the fitting on the container and will not be damaged during the container handling and securing.

2.2 FITTINGS

2.2.1 The dimensions, tolerances and positional relationship of corner and intermediate fittings for

Table 2.1.2

Designation	Height H , mm	Width W , mm	Length L , mm	Maximum gross mass R , kg	Distance between centres of apertures in fittings, mm			$k_{1\max}$, mm	$k_{2\max}$, mm
					S (corner fittings)	S_1 (intermediate fittings)	P		
1EEE	2896 ⁰ ₅	2438 ⁰ ₅	13716 ⁰ ₁₀	30480	13509 ^{±6,5}	11985,5 ^{±6,5}	2259 ^{±4}	19	10
1EE	2591 ⁰ ₅	2438 ⁰ ₅	13716 ⁰ ₁₀	30480	13509 ^{±6,5}	11985,5 ^{±6,5}	2259 ^{±4}	19	10
1AAA	2896 ⁰ ₅	2438 ⁰ ₅	12192 ⁰ ₁₀	30480	11985,5 ^{±6,5}	—	2259 ^{±4}	19	10
1AA	2591 ⁰ ₅	2438 ⁰ ₅	12192 ⁰ ₁₀	30480	11985,5 ^{±6,5}	—	2259 ^{±4}	19	10
1A	2438 ⁰ ₅	2438 ⁰ ₅	12192 ⁰ ₁₀	30480	11985,5 ^{±6,5}	—	2259 ^{±4}	19	10
1AX	<2438	2438 ⁰ ₅	12192 ⁰ ₁₀	30480	11985,5 ^{±6,5}	—	2259 ^{±4}	19	10
1BBB	2896 ⁰ ₅	2438 ⁰ ₅	9125 ⁰ ₁₀	30480	8918,5 ^{±6,5}	—	2259 ^{±4}	16	10
1BB	2591 ⁰ ₅	2438 ⁰ ₅	9125 ⁰ ₁₀	30480	8918,5 ^{±6,5}	—	2259 ^{±4}	16	10
1B	2438 ⁰ ₅	2438 ⁰ ₅	9125 ⁰ ₁₀	30480	8918,5 ^{±6,5}	—	2259 ^{±4}	16	10
1BX	<2438	2438 ⁰ ₅	9125 ⁰ ₁₀	30480	8918,5 ^{±6,5}	—	2259 ^{±4}	16	10
1CC	2591 ⁰ ₅	2438 ⁰ ₅	6058 ⁰ ₆	30480	5853,5 ^{±4,5}	—	2259 ^{±4}	13	10
1C	2438 ⁰ ₅	2438 ⁰ ₅	6058 ⁰ ₆	30480	5853,5 ^{±4,5}	—	2259 ^{±4}	13	10
1CX	<2438	2438 ⁰ ₅	6058 ⁰ ₆	30480	5853,5 ^{±4,5}	—	2259 ^{±4}	13	10
1D	2438 ⁰ ₅	2438 ⁰ ₅	2991 ⁰ ₅	10160	2787 ^{±4}	—	2259 ^{±4}	10	10
1DX	<2438	2438 ⁰ ₅	2991 ⁰ ₅	10160	2787 ^{±4}	—	2259 ^{±4}	10	10

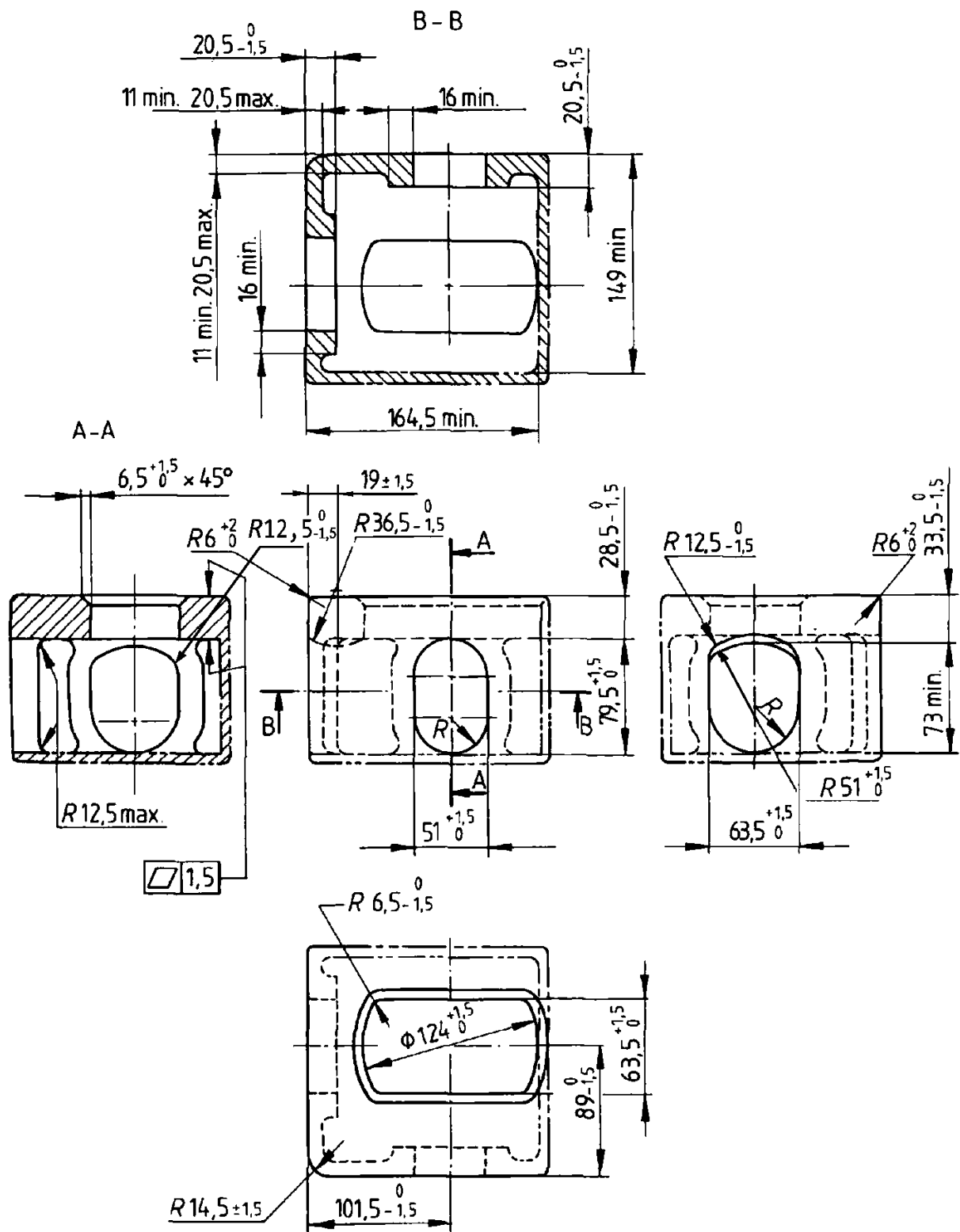


Fig. 2.2.1-1 Top corner fitting, mm:

—, — — — surfaces and contours which shall be physically duplicated in the fitting; - · - · - optional walls which may be used to develop a box-shaped fitting. The outer and inner edge radii, where sharp corners are shown, shall not exceed 3 mm except as noted in the figure

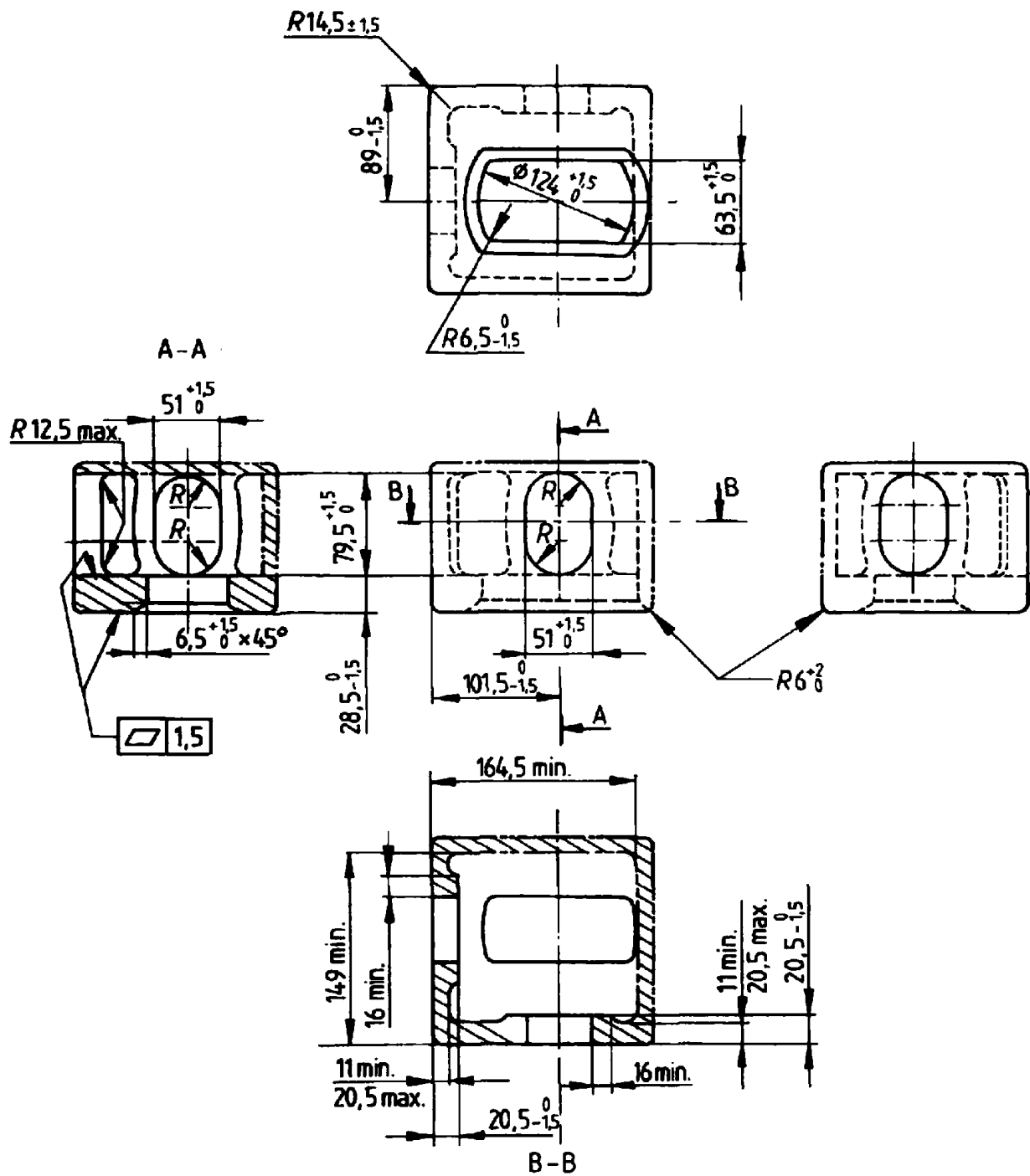


Fig. 2.2.1-2 Bottom corner fitting, mm:

—, — — — — surfaces and contours which shall be physically duplicated in the fitting; optional walls which may be used to develop a box-shaped fitting. The outer and inner edge radii, where sharp corners are shown, shall not exceed 3 mm except as noted in the figure

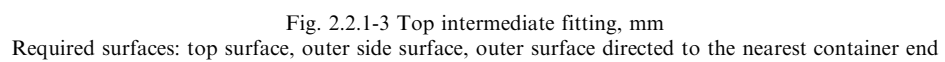


Fig. 2.2.1-3 Top intermediate fitting, mm

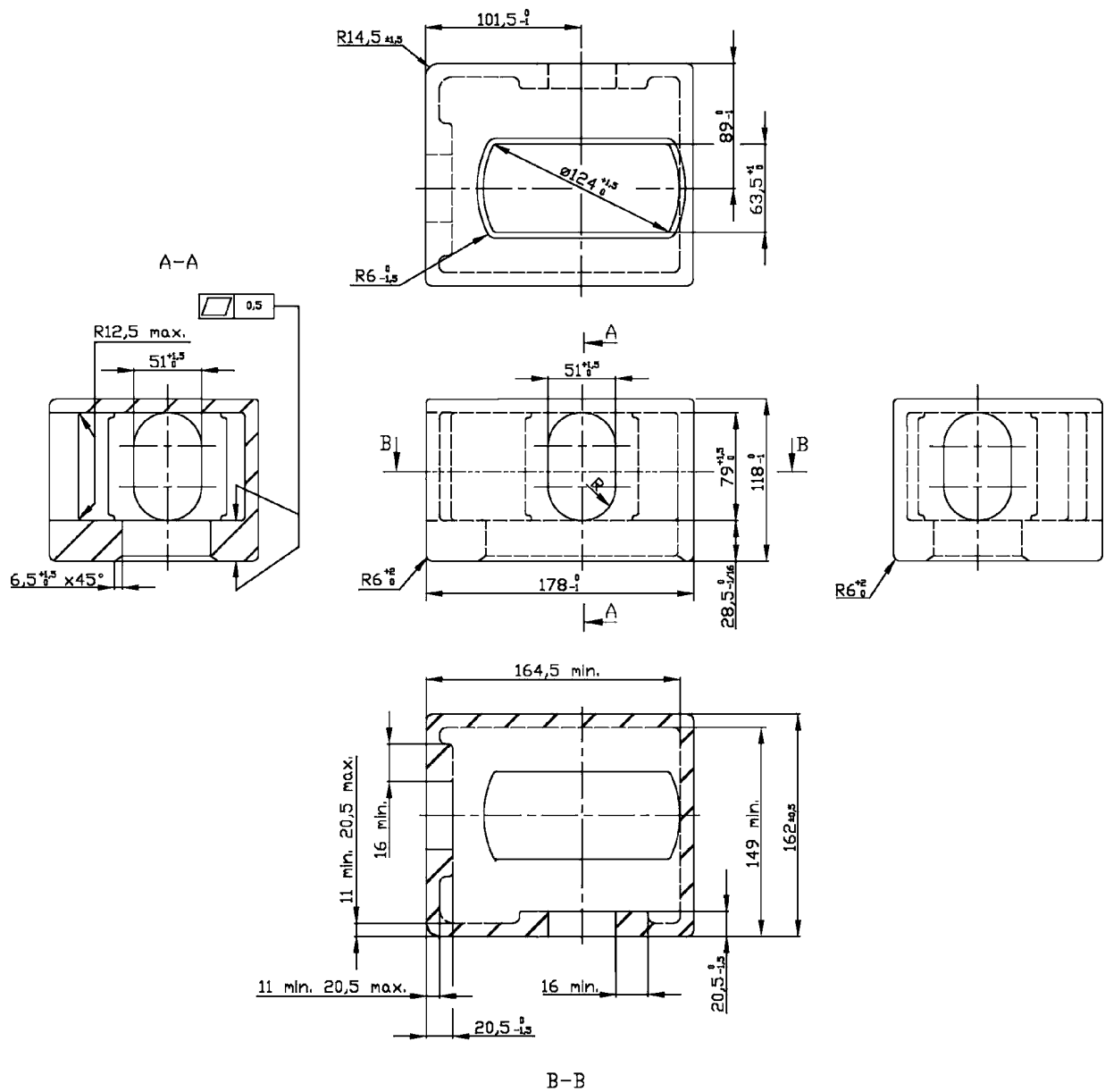


Fig. 2.2.1-4 Bottom intermediate fitting, mm

Required surfaces: bottom surface, outer side surface, outer surface directed to the nearest container end

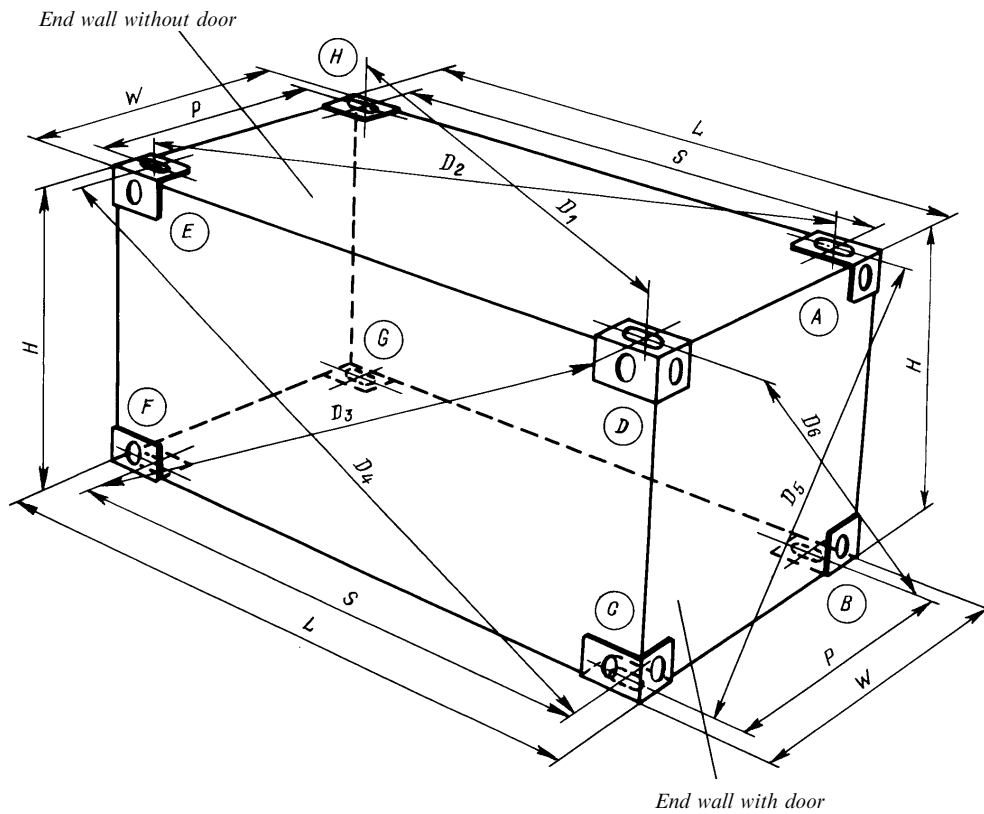


Fig. 2.2.1-5 Assembled corner fittings position:

L — external length of the container; W — external width of the container; H — overall height; S — length between centres of apertures in corner fittings; P — width between centres of apertures in corner fittings; D — distance between centres of apertures (or projected reference points therefrom) of diagonally opposite corner fittings resulting in six measurements:

$D_1, D_2, D_3, D_4, D_5, D_6, K_1$ — difference between D_1 and D_2 or between D_3 and D_4 (i.e. $K_1 = D_1 - D_2$ or $K = D_8 - D_9$);

K_2 — difference between D_5 and D_6 (i.e. $K_2 = D_5 - D_6$).

Letters shown in circles serve for reference when dealing with documentation

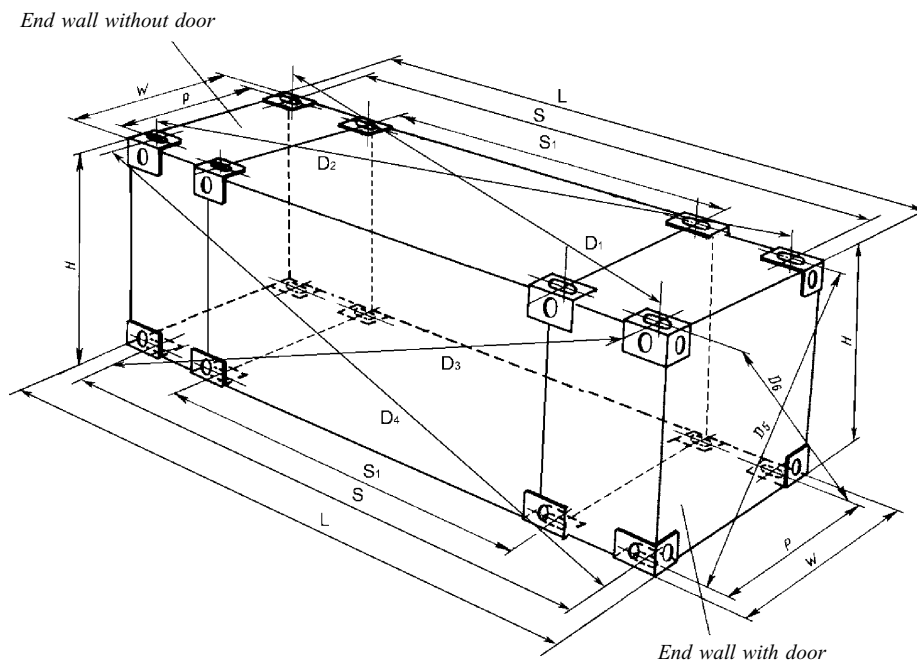


Fig. 2.2.1-6 Positional relationship of 1EEE and 1EE container fittings.

See symbols in Fig. 2.2.1-5. S_1 = length between centres of apertures in intermediate fittings

2.3 BASE STRUCTURE

2.3.1 Under conditions of dynamic and static tests with the container having a uniformly distributed internal load such that the combined mass of container and test load is equal to $1,8 R$, no part of its base shall deflect by more than 6 mm below the base plane (bottom faces of bottom corner fittings). Under conditions of static loads with the container having a uniformly distributed internal load P , no part of its base shall protrude beyond the plane formed by bottom faces of bottom corner fittings.

2.3.2 Containers 1EEE, 1EE, 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C and 1CX shall have load transfer areas in their base structure to permit vertical load transfer when carried on chassis.

2.3.2.1 The distances between lower faces of load transfer areas and the base plane (bottom faces of the bottom corner fittings) shall be $12,5^{+5}_{-1,5}$ mm.

2.3.2.2 Apart from bottom fittings and bottom side rails, no part of the container shall project below the level of load transfer areas. However, doubler plates may be provided in the vicinity of bottom corner fittings to afford protection to the under-structure.

Such plates shall not extend for more than 550 mm from the outer end for more than 470 mm from the side faces of bottom fittings, and their lower faces shall be at least 5 mm above lower faces of bottom fittings of the container.

2.3.2.3 Load transfer areas of the cross-member with chassis shall cover zones of not less than 375 mm in width, not less than 25 mm in length and be located as shown in Fig. 2.3.2.3.

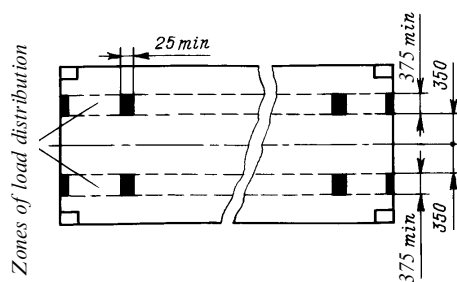


Fig. 2.3.2.3 Zones of load distribution, mm

2.3.2.4 Maximum load on the zones shall not exceed $2R$.

2.3.2.5 The load transfer areas shall be so arranged as to provide sufficient contact with chassis at:

1 bottom end rails and cross-members spaced 1000 mm and less apart, at least, as shown in Figs 2.3.2.5.1-1 to 2.3.2.5.1-4;

2 bottom end rails and cross-members, as well as gooseneck tunnel, at least, as shown in Figs. 2.3.2.5.2-1 to 2.3.2.5.2-4.

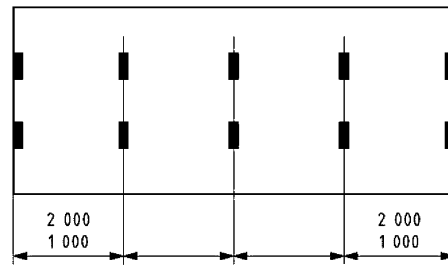


Fig. 2.3.2.5.1-1 Load transfer areas of 1CC, 1C and 1CX containers with 5 pairs of load transfer areas

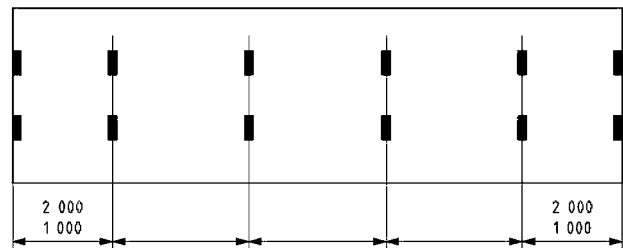


Fig. 2.3.2.5.1-2 Load transfer areas of 1BBB, 1BB, 1B and 1BX containers with 6 pairs of load transfer areas

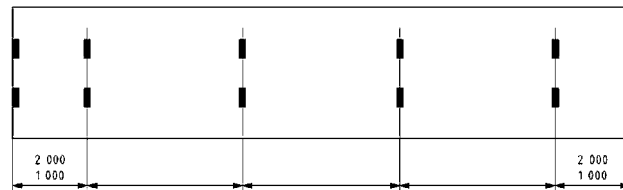


Fig. 2.3.2.5.1-3 Load transfer areas of 1EE, 1AA, 1A and 1AX containers without gooseneck tunnel with 6 pairs of load transfer areas

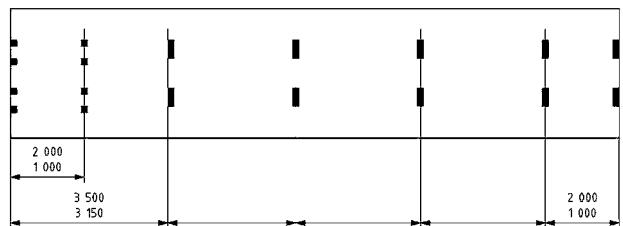


Fig. 2.3.2.5.1-4 Load transfer areas of 1EEE, 1EE, 1AAA, 1AA, 1A and 1AX containers with 7 pairs of load transfer areas

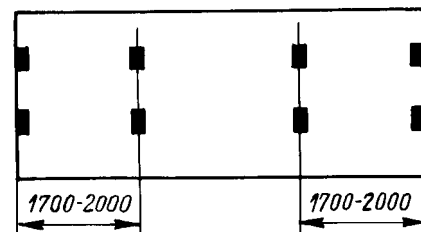


Fig. 2.3.2.5.2-1 Load transfer areas (in 1CC, 1C and 1CX containers)

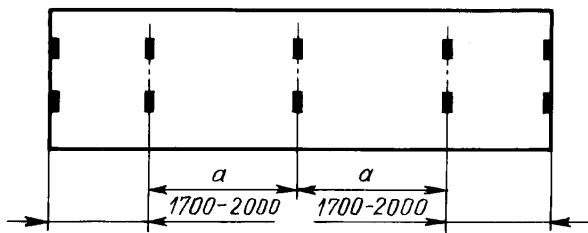


Fig. 2.3.2.5.2-2 Load transfer areas
(in 1BBB, 1BB, 1B and 1BX containers)

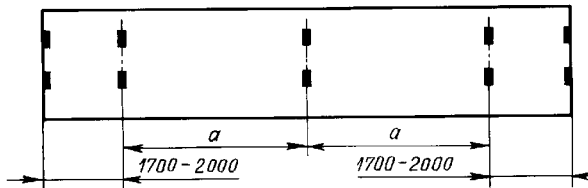


Fig. 2.3.2.5.2-3 Load transfer areas
(in 1EE, 1AA, 1A and 1AX containers without
gooseneck tunnel)

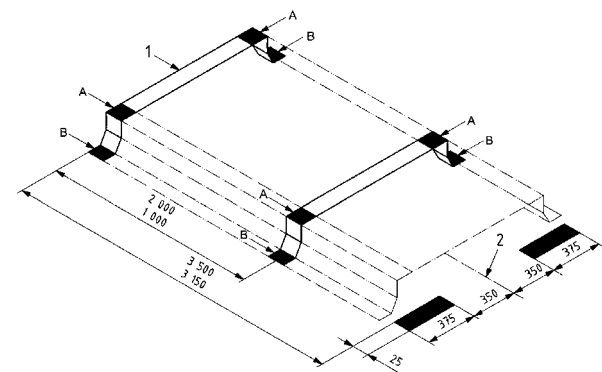
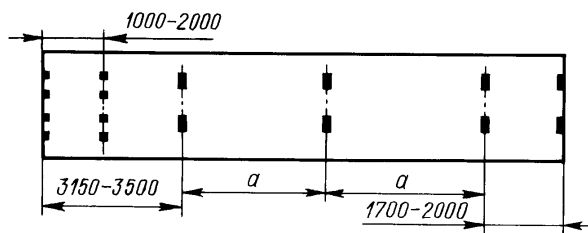


Fig. 2.3.2.5.2-4 Load transfer areas (1EEE, 1EE, 1AAA, 1AA, 1A and 1AX containers with gooseneck tunnel):
1 — front of container; 2 — central axis of symmetry of container

Note. Each load transfer area at the tunnel has 2 components: an upper component A and a lower component B. This paired set, A and B, shall be taken as one load transfer area and the sum of the two components, $A + B$, being equal to or greater than 1250 mm^2 . Where continuous tunnel side members are provided, load transfer areas between 3150 and 3500 mm (between 3150 and 4000 mm for 1EEE and 1EE containers) from the end of the container may be omitted.

2.3.3 All containers shall be so constructed that they can rest only on the bottom corner fittings.

2.3.4 1EEE, 1EE, 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C and 1CX containers shall be, moreover, so constructed that they can rest only on the load transfer area in their base structure when carried on chassis.

2.3.5 1EEE and 1EE containers shall have recesses in the longitudinals of the base structure directed from intermediate fittings towards corner fittings. These recesses shall extend vertically for not less than 117 mm above the plane of bottom faces of intermediate fittings, shall extend longitudinally for not less than 254 mm from the centre of the bottom aperture in intermediate fittings directed towards corner fittings, and shall extend laterally for not less than 154 mm inboard from the external side face of the intermediate fitting (see Fig. 2.3.5).

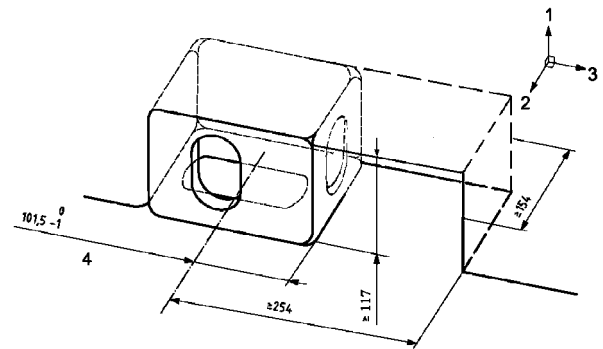


Fig. 2.3.5:

1 — top; 2 — outboard; 3 — end of container and corner fitting;
4 — axis of symmetry of the intermediate fitting bottom aperture

2.4 END STRUCTURE

2.4.1 For 1EEE, 1EE, 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C and 1CX containers sideways deflection of the top with respect to the bottom of container while under full transverse racking test condition shall not cause the sum of the changes in length of diagonals D_5 and D_6 (see Fig. 2.2.1-3), to exceed 60 mm.

2.5 SIDE STRUCTURE

2.5.1 For 1EEE, 1EE, 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C and 1CX containers the longitudinal deflection of the top with respect to the bottom of container while under full longitudinal racking test condition shall not exceed 25 mm.

2.6 OPTIONAL STRUCTURES

2.6.1 Fork lift pockets.

2.6.1.1 Fork lift pockets may be provided for 1CC, 1C, 1CX, 1D and 1DX containers; no pockets shall be provided for tank containers.

Position and dimensions of pockets are shown in Fig. 2.6.1.1.

2.6.1.2 The fork pockets shall be cut in the bottom side rails from either side. The length of pocket is to be equal to the width of container.

2.6.2 Provision for handling by means of grapple arms or similar devices.

Areas for handling the containers by means of grapple arms or similar devices may be provided for all containers.

Position and dimensions of lifting areas for grapple arms are shown in Fig. 2.6.2.

2.6.3 Gooseneck tunnel.

Gooseneck tunnel may be provided only for 1EEE, 1EE, 1AAA, 1AA, 1AX, 1BBB, 1BB and 1BX containers. For 1AAA containers gooseneck tunnel is mandatory.

Position and dimensions of the tunnel are shown in Fig. 2.6.3.

The provision of tunnel shall not preclude fulfilment of requirements specified for the base structure under 2.3.

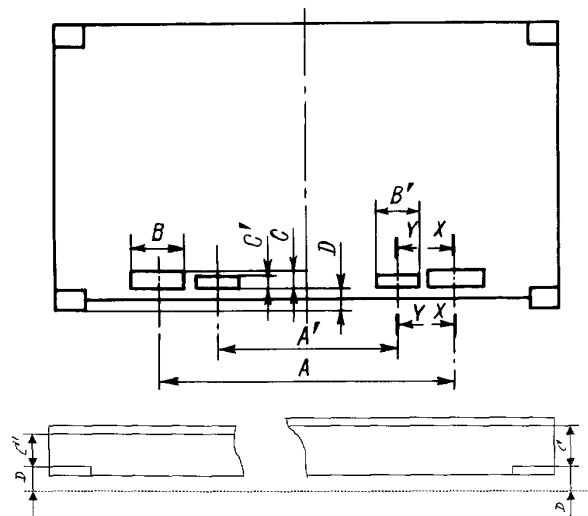
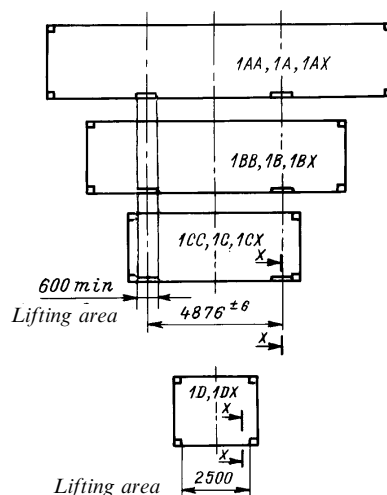


Fig. 2.6.1.1 Position and dimensions of fork lift pockets

Designation of container	Dimensions and tolerances, mm						
	Pockets for loaded and empty container				Pockets for empty container only		
	A	B	C	D	A'	B'	C'
1CC, 1C, 1CX, 1D, 1DX	2050 ± 50	355 min.	115 min.	20 min.	900 ± 50	305 min.	102 min.
	900 ± 50	305 min.	102 min.	20 min.			



7. *) This part of the wall, inclusive of rivets and bolts, must not protrude beyond the inner face of the lip by more than $12 -0/2$ mm.

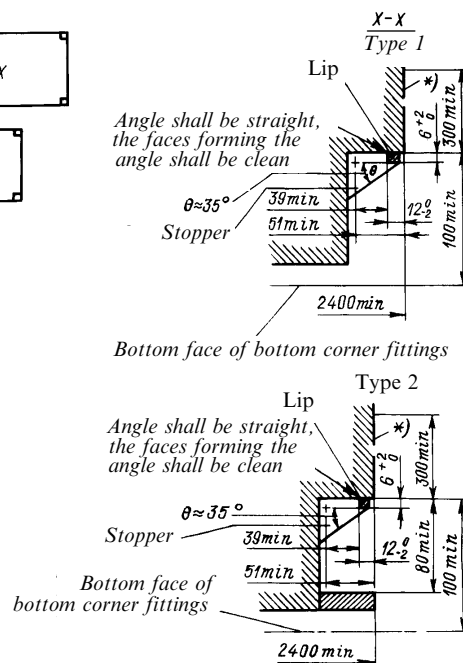


Fig. 2.6.2 Position of grapple arm lifting areas, dimensions (in mm) and design of grapple arm platforms

3 MATERIALS AND WELDING

3.1 GENERAL

3.1.1 The materials used for the manufacture of containers shall satisfy requirements of the present Rules, national standards and international rules agreed with, and recognized by the Register, normative-methodical instructions of the Register, as well as the requirements of technical documentation approved by the Register.

3.1.2 Depending on the design type and operating conditions of the container requirements for materials set forth in the relevant parts of the Rules for the Classification and Construction of Sea-Going Ships (Part X "Boilers, Heat Exchangers and Pressure Vessels", Part XIII "Materials" and Part XIV "Welding") and the Rules for the Classification and Construction of Gas Carriers (Part IX "Materials and Welding") may be also applicable to a reasonable extent.

3.1.3 The materials used shall have assured properties (strength, toughness, weldability, resistance to corrosion failures etc.) to ensure failure-free performance of the structure under service conditions specified in the technical documentation approved by the Register.

3.1.4 When selecting composition of a material for the bearing structures of the container (framework, tank) it is necessary to take into account the range of working temperatures (ambient temperatures) likely to be encountered on the operational routes, which run across the areas with the most unfavourable conditions. In any case resistance of the material to brittle and corrosion failures within the temperature range from -40 to $+50$ °C shall be assured.

Other ranges of the operating temperatures, depending on the climatic version of construction specified in the design, may be adopted subject to agreement with the Register and the customer.

3.1.5 In the course of operation the container owner is responsible for the use of container in the specified climatic zone.

3.1.6 Where stated in the appropriate parts of the present Rules, materials used for manufacture of containers shall be manufactured under the Register technical supervision.

3.1.7 Special requirements specifying mechanical characteristics and selection of the material depending on operating conditions, design type of the container and kind of the cargo carried are set forth in the appropriate parts of the present Rules, Rules for the Classification and Construction of Sea-Going

Ships, Rules for the Classification and Construction of Gas Carriers, Regulations for the Transportation of Dangerous Goods by Sea.

3.1.8 Materials used in manufacture of containers shall not affect adversely each other and shall be adequately insulated, if necessary.

3.2 MATERIALS FOR FRAMEWORK ELEMENTS

3.2.1 The corner fittings may be manufactured by casting or other technique approved by the Register.

3.2.2 The corner fittings shall be manufactured at firms recognized by the Register. Recognition is received on the basis of the results of survey and testing of the corner fittings under program agreed with the Register.

3.2.3 Requirements to the procedure for survey of the manufacturers of fittings, test extent in the course of technical supervision during series production, as well as for approval of manufacture techniques other than casting and material compositions other than those indicated below, are set forth in the appropriate section of the Rules for Technical Supervision during Manufacture of Containers.

3.2.4 The material of the corner fittings manufactured by casting shall meet the following requirements:

.1 chemical composition of steel shall comply with the requirements of Table 3.2.4.1.

.2 mechanical properties of the castings after heat treatment according to procedures given in the documentation approved by the Register shall comply with the requirements of Table 3.2.4.2. Test specimens may be taken either from the cast corner fitting or from a separately cast sample.

3.2.5 To manufacture framework bearing structures (rails, cross-members, including base, posts, tank container vessel supports), use shall be made of carbon steel, carbon-manganese steel, silicon-manganese steel and low-alloy steel complying with the requirements of Table 3.2.7.

3.2.6 Chemical composition of material, heat treatment, weldability shall comply with the requirements of national and international standards agreed with or recognized by the Register, as well as with operating conditions specified during designing of the container.

3.2.7 Depending on the yield stress values strength grades of steel are determined in accordance with Table 3.2.7.

Table 3.2.4.1

Chemical composition (from the results of ladle analysis)

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

Notes:

1. Castings shall be manufactured in electric furnaces or by oxygen-converter or other process subject to agreement with the Register, and steel shall be killed.
2. The carbon equivalent calculated by the formula: $C_{eq} = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$ shall not exceed 0,45 %.
3. Aluminium may be partially or totally replaced by other grain refining elements according to approved specification.

Table 3.2.4.2

Mechanical properties

Yield stress R_{eH} , N/mm ² , min	Tensile strength R_m , N/mm ²	Elongation A_5 , %, min	Reduction of area Z , %, min	Impact energy KV^1 , J, min at temperature, °C, min of	
				-20	-40 ²
220	430-600	25	40	27	21

¹ Average value obtained at testing three sharp-notch specimens in accordance with 2.2.3, Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships. The value of impact energy determined on one test specimen may be less than that given in the Table but in any case it shall not be less than 70 per cent of the tabulated value.

² Test at lower temperature may be carried out at the request of the customer with due regard for the climatic design version of the product.

V-notch, to be cut transverse to the final direction of rolling of the material used. If the thicknesses of the material under test are less than 10 mm, the following average values of impact energy are taken:

for specimens measuring $10 \times 7,5$ mm —
 $E_{7,5} = 5E/6$;

for specimens measuring $10 \times 5,0$ mm —
 $E_{5,0} = 2E/3$,

where E is the average value of impact energy obtained on standard specimens measuring 10×10 mm.

Note. Specimens (types 11, 12, 13) and impact testing method shall comply with GOST 9454-78.

3.2.9 Use of other materials for manufacture of container frame bearing structure and testing scope thereof are subject to special consideration by the Register in each particular case.

Table 3.2.7

Strength grade	Yield stress R_{eH} , N/mm ² , min.	Tensile strength R_m , N/mm ² , min.	Elongation, A_5 , %, min.	Impact energy for longitudinal specimens, KV (at minimum working temperature on V-notched specimens), J, min.	Impact energy for transverse specimens, KV (at minimum working temperature on V-notched specimens), J, min.
265	265	430	22	27	20
295	295	430	22	29	21
315	315	450	22	31	22
345	345	490	21	33	23
355	355	490	21	34	24
390	390	510	20	39	26

Note. Impact tests of material of 6 mm in thickness and less is not required.

3.2.8 When selecting material for the framework elements consideration shall be given to the requirements set out in 3.1.4, to provide an assured impact energy value at the working temperature, which shall not be lower than the average value of specified in Table 3.2.7 for each strength grade obtained at testing three standard specimens measuring 10×10 mm, with sharp

3.3 MATERIALS FOR TANK CONTAINER VESSELS

3.3.1 Materials used in the manufacture of tank container vessels, piping, manholes and their covers, flanges, fittings, safety devices along with the materials used for their attachment, shall withstand the temperatures, the pressure produced by the goods carried and their vapours under the operating conditions, and be immune to attack by the goods transported and their vapours, with regard to the corrosion allowances (if applicable), or shall be passivated or neutralized by chemical reaction, or lined with corrosion-resistant material.

3.3.2 Depending on the type of tank container, kind of cargo carried and operating conditions, use may be made of carbon-manganese microalloy steel, alloy steel, acid-resistant steel, austenitic steel, aluminium alloys.

3.3.3 Chemical composition of the materials and their mechanical properties shall meet the requirements of national standards and international rules agreed with and recognized by the Register. Steel shall be approved by the Register for appropriate operating conditions and working temperature.

3.3.4 The minimum value of impact energy obtained at testing V-notched specimens at the minimum operating temperature shall not be less than 27 J for transverse specimens and 41 J for longitudinal specimens. If the thickness of material is less than 5 mm the said tests are not required.

Test specimens for impact tests are taken within 2 mm from the rolled metal surface, and for material of 40 mm thick and over — from $\frac{1}{4}$ of the rolled metal thickness (test specimen axis shall be in the plane located at $\frac{1}{4}$ of the thickness and parallel to the rolled metal surface).

Note. The dimensions of test specimens and the impact test procedure shall comply with 3.2.8.

3.3.5 Materials used for manufacture of tank containers intended for carriage of liquefied gas shall in addition comply with the requirements of Tables 2-2 and 2-3 of Part IX "Materials and Welding" of the Rules for the Classification and Construction of Gas Carriers depending on design temperatures. Requirements for materials for design temperatures below -165°C are subject to special consideration by the Register in each particular case.

3.3.6 Steels used for the manufacture of tank container vessels intended for the transportation of dangerous goods, as well as welded-in flanges, manholes and their covers, shall have a yield strength/tensile strength ratio of not more than 0,85.

3.4 WOOD

3.4.1 Sawn timber shall be of sufficient strength, with no sap, cracks and loose knots, and with moisture content not over 18 per cent.

3.4.2 Plywood shall be manufactured of durable timber, with layers of veneer glued together by efficient waterproof adhesives resistant to ageing affects so that laminations will not occur if wetted.

3.4.3 The preserving means used for treatments and impregnation of timber shall have no adverse effect on the cargoes carried in containers.

3.5 PLASTICS

3.5.1 The plastics used for the construction of containers shall be specially considered by the Register in each particular case.

3.6 SEALING MATERIALS

3.6.1 Rubber and other sealing materials used for the sealing of doors shall be elastic, durable and

stable to mechanical wear under changes of ambient temperature encountered in service conditions of a container, and shall be also resistant to deteriorative action of sea water.

3.7 WELDING

3.7.1 The welding consumables used for construction of containers shall be approved by the Register and meet the requirements of standards agreed with or recognized by the Register.

3.7.2 The technological procedures of welding used during manufacture of container elements shall be approved by the Register, based on the tests performed at the works manufacturing the containers under a program approved by the Register on completion of which Welding Procedure Approval Test Certificates of due form are issued.

For welded joints, the tensile properties obtained by tensile tests shall not be inferior to the base metal properties, and the minimum impact energy value obtained at impact tests on specimens with the notch in the joint or area near the joint, shall comply with the requirements of 3.2.8 and 3.3.5.

Note. Approval of welding procedures is subject to the requirements of Section 6, Part XIV "Welding" of the Rules for the Classification and Construction of Sea-Going Ships insofar as they apply to containers.

3.7.3 Welding operations at the works manufacturing the containers shall be performed by certified welders having Welder Approval Test Certificate of due form.

3.7.4 For welding of bearing structures of the framework and for welding of tank, use shall be made of welding consumables with controllable diffusible hydrogen content according to Part XIV "Welding" of the Rules for the Classification and Construction of Sea-Going Ships.

3.7.5 Welded joints of the vessel shell with manholes, branches and heads shall be made with full penetration.

3.7.6 Inspection of welded joints of the containers, including vessels of the tank containers, shall meet the requirements of Part XIV "Welding" of the Rules for the Classification and Construction of Sea-Going Ships, the national standards agreed with and recognized by the Register, as well as the technical documentation approved by the Register.

3.7.7 During construction of the tank containers intended for the carriage of liquified gas consideration must be in addition given to the requirements for welding and non-destructive testing of welded joints, set forth in Part IX "Materials and Welding" of the Rules for the Classification and Construction of Gas Carriers.

4 MARKING

4.1 THE CSC PLATE

4.1.1 The CSC Plate shall be permanently affixed to every container of the approved design type-series or to a container approved individually.

4.1.2 The CSC Plate shall bear the following particulars in the English language (Fig. 4.1.2):

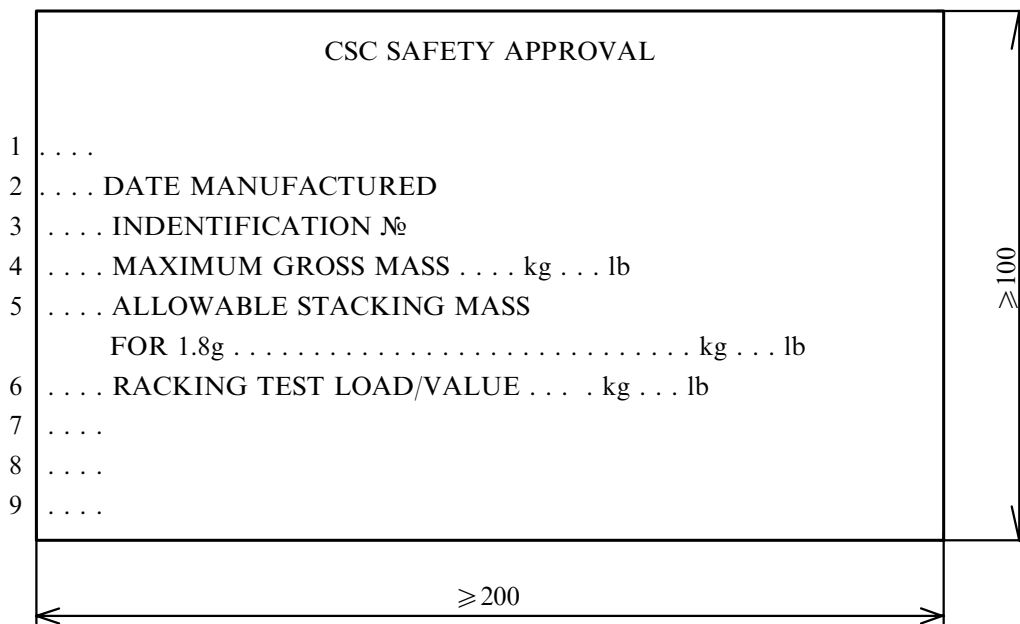


Fig. 4.1.2 The CSC Plate

- Notes: 1. Number of Certificate of Approval issued by the Register.
 2. The date of manufacture is the month and year of manufacture.
 3. The identification number is the number assigned to the container by the manufacturer.
 4. Maximum operating gross mass is the maximum allowable gross mass *R*.
 5. Allowable stacking mass for 1,8g.
 6. Racking test load — transverse racking test load.
 7. End wall strength is indicated on the plate if the end walls are designed to withstand a load of less or greater than 0,4*P*.
 8. Side wall strength is indicated on the plate if the side walls are designed to withstand a load of less or greater than 0,6*P*.
 9. The dates of examinations are the first after manufacture maintenance examination date (month and year), as well as the dates (month and year) of subsequent maintenance examinations. The interval between the date of manufacture and the date of the first maintenance examination shall not exceed 5 years.
 10. The fourth, fifth and sixth items of the CSC Plate may be replaced by the following:
 "MAXIMUM OPERATING GROSS MASS . . . kg . . . lb
 ALLOWABLE STACKING LOAD FOR 1,8g . . . kg . . . lb
 TRANSVERSE RACKING TEST FORCE . . . newtons".
 11. "MASS" may be replaced by "WEIGHT".
 12. Permissible mass(es) for various stacking modes at 1,8g the container is designed for, is(are) additionally indicated for 1EEE and 1EE containers.

A blank space shall be reserved on the plate for indication of survey date and stamping.

4.1.3 The CSC Plate shall be a plate of rectangular shape measuring at least 200 by 100 mm.

The height of letters for the title (see Fig. 4.1.2) of the plate shall be at least 8 mm. The height of all other letters and figures shall be not less than 5 mm.

The title and particulars of the CSC Plate shall be stamped into, embossed on, or indicated on its surface in any other permanent and legible way.

Any letters and figures placed on the plate to those already available, shall be of a minimum height 5 mm, stamped into, embossed on, or indicated in any other permanent and legible way.

4.1.4 The CSC Plate shall be made of durable, non-corrosive and fire-proof material providing legible impression of the Register brand and survey date.

4.1.5 The CSC Plate shall be permanently affixed to the container at a readily visible place where it would not be easily damaged.

4.1.6 Consolidated Data Plate (see Fig. 4.1.6) bearing, as a minimum, particulars in accordance with 4.1.2 of this Section, 4.2.1 of Part IV "Tank Containers" and 3.1.2 of the Rules for the Approval of Containers for the Transport of Goods Under Customs Seal, as well as particulars in accordance with other international and national requirements may be used instead of several individual plates.

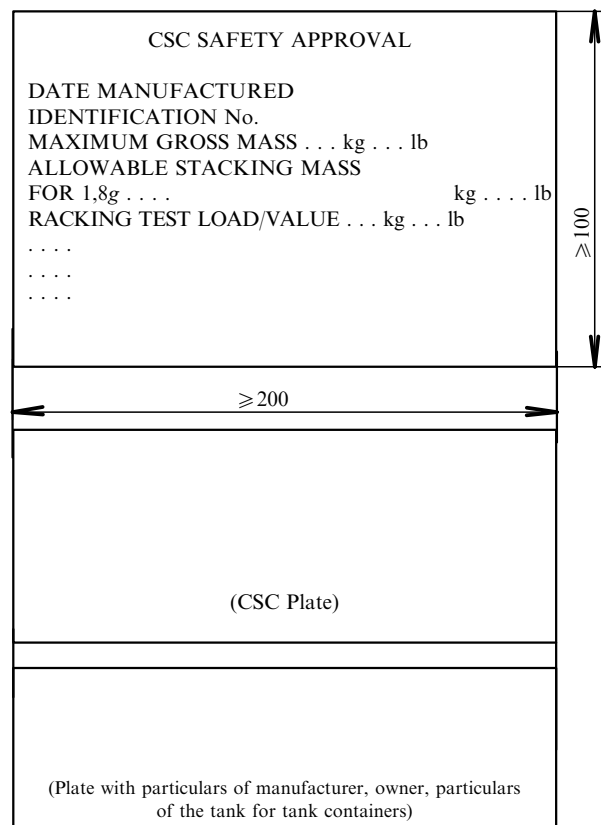


Fig. 4.1.6 Consolidated Data Plate

4.2 MANDATORY MARKING

4.2.1 In addition to the CSC Plate the container, manufactured in accordance with the documentation approved by the Register and under the Register technical supervision, shall bear the Register emblem:

- 1** the code of container type and size;
- 2** the warning symbol of the risk of electric shock (for the containers fitted with ladders);
- 3** the code of the owner, the number, given by the owner and reference number;
- 4** gross mass and tare mass of the container. The gross mass shall correspond to that indicated on the CSC Plate and the tare mass — to the actual mass obtained by weighing of the prototype container, unless otherwise stated in the present Rules;
- 5** symbols of the container height and alternate black and yellow stripes in the area of top corner fittings (for the containers over 2,6 m in height);
- 6** marking containing the "ACEP" index and the program registration number if the container is operated under the Approved Continuous Examination Program;
- 7** manufacturer's serial number in the right bottom back corner fitting.

4.2.2 The inscriptions indicated in 4.2.1 shall be painted or applied by means of material with a glue film in a colour well contrasting with the painting of container. The letters and figures shall be not less than 100 mm in height and not less than 10 mm in width, except that the gross mass and tare mass shall have the figures of not less than 50 mm in height.

The location of inscriptions and signs as well as the size of signs shall comply with the requirements of ISO 6346 and GOST R 52524 standards.

4.2.3 If a container is fitted with special arrangements intended for use solely when the container is empty (e.g. fork lift pockets used for lifting and transporting an empty container) or if the container is designed for the lesser stacking loads than those specified in Section 3, Part II "General Cargo Containers", or if special methods of handling are required for the container, then relevant inscriptions and signs notifying of these restrictions shall be marked.

The inscriptions shall be made in the English language; inscriptions in other languages are also permitted.

4.2.4 For special-purpose containers requirements for the additional marking are, moreover, set forth in the relevant parts of the present Rules.

PART II. GENERAL CARGO CONTAINERS

1 GENERAL

1.1 APPLICATION

1.1.1 The requirements of the present Part apply to containers for general cargo.

1.1.2 The general cargo containers shall comply with the requirements of Part I "Basic Requirements" and the requirements of the present Part.

1.1.3 The general cargo containers differing in design and dimensions from requirements set out in Section 2, including swap bodies, are subject to special consideration by the Register in each particular case.

1.1.4 Technical requirements for platform containers are set forth in the appropriate part of the Rules.

1.2 DEFINITIONS AND EXPLANATIONS

1.2.1 The definitions and explanations relating to the general terminology of the present Rules are given in Part I "Basic Requirements".

The definitions of container types are given in GOST R 52202 and ISO 830 standards.

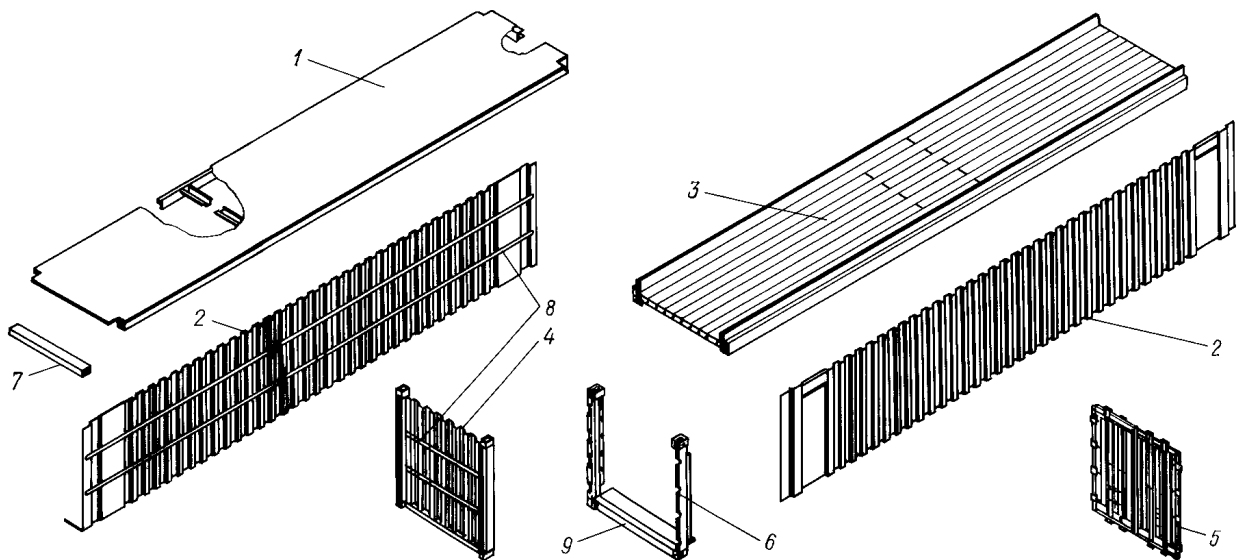


Fig. 1.2.1-1 Structural elements of general cargo containers:

1 — roof; 2 — side wall; 3 — base; 4 — front wall; 5 — door; 6 — rear corner post; 7 — rear top rail;
8 — cargo securing arrangements; 9 — rear bottom rail

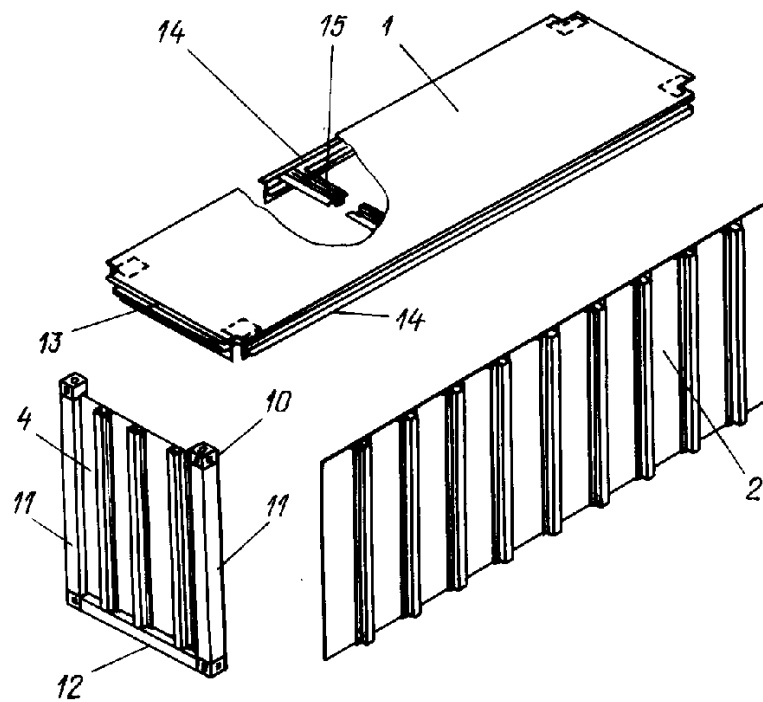


Fig. 1.2.1-2 Structural elements of general cargo containers:
 1,2,4 — see Fig. 1.2.1-1; 10 — corner fitting; 11 — front corner post; 12 — front bottom rail;
 13 — front top rail; 14 — top side rail; 15 — roof cross member

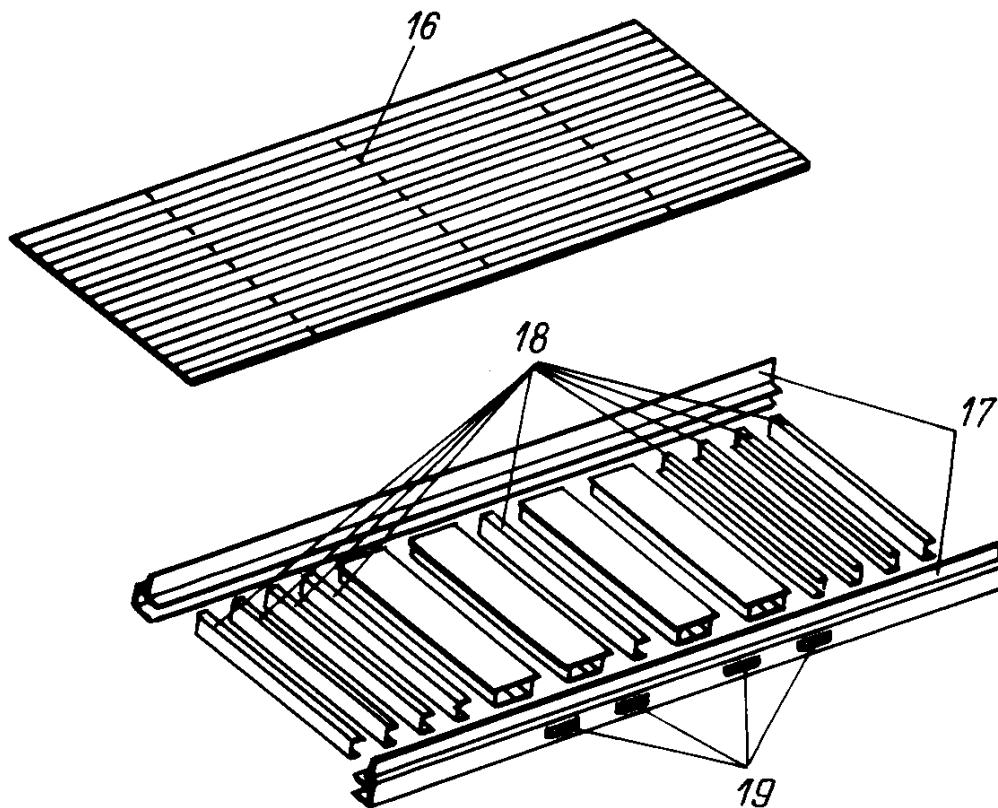


Fig. 1.2.1-3 Structural elements of general cargo containers:
 16 — floor; 17 — bottom side rail; 18 — bottom cross-member; 19 — fork lift pockets

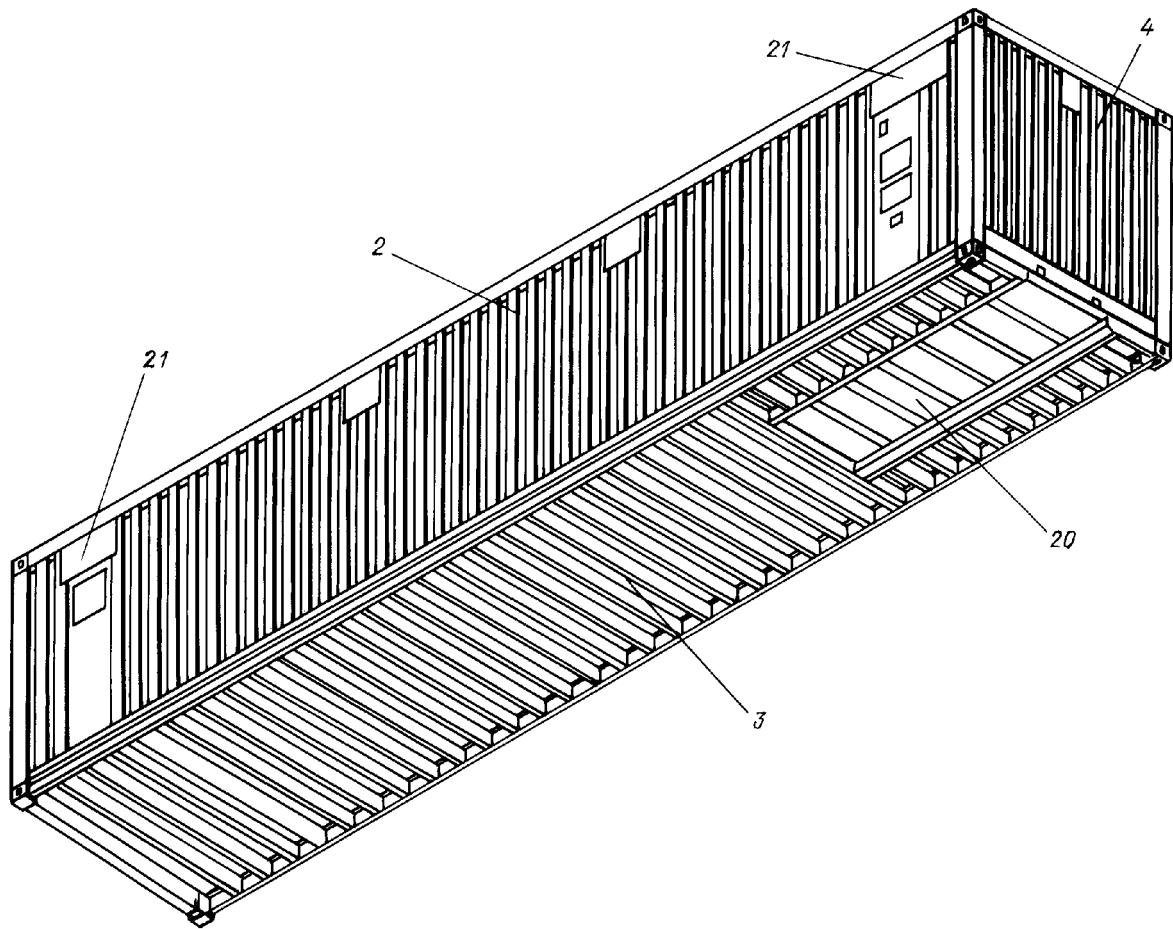


Fig. 1.2.1-4 Structural elements of general cargo containers:
2,3,4 — see Fig. 1.2.1-1; 20 — gooseneck tunnel; 21 — ventilation unit

1.3 SCOPE OF TECHNICAL SUPERVISION

1.3.1 Technical supervision of the Register shall cover:

- framework (bearing structure);
- walls, floor and roof;
- corner fittings;
- doors;
- covers for open top containers.

1.4 TECHNICAL DOCUMENTATION

1.4.1 For general cargo containers, the technical documentation stated in 1.3.3, Part I "Basic Requirements", shall comprise:

1.4.1.1 specification of the container;

1.4.1.2 test program and test procedure for the container;

1.4.1.3 the State Health Authorities approval of the floor material and its antiseptic impregnation, coverings and sealants;

1.4.1.4 drawings of the following parts, assemblies and general views, inclusive of all the specified dimensions:

- .1 corner fittings (during manufacture at the manufacturer's of containers);
- .2 door locks;
- .3 ventilation arrangements;
- .4 corner posts;
- .5 top and bottom end rails;
- .6 top and bottom side rails;
- .7 roof;
- .8 base with bottom corner fittings and gooseneck tunnel;

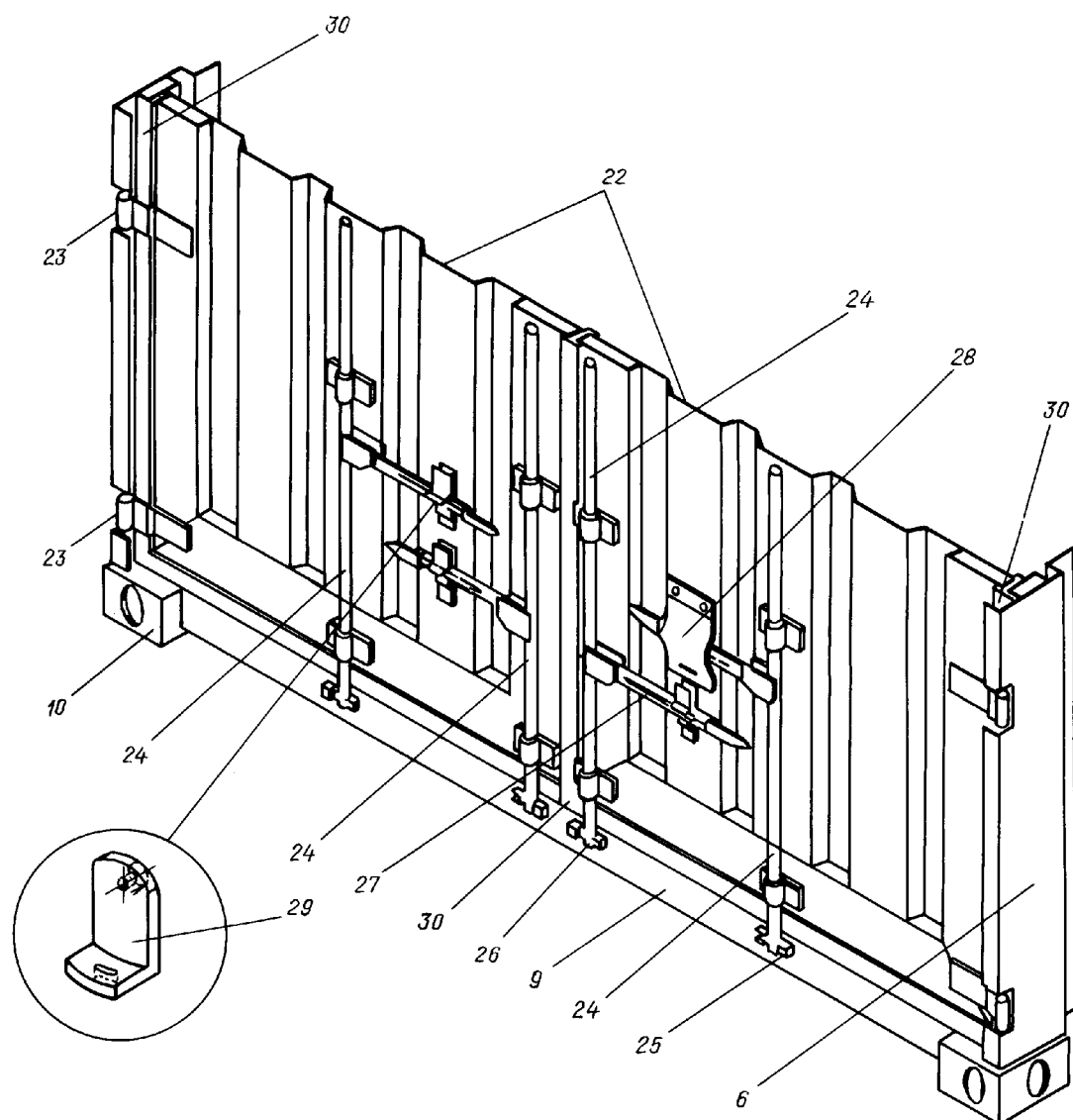


Fig. 1.2.1-5 Structural elements of general cargo containers (door):

6,9 — see Fig. 1.2.1-1; 10 — see Fig. 1.2.1-2; 22 — door panel; 23 — hinge; 24 — door locking bar;
 25 — cam retainer; 26 — cam; 27 — door locking handle; 28 — Customs seal protection cover (allowed not to be fitted);
 29 — device for affixing the Customs seal; 30 — door gasket

.9 floor (fastening, caulking, size of panels and boards, construction of planking);

.10 doors assembled with gaskets and locks;

.11 details covered by requirements of the CCC Convention;

.12 the CSC Plate and Customs Approval Plate for Containers¹;

.13 general views and markings of the container;

.14 roof and detachable bows for affixing the container sheet;

.15 container sheet with views of seams and edges, wire rope with end-pieces for affixing of the Customs seal;

.16 locks of top rails (if removable);

.17 cargo securing arrangements of the container (if any).

Note. Requirements of 1.4.1.3.14 to 1.4.1.3.16 are applicable only to general cargo containers with open top.

The extent of the above documentation is the minimum required.

¹ Hereinafter called "the CCC Plate".

2 TECHNICAL REQUIREMENTS

2.1 INTERNAL DIMENSIONS

2.1.1 Closed containers are to have internal dimensions not less than given in Table 2.1.1.

Table 2.1.1
Minimum internal dimensions of containers, in mm

Designation of container	Height	Width	Length
1EEE	2655	2330	11998
1EE	2350	2330	13542
1AAA	2655	2330	11998
1AA	2350	2330	11998
1A	2197	2330	11998
1AX	< 2197	2330	11998
1BBB	2655	2330	8931
1BB	2350	2330	8931
1B	2197	2330	8931
1BX	< 2197	2330	8931
1CC	2350	2330	5867
1C	2197	2330	5867
1CX	< 2197	2330	5867
1D	2197	2330	2802
1DX	< 2197	2330	2802

Note. The part of top corner fitting protruding into the inner space of the container shall not be regarded as a ground for reducing the required internal dimensions of the container.

2.2 DOOR OPENING

2.2.1 Containers shall be provided with a door opening at least at one end.

2.2.2 Closed 1A, 1B, 1C and 1D containers shall have a door opening preferably having dimensions equal to those of the internal cross-section of the container and in any case not less than 2134 mm high and 2286 mm wide; while for 1EE, 1AA, 1BB and 1CC containers the door opening shall be not less than 2261 mm high and 2286 mm wide and for 1EEE, 1AAA, 1BBB containers — not less than 2566 mm high and 2286 mm wide.

2.3 DOORS

2.3.1 All doors shall open and close freely, the closing shall provide tightness. The angle of opening of each end door shall be 270°, and that of a side door, 180°.

Suitable stop devices shall be provided for keeping the doors open.

3 TESTING

3.1 GENERAL

3.1.1 Irrespective of the design, designation and material used for the manufacture, the ISO series 1 general cargo containers shall be subjected to test loadings and testing procedures set forth in 3.2 to 3.16, while the specified dimensions and tare mass shall be determined in accordance with the requirements of 3.17. The container may be designed for other loads as regards tests specified in 3.7, 3.10, 3.13 and 3.14 which is subject to special consideration by the Register.

3.1.2 The test devices for creating the required test loadings shall not interfere with free deflection of container sections under test.

3.1.3 Upon completion of each test the container shall show neither permanent deformations nor abnormalities which could render it incapable of being used for its designed purpose.

No part of the container upon completion of strength tests of end and side walls shall project beyond the container external dimensions. Requirements of 2.3.1 and 2.3.2.1, Part I "Basic Requirements" shall be also complied with.

3.1.4 The order of tests is not mandatory, except that the test under 3.15 shall be made last and be applied to each container.

3.2 LIFTING BY TOP CORNER FITTINGS

3.2.1 The container having the prescribed internal loading shall be carefully lifted in such a way that no significant acceleration forces are applied.

After lifting, the container shall be suspended for 5 min and then carefully lowered to the ground.

3.2.2 The container shall have a uniformly distributed loading such that the combined mass of the container and test load is equal to 2R.

3.2.3 The external forces applied to the container shall be such as to permit lifting a combined mass of 2R, by the following methods:

for 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C and 1CX containers, vertically at all four fittings (Fig. 3.2.3, a);

for 1D and 1DX containers, at all four corner fittings, so that the angle between each lifting device and the vertical is 30° (Fig. 3.2.3, b);

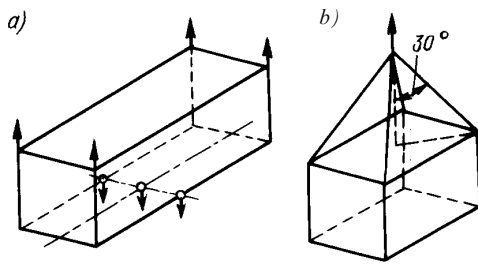


Fig. 3.2.3 Lifting by top corner fittings

for 1EEE and 1EE containers, vertically at four corner fittings and separately at four intermediate fittings.

3.2.4 When lifting by the top corner fittings the measurements shall be taken to determine:

- .1 deflection at the lowest points of side rails and at longitudinal centre line of the base, while the container is loaded and supported by bottom corner fittings;
- .2 maximum elastic deformations during lifting;
- .3 permanent set remaining on removal of the load.

3.3 LIFTING BY BOTTOM CORNER FITTINGS

3.3.1 The container having the prescribed loading shall be carefully lifted in such a way that no significant acceleration forces are applied.

After lifting, the container shall be suspended for 5 min.

3.3.2 The container shall have a uniformly distributed loading such that the combined mass of the container and test load is equal to $2R$.

3.3.3 The external forces applied to the container shall be such as to permit lifting a combined mass of $2R$, by the following method:

the lifting devices shall be secured through the side apertures of the bottom corner fittings so that the lines of action of the lifting forces and the outer faces of corner fittings shall be no farther apart than 38 mm, with the lifting forces applied at an angle to the horizontal (Fig. 3.3.3) of:

30°, for 1EEE, 1EE, 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.

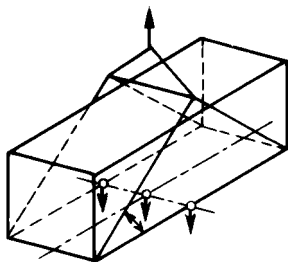


Fig. 3.3.3 Lifting by the bottom corner fittings

1EEE and 1EE containers shall be additionally lifted by the bottom intermediate fittings using the same lifting devices and at the same angle to the horizontal of the forces applied as in case of lifting by corner fittings.

3.3.4 When lifting by the bottom corner fittings the measurements shall be taken to determine the maximum elastic deformations during lifting and the permanent set of the container base.

3.4 LIFTING BY FORK LIFT POCKETS

3.4.1 Tests are carried out for 1CC, 1C, 1CX, 1D and 1DX containers having fork lift pockets.

The container having the prescribed loading shall be carefully lifted in such a way that no significant acceleration forces are applied.

After lifting, the container shall be suspended for 5 min.

3.4.2 The container shall have a uniformly distributed internal loading such that the combined mass of the container and test load is equal to $1,6R$.

3.4.3 The external forces applied to the container shall be such as to permit lifting of a combined mass of $1,6R$, in which case the container shall be placed on two bars which are in the same horizontal plane, one bar being centered within each fork lift pocket. The bars shall be of the same width as the forks intended to be used for handling the container, but not less than 200 mm, and shall project into the fork pocket for a distance of 1828 ± 3 mm, measured from the outer face of the container side.

3.4.4 In case of containers having four fork lift pockets on each side, tests under 3.4.3 shall be carried out for the most widely spaced pockets (outer), which are used for lifting a loaded container.

For pockets (inner) spaced at the least intervals which are used for lifting an empty container, the test procedure is similar to that outlined in 3.4.3, except that the external force applied shall be equal to $0,625R$.

When lifting by fork lift pockets the measurements shall be taken to determine the maximum elastic deformations during lifting and permanent set of the container base.

3.5 LIFTING WITH THE USE OF GRAPPLER ARMS

3.5.1 Tests are carried out for containers provided with grapple arm lifting areas.

The container having the prescribed internal loading shall be carefully lifted in such a way that no significant acceleration forces are applied. After

lifting, the container shall be suspended for 5 min and then carefully lowered.

3.5.2 The container shall have a uniformly distributed internal loading such that the combined mass of the container and test load is equal to $1,25R$.

3.5.3 Where areas are provided for lifting by grapples, the container shall be placed on four pads in the same horizontal plane, one under each grapple arm area. These pads shall be of the same dimensions as the lifting area of the grapple arms intended to be used for handling the container, but not less than 32×254 mm.

3.5.4 When lifting with the use of grapple arms the measurements shall be taken to determine the maximum elastic deformations during lifting and permanent set remaining on removal of the internal load.

3.6 OTHER LIFTING METHODS

3.6.1 Where containers are designed to be lifted in the loaded condition by any method not covered by 3.2, 3.3 and 3.5, they shall also be tested with internal loading and externally applied forces representative of the acceleration conditions appropriate to the method.

3.6.2 When carrying out the tests the measurements shall be taken to determine the maximum elastic deformations during lifting and permanent set remaining on removal of the load.

3.7 STACKING

3.7.1 The test shall be carried out to prove the ability of the loaded container to support the mass of stacked containers of the same length (except 1EEE and 1EE containers) and loaded to the gross mass R , each under acceleration conditions taking into account the possible relative eccentricities between containers (Fig. 3.7.1).

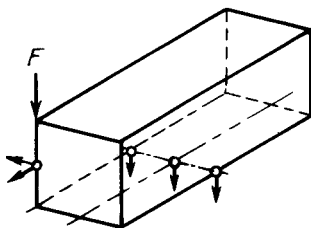


Fig. 3.7.1 Stacking test

3.7.2 A container having a uniformly distributed internal loading such that the total mass of the test load and the container is equal to $1,8R$, shall be placed on four or eight, in case of 1EEE and 1EE

containers at a corresponding variant of loading (see 3.7.4), level pads which, in their turn, rest on a rigid horizontal surface. The pads shall be centered under each corner and intermediate, in case of 1EEE and 1EE containers, fitting and be of approximately the same dimensions as the fittings.

3.7.3 The external forces shall be simultaneously applied to each of the four or eight, in case of 1EEE and 1EE containers, top fittings through corresponding test fittings or pads of the same dimensions as the container fittings. In this case, the external forces may be simultaneously applied to each pair of top end fittings for 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C, 1CX, 1D and 1DX containers. The test fittings or pads shall be placed in relation to the top fittings so as to cover all the potential positions of their offset by 25 mm laterally and 38 mm longitudinally. The container shall be exposed to the externally applied forces during 5 min.

3.7.4 The external forces applied to each top fitting shall be equal to:

942 kN — for 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C and 1CX containers. These values are calculated on the assumption that the containers are stacked in eight tiers, mass $R = 30480$ kg and acceleration = $1,8g$;

224 kN — for 1D and 1DX containers. These values are calculated on the assumption that the containers are stacked in six tiers, mass $R = 10160$ kg and acceleration = $1,8g$.

In case when the external forces are applied to each pair of the top corner fittings the above values shall be doubled.

Note. The forces applied in testing the 1EEE and 1EE containers at the various stacking modes are subject to special consideration by the Register. The following stacking modes are specified for the 1EEE and 1EE containers: 1EEE and 1EE on 1EEE and 1EE; 1AAA, 1AA, 1A and 1AX on 1EEE and 1EE; 1EEE and 1EE on 1AAA, 1AA, 1A and 1AX; 1AAA, 1AA, 1A and 1AX on 1EEE and 1EE placed on 1AAA, 1AA, 1A and 1AX.

3.7.5 In the course of testing measurements shall be taken to determine:

- .1 deflections at the lowest points of side rails and at the longitudinal centre line of the base;
- .2 deflections both longitudinally and laterally at mid-height of corner posts or at any point of maximum deflection of the corner posts;
- .3 permanent set remaining on removal of the load.

3.8 ROOF STRENGTH

3.8.1 No internal loading is provided. The externally applied force which is a load of 3 kN uniformly distributed over an area of 600×300 mm, shall be applied vertically downwards to the outer surface at the weakest point of the roof (Fig. 3.8.1).

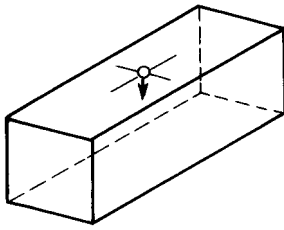


Fig. 3.8.1 Roof strength test

3.8.2 In the course of testing the measurements shall be taken to determine the maximum deflection of the roof section under test and permanent set.

3.9 FLOOR STRENGTH

3.9.1 The container shall be placed on four level supports under its four bottom corners in such a way that the base structure of the container is free to deflect (Fig. 3.9.1).

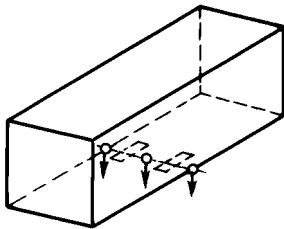


Fig. 3.9.1 Floor strength test

3.9.2 A truck loaded to an axle weight of 71,2 kN that is 35,6 kN on each of two wheels, is used as internal concentrated load applied to the floor. The contact area of the wheels when loaded shall be 284 cm², that is 142 cm² on each wheel, the wheel width being 180 mm and the distance between centres of the wheels 760 mm; all contact points are to be within a rectangle of 185 mm (parallel to the wheel axle) and 100 mm in size. The truck shall be manoeuvred over the entire floor area of the container. No external forces are applied to the container.

Note. For the purpose of compliance with the International Convention for Safe Containers, the axle load for the truck may be assumed 53,6 kN.

3.9.3 In the course of testing the measurements shall be taken to determine deflection of the base at three locations of the truck and permanent set.

3.10 TRANSVERSE RACKING

3.10.1 The 1EEE, 1EE, 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C and 1CX containers shall be capable of withstanding the transverse racking forces.

3.10.2 A container with no internal loading shall be placed on four level supports, one under each of the four bottom corner fittings (Fig. 3.10.2-1). The container shall be restrained against vertical movement by means of the anchor device acting through the bottom apertures of bottom corner fittings. Lateral restraint is provided by means of anchor device acting alternately through the side apertures of bottom corner fittings diagonally opposite to those at which the forces are applied.

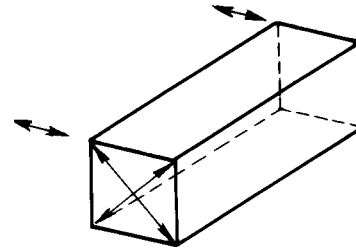


Fig. 3.10.2-1 Transverse racking test

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

If the end walls of the container are symmetrical about their own vertical centre lines, one side only need be tested. With asymmetric ends, the forces shall be applied to both sides.

The changes in lengths of the diagonals D₅ and D₆ (Fig. 2.2.1-3, Part I "Basic Requirements") shall be measured in the course of testing. The sum of these changes shall not exceed 60 mm.

Note. The 1EEE and 1EE containers shall be tested with loads applied according to Figs 3.10.2-2 to 3.10.2-9.

3.11 LONGITUDINAL RACKING

3.11.1 The 1EEE, 1EE, 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1BX, 1CC, 1C and 1CX containers shall be capable of withstanding the longitudinal racking forces.

3.11.2 A container with no internal loading shall be placed on four level supports, one under each of the four bottom corner fittings (Fig. 3.11.2-1). The container shall be restrained against vertical movement by means of an anchor device acting through the bottom apertures of bottom corner fittings. Longitudinal restraint is provided by means of the anchor device acting alternately through the end apertures of bottom corner fittings diagonally opposite to those at which the forces are applied.

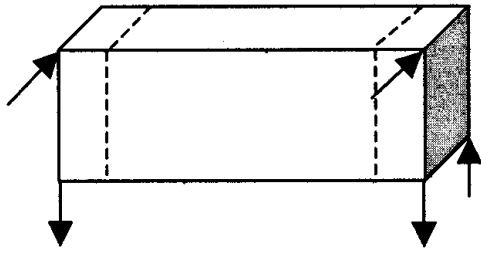


Fig. 3.10.2-2

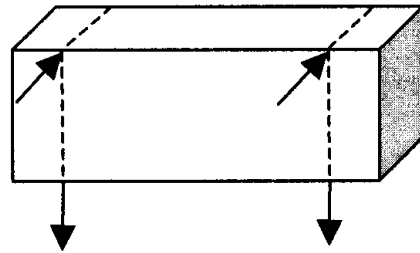


Fig. 3.10.2-3

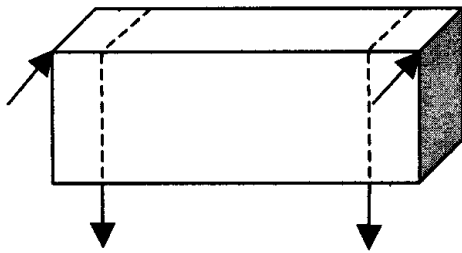


Fig. 3.10.2-4

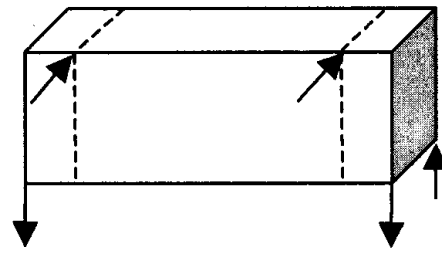


Fig. 3.10.2-5

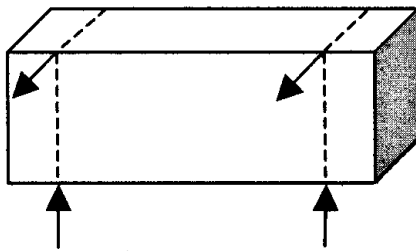


Fig. 3.10.2-6

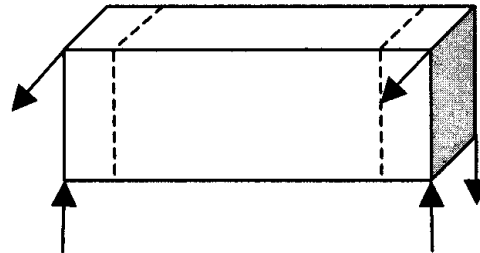


Fig. 3.10.2-7

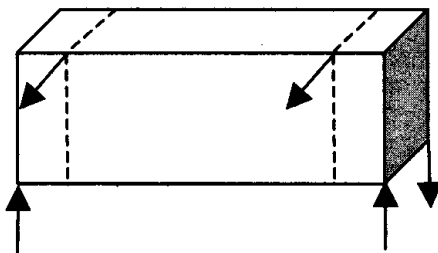


Fig. 3.10.2-8

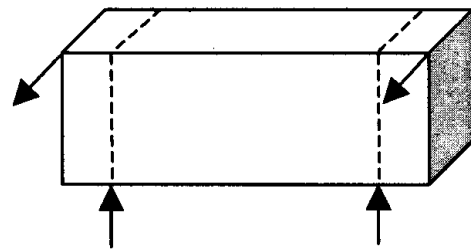


Fig. 3.10.2-9

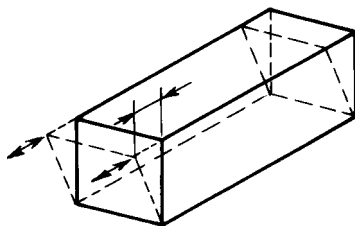


Fig. 3.11.2-1 Longitudinal racking test

External forces equal to 75 kN shall be applied separately or simultaneously to each of the top corner fittings on one end of the container in lines parallel both to the base and the planes of the sides. The forces are applied first towards and then away from the top corner fittings.

If the sides of the container are symmetrical about their own vertical centre lines and are also of similar construction, one end only shall be tested. Where the sides are asymmetrical and of a differing construction as many tests shall be carried out as are necessary to cover all possible modifications.

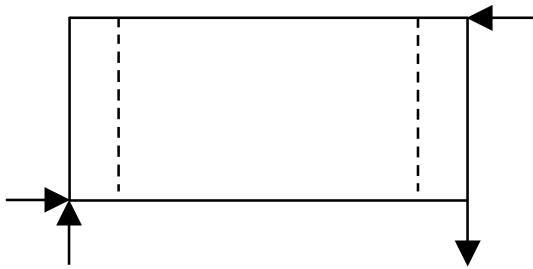


Fig. 3.11.2-2



Fig. 3.11.2-3

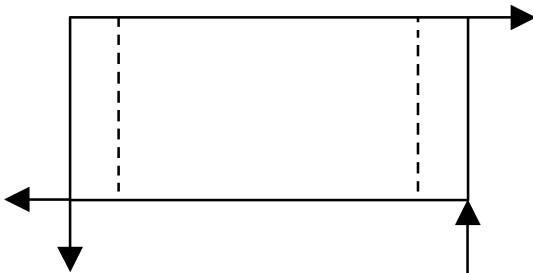


Fig. 3.11.2-4

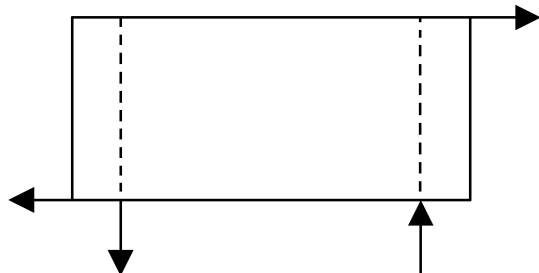


Fig. 3.11.2-5

Longitudinal displacement of top side rails shall be measured during the test. The value of displacement shall not exceed 25 mm.

Note. The 1EEE and 1EE containers shall be tested with loads applied according to Figs 3.11.2-2 to 3.11.2-5.

In the course of testing the change in length of each bottom side rail shall be measured in both directions.

Note. The 1EEE and 1EE containers shall additionally be tested with loads applied to intermediate fittings according to Figs 3.12.1-2 to 3.12.1-3.

3.12 LONGITUDINAL RESTRAINT (STATIC TEST)

3.12.1 A container having a uniformly distributed internal loading such that the combined mass of the container and test load is equal to R , shall be restrained longitudinally by securing the bottom corner fittings (through the bottom apertures) at one end of the container to suitable anchor points (Fig. 3.12.1-1). Two external forces, each equal to Rg , shall be applied horizontally to both unsecured bottom corner fittings, first towards and then away from the anchor points so that the base of the container is subjected to the action of a combined force of $2Rg$.

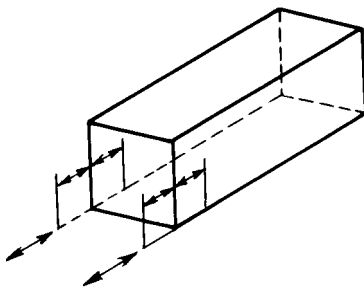


Fig. 3.12.1-1 Longitudinal restraint

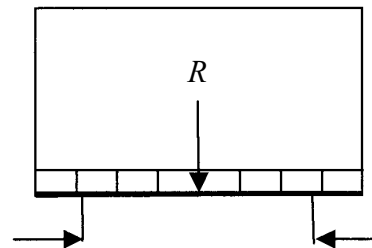


Fig. 3.12.1-2

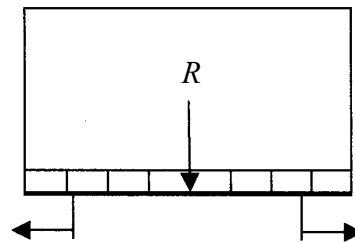


Fig. 3.12.1-3

3.13 STRENGTH OF END WALLS

3.13.1 The end wall shall be capable of withstanding an internal loading equal to $0,4Pg$. The container may, however, be tested by a loading lesser

or greater than $0,4Pg$ (or any other loading to which the wall is designed) uniformly distributed over the whole surface in such a way as to allow free deflection of the wall (Fig. 3.13.1).

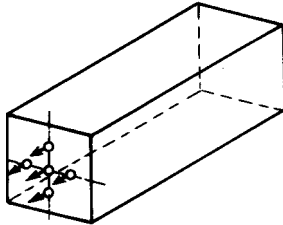


Fig. 3.13.1 End wall strength test

No external forces are applied.

Both end walls shall be tested. However only one wall need be tested when both are similar in construction.

In the course of testing the measurements shall be taken to determine the deflection at the centre and at least two other points of the wall, and permanent set at the same locations.

3.14 STRENGTH OF SIDE WALLS

3.14.1 The side walls shall be capable of withstanding an internal loading of $0,6Pg$. The container may, however, be tested by a loading lesser or greater than $0,6Pg$, if the side walls have been designed to withstand such loading.

The inner surface of the side wall shall be subjected to a loading of $0,6Pg$ (or any other loading to which the wall is designed) uniformly distributed over the whole surface in such a way as to allow the side wall and its top and bottom side rails to deflect freely. The loading shall be applied separately to each side wall (Fig. 3.14.1). No external forces are applied.

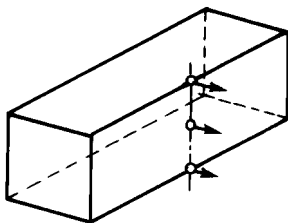


Fig. 3.14.1 Side wall strength test

Both side walls shall be tested. However, only one wall need be tested when both are similar in construction.

In the course of testing the measurements shall be taken to determine deflection at the centre of the wall and at mid-length of the top and bottom side rails, as well as permanent set at the same locations.

3.15 WEATHERTIGHTNESS

3.15.1 All outer surfaces, connections and seams of the container shall be subjected to a stream of water, providing that:

- .1 nozzle diameter — 12,5 mm;
- .2 water pressure measured at the nozzle outlet — 0,1 MPa;
- .3 distance from the nozzle to the surface under test — 1,5 m;
- .4 nozzle directed to the surface at an angle of 90° ;
- .5 speed of stream — 100 mm/s.

Several nozzles may be used for testing provided the above requirements are fulfilled as for a single nozzle.

Upon completion of the test the inner surfaces of the container shall be dry.

The weathertightness test may be performed by any other method approved by the Register.

3.16 STRENGTH OF CARGO SECURING DEVICES

3.16.1 The test shall be carried out for containers fitted with cargo securing devices.

3.16.2 The cargo securing devices shall be capable of withstanding a loading which is 1,5 times higher than the design loading. The lines of action of the forces applied are directed:

for arrangements fitted on the base structure, at right angles to the centre line of the structural elements and at an angle of 45° to the horizontal plane;

for arrangements fitted above the base structure, at an angle of 45° upwards and downwards in respect to the horizontal plane.

3.16.3 The minimum design loading for the arrangements fitted on the floor is equal to 1000 kg, for other arrangements — 500 kg. The arrangements shall be subjected to the loading for at least 5 min.

In the course of testing the measurements shall be taken to determine permanent set of devices and structural elements of the containers at the points where they are fastened.

3.17 INSPECTIONS

3.17.1 Inspections comprise visual inspection, verification of specified dimensions and weighing of the container.

Visual examination shall be conducted during the manufacture of the container and/or upon completion of works, to ascertain that the container design,

materials and workmanship comply with the requirements of the present Rules. Visual examination shall include checking of the opening and closing of the doors.

The specified dimensions shall be verified before commencement, as well as on completion, of the tests.

The container shall be weighed upon completion of all works including painting.

PART III. THERMAL CONTAINERS

1 GENERAL

1.1 APPLICATION

1.1.1 The requirements of the present Part apply to thermal containers.

1.1.2 The requirements of the present Part also apply to offshore thermal containers and to thermal containers of the swap body type, where applicable.

1.1.3 Thermal containers shall comply with the requirements of Part I "Basic Requirements", and with the requirements of the present Part.

1.1.4 Thermal containers differing in design and dimensions from those defined in this Part are subject to special consideration by the Register in each particular case.

1.2 DEFINITIONS AND EXPLANATIONS

1.2.1 For definitions and explanations relating to the general terminology of the present Rules, see Part I "Basic Requirements". For the purpose of this Part the following definitions and explanations have been adopted.

Thermal container is a container the walls, doors, floor and roof of which are insulated to limit heat exchange between the inside and outside of the container. The thermal containers include the following container types:

insulated container is a thermal container without the use of permanently attached devices for cooling and/or heating;

refrigerated container with expendable refrigerant is a thermal container using a source of cold such as ice, dry ice with or without sublimation control, liquified gases with or without evaporation control, and requiring no external power supply;

mechanically refrigerated container is a thermal container served by a refrigerating plant (of compression or absorption type);

heated container is a thermal container served by a heating plant;

refrigerated and heated container is a thermal container served by a refrigerating plant or using an expandable refrigerant and heating plant.

Batten is a structural element of the container protruding from the inside walls and/or roof, built integral with, or fastened to the walls or roof, or installed during cargo loading to create a clearance

between cargo and wall and/or roof for air circulation.

Drainage system is a system intended to drain liquid from defrosting internal surfaces of the container and to relieve internal pressure, and which comprises trays, pipes, drain openings and appropriate closures.

Ceiling duct is a passage or passages located in proximity to the ceiling to direct air flow.

Floor air duct is a passage or passages located beneath the freight support surface for air circulation.

Removable equipment means the refrigerating and/or heating plant so designed and constructed that it may be attached to, or detached from, the container when transferring between different modes of transport.

1.3 SCOPE OF TECHNICAL SUPERVISION

1.3.1 Technical supervision of the Register shall cover:

- .1** framework (bearing structure including the walls, insulation, floor and roof);
- .2** corner fittings;
- .3** doors and door locks;
- .4** stationary refrigerating and/or heating plants of the container;
- .5** electrical equipment;
- .6** electric power source with its prime mover.

1.3.2 In the course of manufacture components, assemblies, plants and equipment, specified in 1.3.1 shall comply with the requirements of the present Rules and are subject to control over fulfilment of the requirements of Part IX "Machinery", Part X "Boilers, Heat Exchangers and Pressure Vessels", Part XI "Electrical Equipment", Part XII "Refrigerating Plants" and Part XV "Automation" of the Rules for the Classification and Construction of Sea-Going Ships, as applied to the thermal containers.

1.4 TECHNICAL DOCUMENTATION

1.4.1 For approval by the Register of a thermal container by design type or individually the following technical documentation in triplicate shall accom-

pany the application for approval, in addition to the technical documentation specified in 1.3.4, Part I "Basic Requirements":

.1 specification, diagrams and drawings of refrigerating and/or heating plants with thermal, mechanical and other characteristics;

.2 specification of electrical equipment with parameters of circuit breakers, control and indication facilities, drawings of plug and socket connections, operating diagrams;

.3 specification, diagrams and drawings of electrical power source with its prime mover;

.4 specification of thermal insulation;

.5 thermal calculations;

.6 program and procedure of thermal tests with indication of values which shall be attained;

.7 test program for type-series containers;

.8 test program for a prototype and type-series refrigerating and/or heating plants.

2 TECHNICAL REQUIREMENTS

In addition to the requirements contained in this Section, the thermal containers shall meet the requirements of Section 2, Part I "Basic Requirements".

2.1 INTERNAL DIMENSIONS

2.1.1 The minimum internal dimensions of thermal containers are given in Table 2.1.1.

2.2 DOOR OPENING

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

The door opening shall preferably have dimensions equal to those of the internal cross-section of the container but the width of such door opening shall not be less than that given in Table 2.1.1.

2.3 DOORS

2.3.1 Requirements for the doors are outlined in 2.2, Part II "General Cargo Containers".

2.4 THERMAL CHARACTERISTICS

2.4.1 Thermal containers shall be so designed as to provide thermal characteristics indicated in Table 2.4.1.

2.5 TEMPERATURE MEASURING DEVICES

2.5.1 Thermal containers, except for insulated and refrigerated containers with expendable refrigerant, shall be fitted with temperature measuring devices to permit indication of temperature outside the container.

2.5.2 In thermal containers other than insulated and refrigerated ones with expendable refrigerant, there shall be fitted a temperature recorder to record the temperature inside the container.

2.6 REQUIREMENTS FOR ADDITIONAL (OPTIONAL) EQUIPMENT

2.6.1 Drainage system.

2.6.1.1 The bottom portion of the container may be fitted with drainage system complying with the following requirements:

Table 2.1.1

Container code	Minimum length ¹ = nominal external containers length minus, mm	Minimum width = nominal external container width minus, mm	Minimum height ¹ (without gooseneck tunnel) = nominal external container height minus, mm	Minimum height ¹ (with gooseneck tunnel) = nominal external container height minus, mm
30, 31, 32, 33	690	220	345	385
36, 37, 38, 41	990			
40	440			
42	390	180	310	350
45	340	220	285	340
46	290	180	250	290

¹A part of the container length and height shall be used for air circulation.

Table 2.4.1

ISO container code (code after 1993)	Container type	Maximum heat transfer U_{\max} , W/K								Temperature, K(°C)	
		1D	1C, 1CC	1B, 1BB	1BBB	1A, 1AA	1AAA	1EE	1EEE	inside	outside
30	Refrigerated (expendable refrigerant)	13	22	31	33	40	42	44	46	255(−18)	318(+45)
31 (R0)	Mechanically refrigerated	13	22	31	33	40	42	44	46	255(−18)	318(+45)
32 (R1)	Refrigerated and heated	13	22	31	33	40	42	44	46	289/255 (+16/−18)	253/318 (−20/+45)
33	Heated	13	22	31	33	40	42	44	46	289(+16)	253(−20)
36 (R2)	Mechanically refrigerated, self-powered	13	22	31	33	40	42	44	46	255(−18)	311(+45)
37 (R3)	Refrigerated and heated, self-powered	13	22	31	33	40	42	44	46	289/255 (+16/−18)	253/318 (−20/+45)
38	Heated, self-powered	13	22	31	33	40	42	44	46	289(+16)	253(−20)
40 (H0)	Refrigerated and/or heated, with clip-on equipment fitted outside the container	13	22	31	33	40	42	44	46	—	—
41 (H1)	Refrigerated and/or heated, with clip-on equipment fitted inside the container	13	22	31	33	40	42	44	46	—	—
42 (H2)	Refrigerated and/or heated, with clip-on equipment fitted outside the container	26	46	66	71	86	92			—	—
45 (H5)	Insulated	13	22	31	33	40	42	44	46	—	—
46 (H6)	Insulated	26	46	66	71	86	92			—	—

Notes: 1. The values of U_{\max} for containers with enhanced insulation (codes 30, 31, 32, 33, 36, 37, 40, 41 and 45) correspond to heat transfer coefficient $k < 0,4 \text{ W/(m}^2\text{K)}$.
2. The values of U_{\max} for containers with normal insulation (codes 42 and 46) correspond to heat transfer coefficient $k = 0,7 \text{ W/(m}^2\text{K)}$.
3. No temperature limits are determined for containers with codes 40, 41 and 42. Such limits depend on the capacity of the removable refrigerating or heating plant used on various vehicles.

.1 the drainage system, if required to operate when carrying cargo, shall have suitable fittings which open automatically above normal internal operating pressure;

.2 if required for cleaning of the interior of the container, the drainage system fittings shall be provided with manual closures;

.3 the design of the draining system shall comply with the requirements of the Rules for the Approval of Containers for the Transport of Goods Under Customs Seal.

2.6.2 Water cooling system.

For equipment requiring water cooling, inlet and outlet connections shall be in accordance with the requirements of GOST R 50697 and ISO 1496-2 standards.

Such equipment shall be provided with drainage facilities to prevent water from freezing when draining the container.

Inlet and outlet connections of the water cooling system shall be so located at the machinery end of the container that, to an observer facing that end, they appear in the lower right-hand quarter.

2.6.3 Ventilation system.

2.6.3.1 Air openings for the ventilation of the internal volume of a container shall have closures readily accessible from outside.

2.6.3.2 The air circulation openings of 1AA, 1CC and 1C containers, where removable equipment is used for refrigerating or heating of the container,

shall comply with the following requirements (Fig. 2.6.3.2):

.1 the bosses for holes shall be minimum 457 mm in diameter or square for 1CC and 1C containers and minimum 550 mm for 1AA containers;

.2 the face of bosses shall be smooth with a tolerance of 0,25 mm on the parallel plane of the front faces of corner fittings;

.3 a clearance of 3 to 6 mm shall be provided between the plane of the front faces of corner fittings and the face of bosses;

.4 the bore of the hole shall be not less than 254 mm in diameter for 1CC and 1C containers and not less than 350 mm for 1AA containers;

.5 the opening shall have closures complying with the requirements of the Rules for the Approval of Containers for the Transport of Goods Under Customs Seal.

The size of openings and their location for containers of other designations shall be specially considered by the Register in each particular case.

2.6.4 Additional sockets for clip-on equipment.

If containers are designed for clip-on equipment, the sockets for it shall be designed and located as shown in Figs 2.6.4-1 and 2.6.4-2.

Each socket for attaching a clip-on power generator set shall be designed to withstand the load of 2000 kg applied in the vertical and horizontal directions.

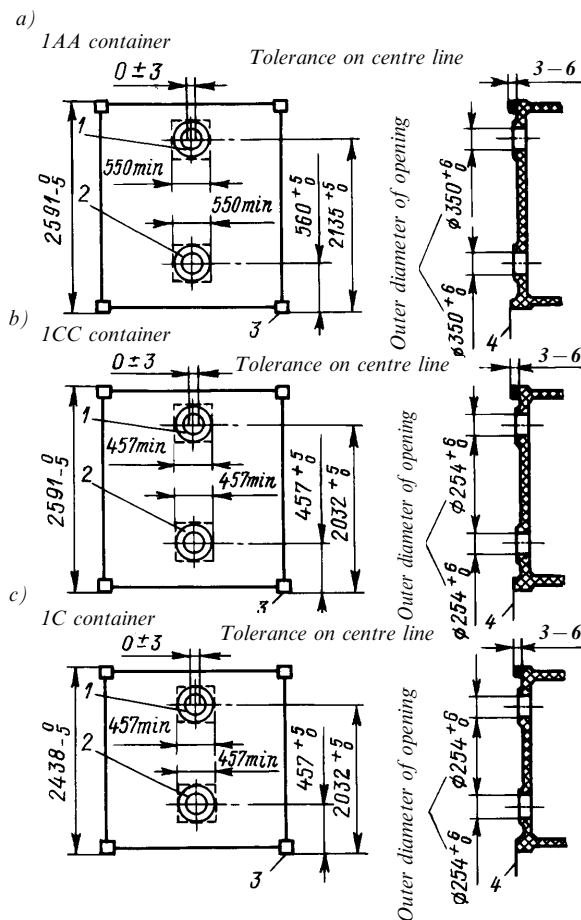


Fig. 2.6.3.2 Air openings in end wall (front and lateral view) of IAA, ICC and IC containers:
1 — air outlet hole; 2 — air inlet hole; 3 — bottom face of bottom corner fitting; 4 — front face of bottom corner fitting

2.6.5 Equipment for hanging cargo.

The equipment for hanging cargo shall withstand the loads indicated in 3.2.2.

2.7 MATERIALS

2.7.1 Materials used for manufacture of a container, as well as its refrigerating and heating equipment shall not have an adverse effect on the cargo carried (especially, on the foodstuffs).

2.7.2 The inner surface of the thermal container shall meet the following requirements:

- .1 the inner surfaces, as far as practicable, shall be plane and shall not permit moisture to accumulate;
- .2 the inner surfaces shall be resistant to steam, detergents and disinfectants;
- .3 the inner surfaces shall be provided with the pockets accessible to normal cleaning and disinfecting procedures.

2.7.3 Thermal containers shall have their outer and inner surfaces light-coloured (white, light-grey, silvery, etc.).

2.7.4 The insulating materials of a container shall ensure heat conductivity determined from Table 2.4.1, be non-hydroscopic, as far as practicable, and have physical and chemical resistance, remaining at the same time neutral to the materials with which they are in contact.

2.7.5 The insulation of a container shall be covered with a lining of adequate strength to protect the insulation during container handling operations.

2.8 REFRIGERATING AND HEATING PLANTS

2.8.1 The requirements of this Chapter cover the refrigerating plants employing R-134A or R-22 refrigeration compressors. The use of refrigerating plants of other designs or compressors with refrigerants other than stated above, is subject to special consideration by the Register in each particular case.

Toxic, flammable and aggressive refrigerants shall not be used in refrigerating plants of containers.

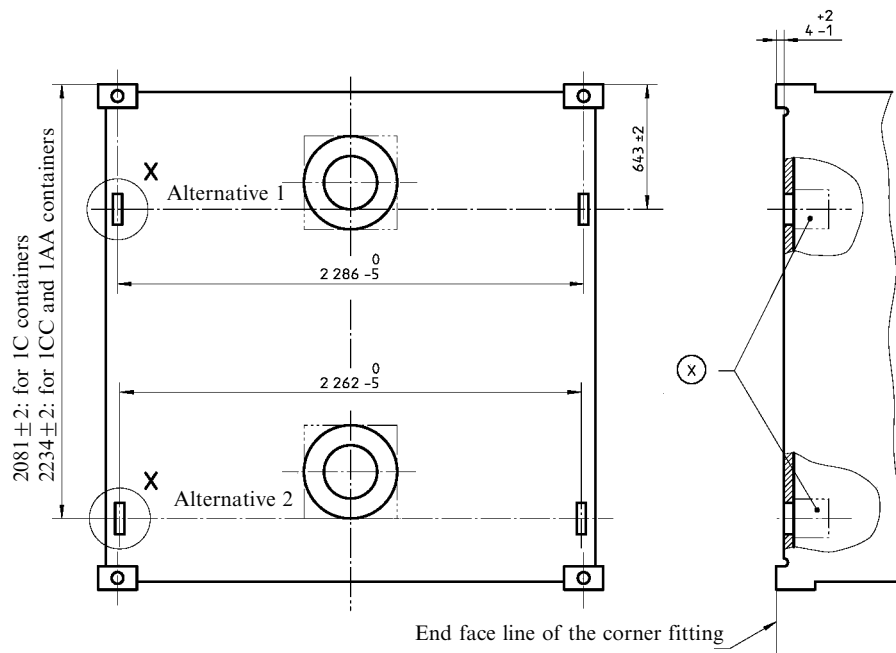
2.8.2 The refrigerating plant of a container:

- .1 shall be fitted with a hermetic or semi-hermetic compressor;
- .2 shall be air cooled;
- .3 shall be designed for continuous running and have a capacity sufficient to maintain the minimum required temperature inside the container at maximum outside temperature, when running not more than 18 h a day;
- .4 shall have all the equipment fully automated, inclusive of defrosting devices;
- .5 shall have reliable overpressure protection, with the pressure-relief devices, located outside the internal volume of the container;
- .6 shall include precautions to prevent freezing of the elements of the automatic control devices;
- .7 shall be fitted with hand controls operable from a readily accessible position;
- .8 shall withstand vibration and impacts during conveyance by different modes of transport.

2.8.3 Provision shall be made in the container for fitting of at least one thermometer to control the operation of refrigerating plant and also for measurements to be taken by a test thermometer.

2.8.4 If the internal combustion engine is used as prime mover the following conditions shall be met:

- .1 the engine shall run on fuel with flash point not less than 55 °C;
- .2 the fuel tank shall be provided with draining arrangements and a level gauge;
- .3 the air pipe shall be fitted with a flameproof head;



Detail X

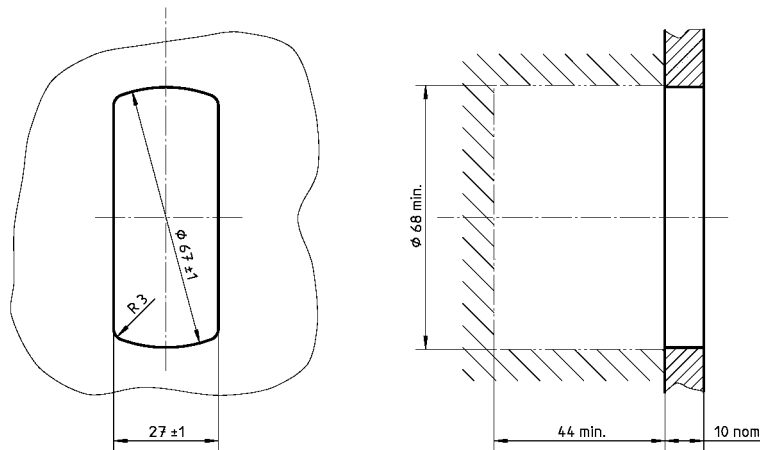


Fig. 2.6.4-1 Location of sockets for clip-on equipment to 40 and 42 type containers, mm:
1 — tank for refrigerant; 2 — refrigerating plant

.4 to prevent restarting the engine shall be shut down automatically when the fuel level in tank is minimum;

.5 the exhaust pipe of the engine shall be fitted with a spark arrester;

.6 the engine shall be started up freely at least at a temperature of -10°C .

2.8.5 A refrigerated container with expendable refrigerant shall be fitted with arrangements for draining the rest of refrigerant after consumption.

2.8.6 A heating plant shall meet the requirements applicable to refrigerating plant with respect to capacity, operation and safety.

2.9 ELECTRICAL EQUIPMENT

2.9.1 Electrically powered equipment.

It is permissible to use in containers such equipment which is operating from electrical power sources with characteristics as follows:

3-phase current with voltage of 360 to 460 V at a frequency of 50 Hz; (Type II Equipment);

3-phase current with voltage of 400 to 500 V at a frequency of 60 Hz.

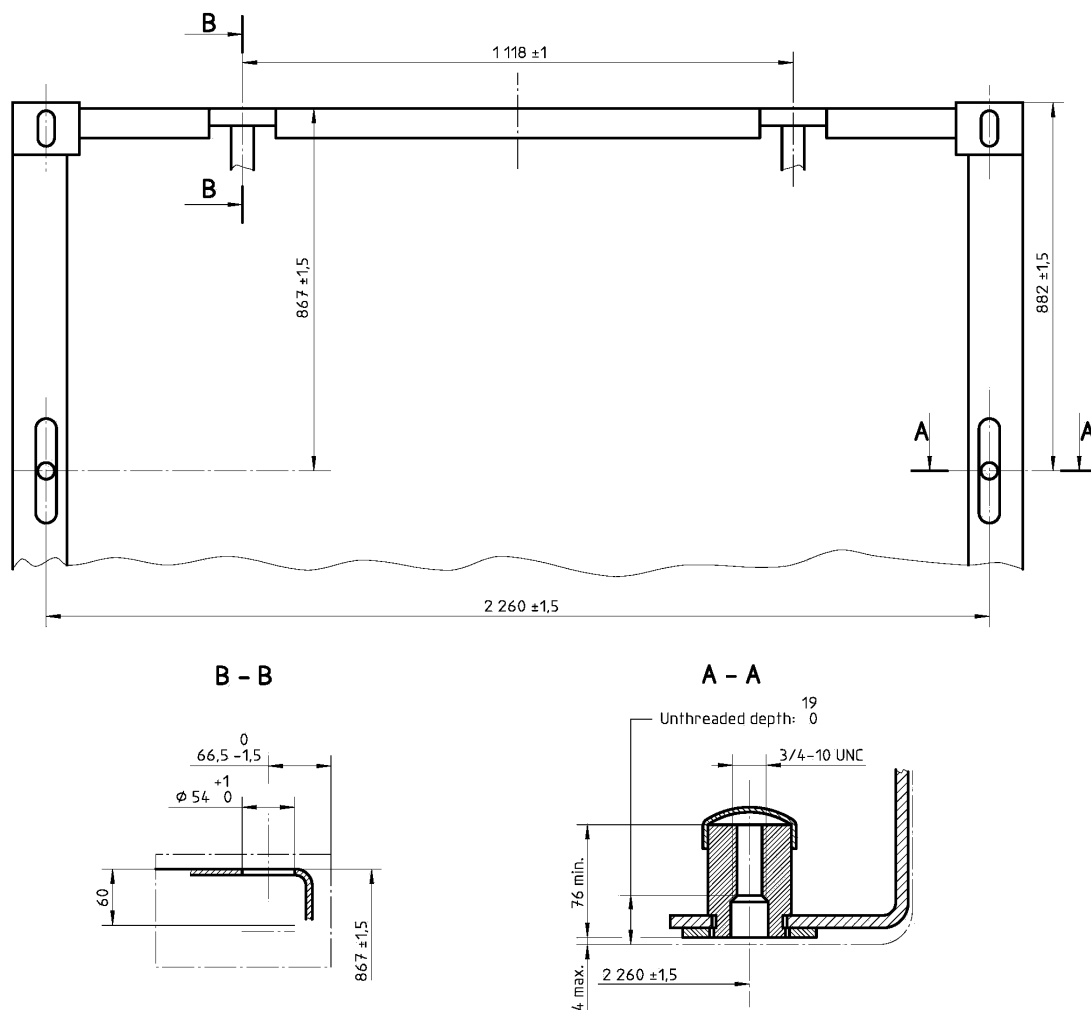


Fig. 2.6.4-2 Location and dimensions of sockets for clip-on power generator set

2.9.2 General requirements.

2.9.2.1 The electrical equipment shall operate reliably at frequency variations from nominal values within $\pm 2,5\%$.

2.9.2.2 The total power of electrical equipment under rated operating conditions shall not exceed 15 kW (18,75 kVA).

2.9.2.3 Equipment shall be provided with means for protecting the temperature-control apparatus against electrical overloads.

2.9.2.4 The plugs and metallic casings of current-carrying equipment shall be earthed. All current-carrying parts shall be shielded against accidental contact. The insulation resistance of the electrical equipment shall be not less than 20 MOhm.

2.9.2.5 All electrically live metal parts shall be protected from accidental contact.

2.9.2.6 All non-current-carrying metallic components in a plug assembly shall be earthed.

Cable connections to live pins of the plug shall be protected against abrasion, strain and twisting. The

protection shall be designed in such a way that the live pins cannot touch accessible metal parts of the plug case.

2.9.2.7 A wiring diagram shall be mounted on the equipment in a readily accessible place.

All wires shall be identified by marking (for example, colour coding) to correspond with information on the wiring diagram.

2.9.2.8 The equipment shall be provided with a nameplate including the following data as a minimum requirement:

- 3-phase current voltage, V;
- frequency, Hz;
- rated current, A;
- total starting current, A.

2.9.3 Cables.

2.9.3.1 A flexible power cable of adequate cross-section area shall be provided to supply the equipment of the container from an external source of electrical power, which shall be permanently attached to the refrigeration and/or heating plant at one end

and shall have a male plug at the other end. The cable shall have a minimum length equal to the length of the container plus 6 m, or 15 m, whichever is greater.

2.9.3.2 The equipment shall be provided with a 32 A four-pin (three poles plus earth) male plug.

2.9.3.3 The plug shall be sealed to the power cable by a suitable means so as to prevent the entry of water under service conditions.

2.9.3.4 A flexible power cable shall be stored in a well ventilated space used solely for this purpose.

2.9.3.5 Electrical equipment of the container when supplied from an external source of power shall operate with clockwise phase rotation A(R), B(S), C(T), according to a scheme presented in Fig. 2.9.3.5.

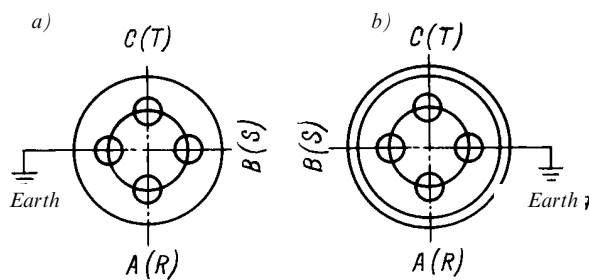


Fig. 2.9.3.5 Phase connections to container plugs and sockets:

a — front view of plug;
b — front view of socket

2.9.4 Plug and socket connections.

The design and dimensions of plugs and sockets shall comply with accepted national and international standards.

2.9.5 Switch gear, control and protection devices.

2.9.5.1 The equipment controls shall be located in accessible positions, be easy for operation and be adequately protected against mechanical damage.

2.9.5.2 Controls shall include an easily accessible and clearly marked ON/OFF switch on the outside of the equipment which prevents operation of the unit when in the OFF position. Whenever the unit's ON/OFF switch is in the ON position, an indicating light shall be illuminated which shall be different in colour from other unit's lights.

2.9.5.3 With the switch in ON position the electrical equipment shall operate automatically under cooling or heating conditions.

2.9.5.4 The control devices and electric motors shall be so designed that the total starting current is as low as possible and it shall in any case not exceed 150 A. The peak starting current shall be defined as the instantaneous mean of the sum of the currents of switched-on electric motors and the current taken by non-rotating elements. It is permissible for the total starting current of an equipment to be limited to the specified value by sequence controls permitting only one of the motors in the multimotor equipment to start at any one instant.

2.9.5.5 The starting current shall decay to 125 per cent of the rated operating current in not more than 1 s.

2.9.5.6 The switch gear shall be fitted with protective devices against overloads and short circuits.

3 TESTING

3.1 GENERAL

3.1.1 Irrespective of the design, designation and material chosen for manufacture of a thermal container, all types of thermal containers shall be subjected to test loads and testing procedures outlined in 3.1.5 and 3.2 to 3.7, with prescribed dimensions and tare mass to be determined according to 3.17, Part II "General Cargo Containers".

3.1.2 Refrigerated and/or heated containers may be tested without cooling and/or heating plants unless otherwise specified for particular tests. In this case, the capability of the framework and other components of cooling and/or heating plants to withstand loads and accelerations arising in operation of containers shall be confirmed separately.

3.1.3 Where refrigerated and/or heated containers are subjected to strength tests without the cooling and/or heating plant, the latter shall be substituted by the appliance of an equivalent mass and strength characteristics not exceeding the strength of the missing equipment and attached in the same way.

3.1.4 On completion of each test, the container shall show neither permanent deformation nor abnormalities which may render it unsuitable for the designed purpose.

3.1.5 The test loads and testing procedures for lifting, stacking, floor strength, racking, longitudinal restraint (static test), strength of end and side walls are described in Section 3, Part II "General Cargo Containers".

Thermal containers shall be tested ready-assembled with insulation and ventilation equipment (if applicable).

3.1.6 The measuring equipment used in tests shall be certified by a competent authority and shall have percentage error not exceeding the values specified in 4.2.3 of the Rules for Technical Supervision during Manufacture of Containers.

3.1.7 For refrigerated containers with expendable refrigerant, as well as for containers fitted with a refrigerating plant and seats for clip-on equipment, additional tests are required for checking the operating characteristics of the container with the running refrigerating plant at the increased ambient temperature, for checking the operating characteristics of the container with expendable refrigerant, for checking the strength of seats for clip-on equipment. The tests shall be carried out in compliance with the requirements of ISO 1496-2 and GOST R 50697 standards.

3.2 STRENGTH OF THE ROOF AND EQUIPMENT FOR HANGING CARGO

3.2.1 The roof testing procedure is outlined in 3.8, Part II "General Cargo Containers".

3.2.2 Where equipment for hanging cargo is used in a thermal container, it shall withstand an internal test loading of 30 kN per 1 m of the internal useful length of the container, or a double operating load per 1 m of the internal useful length, whichever is the greater.

On completion of testing, the equipment for hanging cargo shall have no damages and deformations, affecting its safe use.

3.3 WEATHERTIGHTNESS

3.3.1 The container subjected to testing shall be fitted with full number of equipment prescribed in specifications. The testing procedure and characteristics of the water stream are set out in 3.15, Part II "General Cargo Containers". The test shall be carried out on door gaskets, external flanged connections, opening fitted with closing devices, as well as refrigerating plants and their attachments to container. Upon completion of the test the inner surfaces of the container shall be dry.

3.4 AIRTIGHTNESS

3.4.1 The airtightness test shall be carried out after completion of the tests stated in 3.1.5, 3.2 and 3.3, and prior to thermal test.

3.4.2 The test shall be performed at the temperatures outside and inside the container within the range of +15 to +25 °C under the standard atmospheric conditions.

3.4.3 During testing the outside and inside temperatures shall be stabilized within 3 °C of one another.

3.4.4 The container shall be fitted with full number of the specification equipment. The refrigerating and/or heating plant shall be fitted in proper location. Where the container is intended for use with clip-on equipment, the latter shall be removed and all connecting ports shall be closed. Doors, ventilation, drain and other openings shall also be closed.

3.4.5 The air duct to the container shall be fitted with a calibrated metering device to control the air supply, a pressure gauge and a flowmeter. The pressure gauge shall be connected to the container itself, outside the air supply system.

3.4.6 An excessive internal pressure equal to 250 ± 10 Pa shall be produced in the container.

After the pressure in the container reaches a steady-state value, air flow required to maintain this pressure shall be recorded.

Measurement of air flow shall be taken during 30 min.

3.4.7 For all the thermal containers, with the exception of containers provided with additional door openings, determined for the standard atmospheric conditions, the air leakage shall not exceed $5 \text{ m}^3/\text{h}$. For each additional door opening (e.g. for side doors), provision shall be made for an additional air leakage equal to $5 \text{ m}^3/\text{h}$.

3.5 THERMAL TEST

3.5.1 The thermal test shall be carried out subject to the condition that the container complies with the requirements of 3.4.4 and is prepared, with respect to its technical state, to operation under prescribed conditions. The removable refrigerating and/or heating equipment shall not be fitted to the container and the openings in end wall shall be closed.

3.5.2 The heat transfer required to make up heat balance, shall be determined only by internal heating method.

3.5.3 The heat transfer shall be determined as a total heat transfer to be derived from the formula

$$U_t = \frac{Q}{t_{out} - t_{in}} \quad (3.5.3)$$

where U_t = total heat transfer;
 t = mean average wall temperature, K;

$$t = \frac{t_{in} + t_{out}}{2}$$

Q = power dissipated by the operation of internal heaters and fans, W;

t_{in} = average temperature calculated as the arithmetic mean of the temperatures measured at least at 12 points inside the container at the end of each test period, K (Fig. 3.5.3-1);

t_{out} = average temperature calculated as the arithmetic mean of the temperatures measured at least at 12 points outside the container at the end of each test period, K (Fig. 3.5.3-2).

3.5.4 Measurements to determine the heat transfer of a container shall be taken uninterruptedly during 8 h and the following conditions shall be met:

.1 mean wall temperature shall be within a range of 293 — 305 K (20 — 32 °C) and the difference

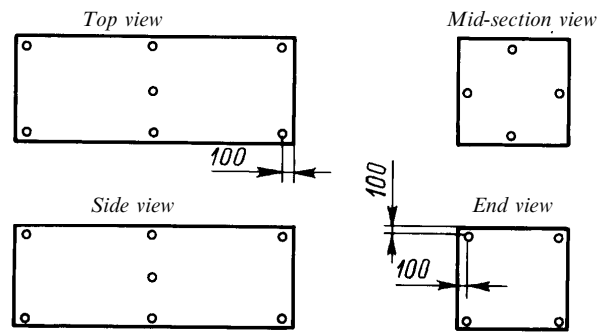


Fig. 3.5.3-1 Inside air temperature measurement points:
 o — measurement point

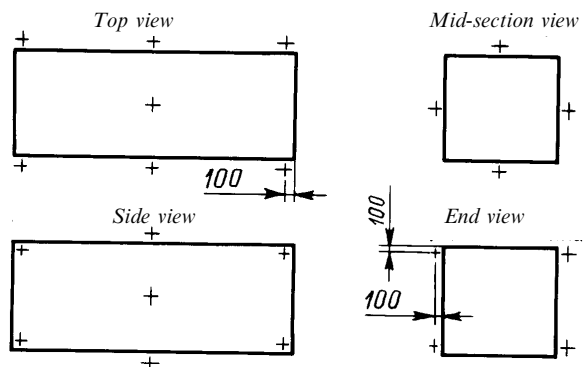


Fig. 3.5.3-2 Outside air temperature measurement points:
 + — measurement point

between the inside and outside air temperatures ($t_{in} - t_{out}$) shall be not less than 20 K (20 °C);

.2 the maximum difference between the highest and the lowest temperatures at any one time shall not exceed 3 K (3 °C) both for the outside and inside temperatures;

.3 the maximum difference between any two mean air temperatures inside and outside the container shall not exceed 1,5 K (1,5 °C);

.4 the maximum difference, expressed as a percentage, between the lowest and highest values of the dissipated power shall not exceed 3 % of the lowest value.

3.5.5 All the gauges and devices shall provide accuracy of measurements indicated in 3.1.6 and the measurements shall be taken at not more than 30 min intervals.

3.5.6 Air current shall flow over the container surface with a speed of not more than 2 m/s measured at points located approximately 100 mm away from the middle of container side walls and roof.

3.5.7 All temperature gauges fitted inside and outside the container shall be protected from radiation heat.

3.5.8 The heat transfer U , W/K shall be calculated as the arithmetic mean of the heat transfer values, measured within at least 8 h under thermal equilibrium conditions, by the formula

$$U = \frac{1}{n} \sum_{i=1}^n U_i \quad (3.5.8)$$

where n = number of measurement points; $n \geq 17$.

The heat transfer value shall be recorded simultaneously with the mean wall temperature values obtained in the course of testing. The heat transfer value corrected for the standard mean wall temperature of 293 K (20 °C) shall also be recorded. The correction shall be made using a curve relating heat transfer to mean wall temperature relation. The heat transfer shall not exceed values given in Table 2.5.1.

3.5.9 Heat transfer coefficient, W/(m²·K) shall be calculated by the formula

$$k = U/S \quad (3.5.9)$$

where $S = \sqrt{S_{in} S_{out}}$ is the geometric mean of the container surface area, m²;
 S_{in} is the inner surface area without corrugations, m²;
 S_{out} is the outer surface area without corrugations, m².

3.6 CHECKING OF OPERATING CHARACTERISTICS OF THE REFRIGERATING PLANT

3.6.1 Where the thermal test shows positive results the container provided with permanent or removable refrigerating machinery shall be placed in a room with air temperature consistent with this type of container (see Table 2.5.1).

3.6.2 After starting the refrigerating plant shall reduce the temperature inside the container to the temperature specified for that type of container (at outside temperature given in Table 2.5.1) and then maintain this temperature within 8 h, provided that the heat load passes through the container walls and roof.

3.6.3 With the thermal stabilization period completed according to 3.2.6, the container heater (heaters) and fan (fans) fitted inside the container shall be turned on to produce additional heat load, W , equal to

$$Q = 0,25 U_i (t_{out} - t_{in}) \quad (3.6.3)$$

where U_i , t_{out} , t_{in} — see the Formula (3.5.3).

3.6.4 In joint operation of the refrigerating plant and the equipment specified in 3.6.3, following restabilization of operating conditions, the temperature required in 3.6.2 shall be maintained inside the container within at least 4 h.

3.6.5 During testing, the container shall be fitted with gauges to measure:

.1 air temperature at 12 points outside and inside the container (see Figs. 3.5.3-1 and 3.5.3-2);

.2 air inlet and outlet temperatures (dry bulb temperature sensor) inside the container (at least two sensors on each side);

.3 refrigerant temperature at the inlet of the outside air cooled condenser;

.4 power consumed by the heater and fan.

3.6.6 With the operating conditions of the refrigerating plant reached the steady state, the inside and outside temperatures, as well as the power consumed by the heater and fan shall be recorded at not more than 30 min intervals.

The temperature values shall meet the requirements of 3.5.4 and the heat transfer shall be determined by the Formula (3.5.3).

3.6.7 On agreement with the Register, the above test of the refrigerating plant may be carried out separately from the container provided that the requirements of the present Chapter are met.

3.7 PERFORMANCE TEST OF REFRIGERATING/HEATING PLANT

3.7.1 The performance test shall be conducted to check the leakproofness of the cooling circuit, the operability of compressors, fans and the proper functioning in the modes "cooling", "defrosting" and, where applicable, "heating".

3.7.2 The automatic functioning of the plant shall be checked by varying the thermostat temperatures.

3.7.3 The proper functioning of safety devices, temperature measurement devices and recorders shall also be checked.

3.8 INSPECTIONS

3.8.1 A thermal container shall be subjected to inspections specified in 3.17, Part II "General Cargo Containers".

4 MARKING

4.1 MANDATORY MARKING

4.1.1 Thermal containers shall be marked in accordance with the requirements set out in Section 4, Part I "Basic Requirements".

4.1.2 If a thermal container is fitted with equipment for hanging cargo, the maximum carrying capacity of that equipment shall be plainly marked inside the container.

4.1.3 Thermal containers designed for use with the variable air inside the container, which may be hazardous for health until the complete ventilation of a cargo space, shall have the corresponding marks of the oxygen deficiency danger in way of each place of access inside the container.

4.1.4 If the thermal container has an automatic ventilation control system, the corresponding mark shall be placed at air inlets.

4.2 IDENTIFICATION PLATE WITH PLANT'S DATA

4.2.1 The refrigerating and/or heating plants shall bear at a conspicuous place: a plate containing technical particulars of the plant.

4.3 INSTRUCTIONS

4.3.1 In immediate proximity to the switches, controls and indicating devices of the refrigerating and/or heating plants there shall be posted the operation instructions so arranged and fastened as to make them fit for continuous use. These instructions shall be written both in the national and the English languages.

PART IV. TANK CONTAINERS

1 GENERAL

1.1 APPLICATION

1.1.1 The requirements of the present Part apply to tank containers designed for the transport of pressurized liquids, liquified gases and dry bulk cargoes.

1.1.2 The requirements of the present Part also apply to offshore tank containers and to tank containers of the swap body type, where applicable.

1.1.3 Tank containers shall comply with the provisions of Part I "Basic Requirements", Procedures for the Design, Manufacture, Service and Repair of Pressure Vessels for the Storage and Transport of Dangerous Goods and the present Part.

1.1.4 Tank containers differing in design and dimensions from those defined in this Part are subject to special consideration by the Register in each particular case.

1.1.5 Additional international and national requirements specified by competent authorities may apply to tank containers used for the transport of dangerous goods.

1.2 DEFINITIONS AND EXPLANATIONS

1.2.1 For definitions and explanations relating to the general terminology of the present Rules, see Part I "Basic Requirements". For the purpose of this Part, the following definitions and explanations have been adopted.

T a n k c o n t a i n e r means a container having a framework (frame members), a tank or tanks complete with associated fittings and other devices according to the requirements of this Part either for gravity or pressure loading and discharge.

T a n k means a strong and tight vessel with a manhole (manholes) for inspection and openings for fittings and control devices.

Note. Tanks designed for the transport of cryogenic products may have no manholes for inspection.

C o m p a r t m e n t means a fluid tight section of the tank formed by the shell, ends and/or tight partitions.

N o n - d a n g e r o u s g o o d s are those substances which are not covered by the Code of the UN Committee of Experts on the Transport of Dangerous Goods or national normative documents.

D a n g e r o u s g o o d s are those substances which are covered by the Code of the UN Committee of Experts on the Transport of Dangerous Goods and/or the national normative documents. The degree of hazard of the cargo intended for transport in a tank container shall be specially considered by the Register in each particular case.

G a s means a substance, which at 50 °C has vaporization pressure of more than 0,3 MPa; or

at 20 °C and normal pressure of 0,101 MPa is absolutely gaseous.

L i q u i d means a substance, which at 50 °C has pressure of saturated vapours not more than 0,3 MPa; or

at 20 °C and pressure of 0,101 MPa is not absolutely gaseous; or

at pressure of 0,101 MPa has a melting temperature or thaw point 20 °C or below.

L i q u e f i e d g a s means a gas pressurised for transport, which is partially liquid at temperature higher than -50 °C.

L i q u e f i e d r e f r i g e r a t e d g a s means a gas pressurised for transport, which is partially liquid at reduced or cryogenic temperatures.

M a x i m u m a l l o w a b l e w o r k i n g p r e s s u r e means a pressure (gauge) to be defined as the highest pressure of the following values:

the maximum allowable filling or draining pressure;

the maximum pressure which can be built up in the tank under the effect of the cargo contained in the tank (including foreign gases which can be present therein).

D e s i g n p r e s s u r e is the pressure used for strength calculation.

T e s t p r e s s u r e is the inside gauge pressure which is built up in the tank in the course of hydraulic tests. The test pressure is measured in the top part of the tank.

T o t a l c a p a c i t y means that volume of water which will completely fill the tank at 20 °C.

U l l a g e means the portion of the total capacity of the tank not occupied by its cargo, expressed as a percentage of the total capacity.

R e f e r e n c e s t e e l means a steel with fixed minimum guaranteed tensile strength R_m equal to 370 MPa and minimum guaranteed elongation at fracture A_5 equal to 27 per cent. (Mechanical properties of reference steel are used only for calculations by the Formula (2.2.8)).

Reference holding time means the time that will elapse from the establishment of the initial filling condition until the pressure has risen due to heat influx to the set pressure of the pressure-limiting devices.

Auxiliary (service) equipment means measuring instruments, filling, discharge, vapour and gas venting, safety, heating and cooling, pressurising and thermal insulation devices.

Jacket means the outer insulation cover or cladding of tank container intended for transport of refrigerated liquefied gases, which may be part of the insulation system.

Design temperature range for the shell means a temperature interval from $-40\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ for substances transported at ambient temperature. For substances transported at elevated temperature, design temperature shall be not less than the maximum temperature of the substance during filling, discharge or transport. More severe design temperatures shall be considered for tank containers operated at temperature below $-40\text{ }^{\circ}\text{C}$.

Design reference temperature (for tank containers intended for transport of non-refrigerated liquefied gases) means the temperature, at which the vapour pressure of the contents of the tank is determined for the purpose of calculating maximum allowable working pressure.

Design reference temperature shall be less than the critical temperature of the non-refrigerated liquefied gas intended to be transported to ensure that the gas at all times is liquefied.

Minimum design temperature (for tank containers intended for transport of refrigerated liquefied gases) means the temperature, which is used for the design and manufacture of the tank shell not

higher than the lowest (coldest) temperature (service temperature) of the contents during normal conditions of filling, discharge and transport.

Actual holding time is calculated for each voyage keeping due note of the following characteristics:

- reference holding time of the refrigerated liquefied gas to be transported;
- actual filling density;
- actual filling pressure;
- the lowest pressure for pressure-limiting devices

Low-carbon steel means steel with the minimum assured tensile strength R_m equal to 370 MPa and the minimum assured elongation A_5 equal to 27 %.

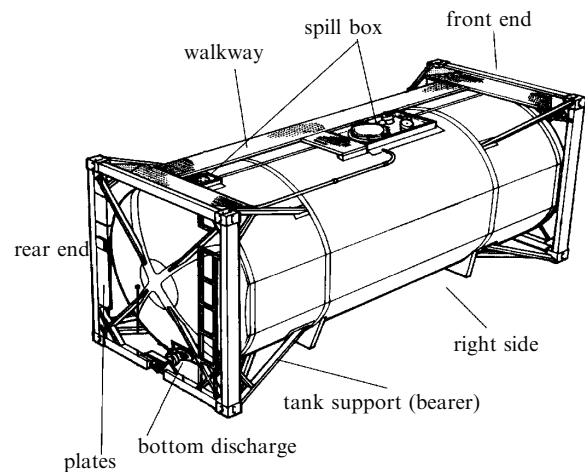


Fig. 1.2-2 Beam tank container structure

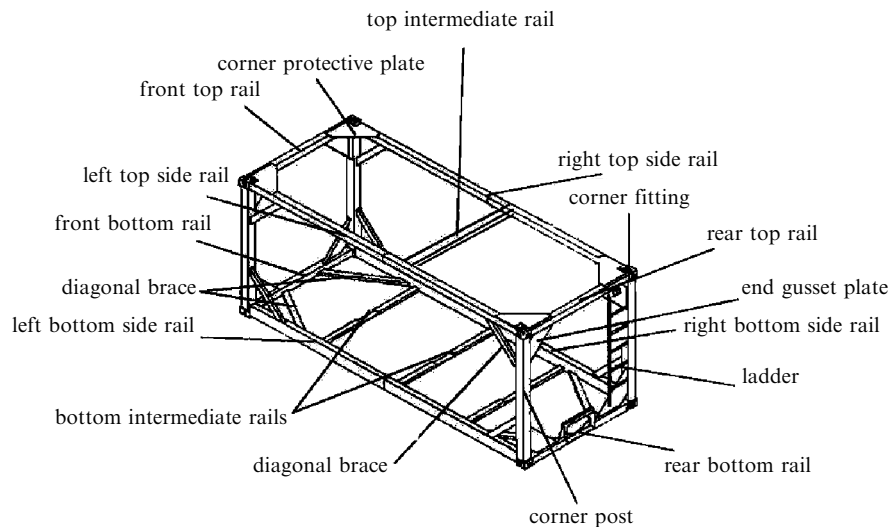


Fig. 1.2-1 Structural elements of the tank container frame

1.3 SCOPE OF TECHNICAL SUPERVISION

1.3.1 Technical supervision of the Register shall cover:

- .1** framework, frame members (bearing structure);
- .2** corner fittings;
- .3** tank and tank outer shell, if any;
- .4** pressure units, cooling and heating appliances for cargo, if provided;
- .5** safety devices (pressure-relief valves, frangible disks, fusible elements and vacuum valves);
- .6** piping;
- .7** stop valves;
- .8** liquid level indicators;
- .9** materials for the manufacture of tank, shell, framework and fastening elements to frame.

1.4 TECHNICAL DOCUMENTATION

1.4.1 As far as tank containers are concerned, the technical documentation specified in 1.3, Part I "Basic Requirements" shall comprise:

- .1** container technical specification or technical conditions with indication of its purpose (cargoes carried), technical characteristics, materials used and their strength properties including welding consumables, types of welds and methods of their inspection;
- .2** calculations of the framework (frame members) and tank, including calculations using finite element method in accordance with the requirements of 2.2.3, 2.2.4 and 3.8 of the present Part, and calculations of safety devices, piping and ullage space, thermotechnical calculations (containers for refrigerated liquified gases);
- .3** list of cargoes which may be carried in the tank container and certificates confirming resistance of the metallic and non-metallic materials of the tank

container to the effects of substances intended for carriage;

.4 test program of tank containers and test procedures with detailed description of dynamic test (impact test). The program and procedure of thermotechnical tests shall be additionally submitted for containers carrying refrigerated liquefied gases (estimation of reference holding time and effectiveness of insulation system);

.5 operation manual (to the extent sufficient for verifying the observance of the requirements of the Register rules);

.6 drawings of the following parts, assemblies, general views, inclusive of the specified dimensions, materials used:

corner fittings;

framework (corner posts, attachments of the tank to the framework, top and bottom side and end rails, walkways and ladders);

tank or tanks;

hatch and manhole covers;

safety devices;

stop valves;

liquid level indicators;

piping;

refrigerating and/or heating systems;

details covered by the requirements of the CCC Convention;

CSC and CCC plates;

plate bearing the particulars of tank;

plate bearing the operation manual in Russian and in English;

general views of the container and its marking including markings of the fittings;

.7 summary table of welded joint types and their structural elements;

chart and table for welded joint quality inspection.

The extent of above documentation is the minimum required.

2 TECHNICAL REQUIREMENTS

2.1 BASE STRUCTURE

2.1.1 When the tank container is loaded to its gross mass R , no part of the tank vessel and its associated shell fittings shall project downwards below a plane, 25 mm above the base plane (bottom faces of the bottom corner fittings).

This requirement does not apply to load-transfer areas if they are located on the tank vessel.

2.1.2 All tank containers, other than ICC, 1C, 1CX, 1D and 1DX, shall have load-transfer areas in their base structure to permit vertical load transfer when carried on chassis. ICC, 1C and 1CX tank containers may have load-transfer areas in their base structure as an optional feature. If so, these tank containers shall meet the requirements of 2.3, Part I "Basic Requirements".

2.2 TANKS

2.2.1 The tanks shall be designed and constructed in accordance with the national and/or international standards and the present Rules. The tank strength shall be calculated in compliance with the requirements of recognized normative documents like GOST 14249-89, GOST 24755-89 standards or the Boilers and Pressure Vessels Code of the American Society of Marine Engineers (ASME). The strength calculations according to the requirements of other normative documents, as well as the very calculation methods are subject to special consideration by the Register.

2.2.2 A tank or tanks shall be firmly secured to structural elements of the tank framework. Supports and attachments of the tank to the framework shall be such as not to cause dangerous local stress concentrations in the tank shell.

2.2.3 The tank, supports and attachments when loaded to the maximum allowable gross mass R , shall withstand the following static forces applied separately:

1 in the moving direction: doubled gross mass R multiplied by the acceleration of gravity g ($2Rg$). In design of tank containers for dangerous goods, the static forces in the longitudinal direction shall be equal to $4Rg$;

2 horizontal, at a right angle to the moving direction: gross mass R multiplied by the acceleration of gravity g (Rg). Where the moving direction is uncertain, the loads shall be assumed equal to $2Rg$;

3 vertically upwards: gross mass R multiplied by the acceleration of gravity g (Rg);

4 vertically downwards: doubled gross mass R multiplied by the acceleration of gravity g ($2Rg$).

2.2.4 The following safety factors used for determining of allowable stress shall be provided at each of the above loadings:

for metals with a distinct yield plateau: safety factor of 1,5 with respect to the minimum assured yield point R_e ;

for metals with a non-distinct yield plateau: safety factor of 1,5 with respect to the assured conventional yield point R_{p1} for steels of austenitic class or $R_{p0,2}$ for steels of other classes.

At the loading of $4g$, the safety factor used for determining of allowable stress shall be taken equal to 1 with respect to the minimum assured yield point or R_{p1} , $R_{p0,2}$.

2.2.5 The minimum thickness of shell and heads in a tank constructed of standard steel shall be not less than 5 mm with $D_{ins.} < 1800$ mm and 6 mm with $D_{ins.} \geq 1800$ mm ($D_{ins.}$ = inside diameter of the tank).

2.2.6 In a case where provision is made for an additional tank protection and hydraulic test pressure is less than 0,265 MPa, the minimum thickness of shell and heads in a tank constructed of standard steel, may be reduced but shall not be less than 3 mm with $D_{ins.} < 1800$ mm and 4 mm with $D_{ins.} \geq 1800$ mm. The additional protection may be afforded by:

continuous outer multiply protection of "sandwich" type;

or double-wall construction of the tank;

or mounting of the tank in a full scantling framework.

2.2.7 For specific dangerous goods the minimum thickness of shell and heads in a tank constructed of standard steel shall be increased subject to special consideration by the Register.

2.2.8 The minimum thickness of shell and heads in a tank intended for dangerous goods, constructed of the materials other than standard steel, shall be determined by the formula

$$S_1 = \frac{21,4S_0}{\sqrt[3]{R_{mi}A_5}} \quad (2.2.8)$$

where S_0 = minimum thickness of shell and heads in tanks constructed of low-carbon steel, mm;
 S_1 = specified equivalent of the material used for construction of the tank, mm;
 A_5 = minimum assured elongation of the metal at the tensile test, % (obtained on a standard five-fold specimen);
 R_{mi} = minimum assured tensile strength of the material at the tensile test, MPa.

2.2.9 In any case the minimum thickness of shell and heads in a tank shall be not less than 3 mm, regardless of the material used for its construction.

2.2.10 Corrosion allowances shall be accepted in accordance with the requirements of the national and/or international standards and shall be in each case specially considered by the Register.

2.2.11 The materials used for the manufacture of components parts and assemblies which are in contact, or may come in contact, with the cargo carried in the tank container shall be resistant to the effects of that cargo.

2.2.12 A tank may be constructed of composite materials on condition that the thickness of its shell and heads is specially considered by the Register in each case.

Use of nonmetallic (polymer) composite materials for the tanks shall be guided by the normative methodical instructions on design, manufacture, operation and repair of pressure vessels for storage and transport of dangerous goods, if not otherwise stated.

2.2.13 Tanks or tank compartments with no vacuum relief devices shall be so constructed as to withstand an external pressure of at least 0,04 MPa above the internal pressure without permanent deformation and abnormalities which may render the tank container unfit for the designed purpose.

If tanks of tank containers intended for transport of non-refrigerated liquefied gases shall be exposed to high external pressure before filling or during discharge, they shall be designed so that to withstand external manometer pressure exceeding internal pressure not less than by 0,09 MPa and shall be tested by this pressure.

2.2.14 The ullage space for a tank for liquids is to be determined depending on the kind of cargo carried; it shall, however, be minimum 2,5 per cent of total capacity at the environment temperature of 50 °C. In no case shall the tank be liquid-full at the environment temperature of 55 °C. For tanks intended for the transport of gases, the maximum mass of liquefied gas per litre of tank capacity shall not exceed the density of the liquefied gas at 50 °C multiplied by 0,95. Furthermore, the tank shall not be liquid-full at 60 °C.

Initial filling rate of tank containers intended for transport of non-refrigerated liquefied gases shall be so that if temperature increases to the level, at which saturated vapour pressure is equal to the maximum allowable working pressure, the volume occupied by the liquid does not exceed 98 per cent.

2.2.15 Tanks of more than 13500 l in capacity, intended for the transport of liquids with kinematic viscosity of no more than 2680 mm²/s, shall be subdivided by baffle plates into sections with max-

imal capacity of 7500 l if the tank is not filled to 80 % of its total capacity.

2.2.16 Tanks designed for the transport of specific dangerous goods shall have no openings located below the level of liquid.

2.2.17 Weld joints of tanks shall be inspected by radiographic examination or some other method approved by the Register, to the extent agreed with the Register.

2.3 ARRANGEMENT OF OPERATIONAL EQUIPMENT

2.3.1 The operational equipment (stop valves, safety devices, manholes, instruments etc.) shall be so arranged as to prevent it from being broken away or damaged while in use. Leak-proofness of the operational equipment shall be maintained even if the tank container is tipped over.

2.3.2 Safety devices of tanks for the transport of dangerous goods.

2.3.2.1 Each tank or tank compartment shall be provided with at least one spring type pressure-relief valve and may be additionally fitted with a frangible disk — or a fusible element arranged parallel to the spring pressure-relief valve, with the exception of cases specified in 2.3.2.6 and for tanks intended for gases. The safety devices shall be arranged in the vapour space in the top of the tank as near as possible to the tank's mid-length.

Each tank intended for transport of non-refrigerated liquefied gases shall have at least two independent spring-type safety valves.

Tank intended for transport of refrigerated non-combustible liquefied gases and hydrogen may be additionally fitted with frangible disks together with spring-type valves.

2.3.2.2 The pressure at which the spring pressure-relief valve shall begin opening shall be at least 100 % and at most 125 % of the maximum allowable working pressure and shall be a matter of special consideration by the Register in each case. Upon release of pressure the spring pressure-relief valve shall close at a pressure of at least 10 % below the pressure at which the valve begins opening and shall remain closed under all lower pressures.

2.3.2.3 Frangible disks arranged parallel to the spring pressure-relief valves shall rupture at a pressure equal to the hydraulic test pressure.

2.3.2.4 Fusible elements shall melt within the temperature range from 110 to 149 °C provided that the pressure which is built up in the tank at the melting temperature of the fusible element shall not exceed the test pressure. A fusible element shall have no thermal insulation or screen.

2.3.2.5 The total discharge capacity of the safety devices of a tank for liquid shall be such that under

no conditions the pressure in tank exceeds the pressure at which the safety device comes into action by more than 20 %. The total discharge capacity of the spring pressure-relief valves of a tank for gas shall be such that under no conditions the pressure in tank exceeds the maximum allowable working pressure by more than 10 %.

The calculation of the discharge capacity and discharge area will be specially considered by the Register in each particular case.

2.3.2.6 Tanks intended for the transport of specific dangerous goods shall be provided with safety devices including frangible disk located ahead of the spring type pressure-relief valve. A pressure gauge or another indicator of the disk integrity shall be arranged between the frangible disk and the valve. The frangible disk in this case shall rupture at a pressure by 10 % greater than the pressure at which the pressure-relief valve begins opening. Use of such devices shall be a matter of special consideration by the Register in each particular case.

2.3.2.7 Stop valves shall not be installed between the safety device and the tank.

2.3.2.8 Safety devices shall be so constructed as to prevent any change of their setting without the knowledge of authorized persons.

2.3.3 Pressure-relief valves of tanks intended for non-dangerous goods.

2.3.3.1 The tank containers intended for the transport of non-dangerous goods may be provided with a safety device consisting of one frangible disk.

2.3.3.2 The pressure-relief valves shall be so designed as to begin opening at maximum allowable working pressure and to be fully open at a pressure exceeding the pressure at which the valves begin opening, by not more than 10 %.

2.3.3.3 The pressure-relief valves shall have a clear area of discharge, when fully open, sufficient to provide the minimum pressure relief capacity according to Table 2.3.3.3.

Table 2.3.3.3

Minimum pressure-relief capacity	Designation of tank-container				
	1AA	1A, 1AX	1BB, 1B, 1BX	1CC, 1C, 1CX	1D, 1DX
dm ³ /s	106	95	80	63	47
m ³ /min	6,4	5,7	4,8	3,8	2,8

2.3.4 Vacuum valves shall be constructed in a way as to permit being set to internal pressure considering the kind of cargo carried, but in any case not below 0,021 MPa. If flammable substances are carried, the vacuum valves shall be fitted with flame trap.

2.3.5 Closing fittings and operation equipment.

2.3.5.1 All the tank openings for the tank loading and discharge (cargo and air lines) shall be fitted with manually operated stop valves located as close to the tank as possible. The stop valves with screwed spindles shall be manually operated and closed by the clockwise motion of a handwheel. The "Open/Closed" position and the closing direction for other valves shall be clearly indicated. Other openings, except those for safety devices, ventilation arrangements, thermometers, instruments and inspection holes, shall be provided with stop valves or other tight closure.

Note. It is recommended to provide outlet flanges of stop valves with liquid-tight removable blinds (bolted flange or screw cap).

2.3.5.2 The tank containers with bottom discharge for the dangerous goods specified in valid normative documents, shall be equipped, as a minimum, with two shut-off devices arranged independently of one another and in series, namely:

.1 an external stop valve fitted as close to the tank as reasonably practicable;

.2 shut-off device impermeable for liquid on the end of drainage pipe, which may be a bolted blank flange or screwed cover.

2.3.5.3 The tank containers with bottom discharge for the solid, crystallizing or high viscosity dangerous goods specified in valid normative documents shall be equipped with three shut-off devices arranged independently of one another and in series, namely:

.1 a self-closing internal stop valve within the tank or within a flange welded to the tank or within a union being a part of the tank. The valve shall remain closed (operable) when subjected to impact or other inadvertent act. The valve may be operable from above and below; the "Open"/"Closed" position shall be controlled, whenever possible, from below. Moreover, it shall be possible to close the valve from an accessible position of the tank container that is remote from the valve itself;

.2 an external stop valve;

.3 a shut-off device in accordance with 2.3.5.2.2.

2.3.5.4 The discharge (filling) openings for specific dangerous goods shall be located above the load level.

Design, number and mutual arrangement of these shut-off devices shall comply with the national and international requirements applied to tank containers intended for transport of dangerous goods.

2.3.5.5 Tank containers may be fitted with cargo level indicators.

Tank containers for the carriage of liquefied gases shall be fitted with cargo level indicators. The construction of cargo level indicators shall comply with the applicable requirements of Part VIII

"Instrumentation" of the Rules for the Classification and Construction of Gas Carriers.

2.3.5.6 To permit inspection, repair and other works, the tanks shall have manholes not less than 500 mm in diameter. The covers of manholes shall be secured in an effective manner. The tightness shall be ensured by gaskets resistant to effects of the cargo carried and climatic conditions.

No inspection opening is needed in the vacuum insulated tanks.

2.3.5.7 The internal burst pressure of all piping and fittings shall be not less than the maximum of two following values: four times the maximum allowable working pressure of the tank or four times the pressure, to which it may be subjected during operation with working pump or other devices (except pressure-relief valves). Suitable provisions shall be made in every case to prevent damage to piping due to thermal expansion and contraction, jarring and vibration.

Pipe joints, which may be shut-off from two sides and which may contain liquid, shall be fitted with safety devices in order to avoid increased pressure in the closed pipe section.

2.3.5.8 All valves and fittings shall be located as near the tank as practicable and shall have additional external protection from mechanical damage and shall be grouped in a minimum number of positions on the tank.

2.3.5.9 The tanks and framework shall be adequately earthed.

2.3.5.10 The tank container or each compartment thereof shall be equipped with the pressure gauges connected with the vapour space of the container or compartments. A stop valve shall be fitted between the pressure gauge and tank.

2.3.5.11 The tank container jackets with vacuum insulation shall be fitted with a branch pipe for vacuum-gauge.

2.3.6 Materials.

2.3.6.1 The materials used for manufacture of parts and fittings units, as well as service equipment, which contact or may contact the cargo, shall be chemical-resistant to its effect within the temperature range specified in the technical documentation for the container.

2.3.6.2 The materials used for sealing fittings hatches and service equipment shall be chemical-resistant to the cargoes carried, elastic (where needed), durable and resistant to mechanical wear within the temperature range specified in the technical documentation for the container.

2.4 THERMAL INSULATION

2.4.1 Material of thermal insulation shall be, where possible, non-hygroscopic and physically and chemically resistant.

2.4.2 Thermal insulation shall not obstruct the production equipment.

2.4.3 Thermal insulation shall be protected to prevent the ingress of moisture and damage under normal operational conditions.

2.4.4 Thermal insulation directly in contact with the tank intended for substances transported at elevated temperature shall have ignition temperature at least 50 °C higher than the maximum design temperature of the tank.

2.4.5 Thermal insulation systems intended for reduction of the minimal emergency capacity of pressure-relief devices are subject to the special consideration by the Register and they shall, at least: remain effective at all temperatures below 649 °C; be jacketed with the material having melting point of 700 °C or greater.

2.4.6 Thermal insulation of tank containers intended for transport of non-refrigerated liquefied gases shall comply, among others, with the following requirements:

.1 in case a sun screen is used, it shall cover not less than the upper third but not more than the upper half of the tank surface and shall be separated from the tank surface by an air space 40 mm across;

.2 in case a complete cladding of insulating materials is applied, it shall provide heat transfer coefficient of not more than 0,67 W/(m²·K);

.3 in case the thermal insulation is gas-tight, a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the tank or its items of equipment.

2.4.7 The insulation systems of tank containers intended for transport of refrigerated liquefied gases shall comply with the applicable national and international requirements and are subject to special consideration by the Register in each case.

2.5 ADDITIONAL PLANTS

2.5.1 The refrigerating and/or heating plants, if provided for tank containers, shall conform to the requirements of Part III "Thermal Containers".

3 TESTING

3.1 GENERAL

3.1.1 The requirements of the present Section apply to tank containers of all designations, irrespective of their construction and material involved.

3.1.2 To achieve the specified test loadings, the tank shall be loaded with a suitable liquid. If the test loading cannot be met or the liquid is undesirable for use, the tank shall be loaded with another liquid with application of a supplementary loading so that the specified value of test loading is reached. The non-uniformity in distribution of test loading shall not exceed 20 %.

3.1.3 Upon completion of each test, the tank container shall show neither permanent deformations nor abnormalities which will render it unsuitable for the designed purpose.

3.1.4 Test loadings and testing procedures for lifting, stacking (except requirements for total mass of container), longitudinal restraint are specified in Section 3, Part II "General Cargo Containers". When carrying out the stacking test, the internal test load mass shall be achieved only by filling the tank completely with water and the external forces applied to each of four top corner fittings of the container shall be as follows:

848 kN: for 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C and 1CX containers;
224 kN: for 1D and 1DX containers.

3.2 WALKWAYS STRENGTH

3.2.1 The tank container has no internal loading. The test is carried out by the application of external force represented by a load of 3 kN uniformly distributed over an area of 600 × 300 mm. This load shall be applied vertically downwards to the outside of the walkways, at the weakest area.

3.3 LADDER STRENGTH

3.3.1 The tank container has no internal loading. The test is carried out by the application of external force represented by a concentrated load of 2 kN. This load shall be applied vertically downwards to the middle of each rung.

3.4 LONGITUDINAL INERTIA TEST

3.4.1 The tank container having a uniformly distributed internal loading so that the combined mass of the container and test load is equal to R , shall be positioned with its longitudinal axis vertical.

Note. The internal loading may be applied to the tank container after it is in vertical position.

This test is not required for containers without longitudinal frames.

One pair of the bottom corner fittings at the lower end shall be restrained in this position against lateral and vertical shifting. The other pair of fittings at the upper end shall be restrained against lateral shifting only.

Depending on construction of the tank container, subject to agreement with the Register, other container positioning scheme may be used.

For testing of the opposite end, the tank container shall be turned to 180° about its vertical axis so that the pair of bottom corner fittings that were at the upper end, are at the lower end.

Restraint is provided in similar manner.

The tank container is held in this position, for each end, for at least 5 min (Fig. 3.4.1).

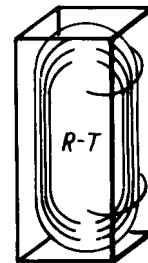


Fig. 3.4.1 Longitudinal inertia test

During the test and after unloading, there shall be identified damages, elastic and permanent deformations of the tank, its fittings and framework.

3.5 LATERAL INERTIA TEST

3.5.1 The tank container having a uniformly distributed internal loading so that the combined mass of the container and test load is equal to R , shall be positioned with its transverse axis vertical.

Note. The internal loading may be applied to the tank container after it is in lateral position. This test is not required for containers without longitudinal frames.

One pair of the bottom corner fittings at the lower side shall be restrained in this position against lateral and vertical shifting. The other pair of fittings at the upper side shall be restrained against lateral shifting only.

Depending on construction of the tank container, subject to agreement with the Register, other container positioning scheme may be used.

For testing of the opposite side, the tank container shall be turned to 180° about its vertical axis so that the pair of bottom corner fittings that were at the upper side, are at the lower side.

Restraint is provided in similar manner.

The tank container is held in this position, for each side, for at least 5 min (Fig. 3.5.1).

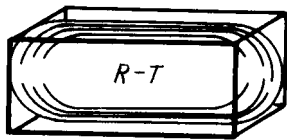
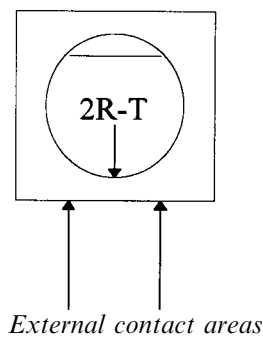
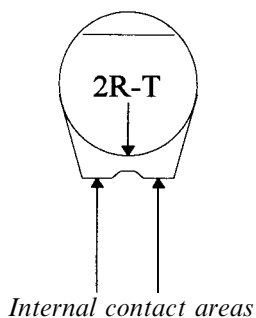


Fig. 3.5.1 Lateral inertia test

During the test and after unloading, there shall be identified damages, elastic and permanent deformations of the tank, its fittings and framework.



External contact areas



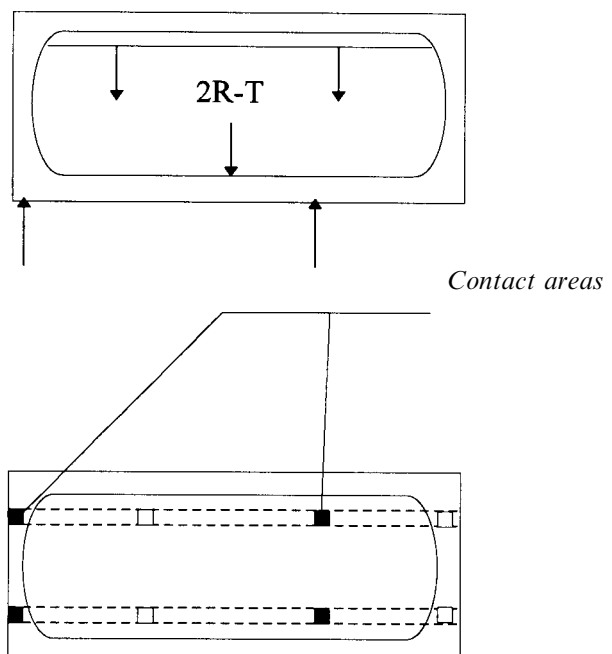
Internal contact areas

3.6 LOAD-TRANSFER AREA TEST

3.6.1 A tank container filled with water to a mass $2R-T$ shall be placed on four supports in such a way that two supports are against the external contact areas and two — against the internal ones (see 3.6.1). Each of the supports shall have a bearing surface of $150\text{ mm} \times 150\text{ mm}$. The container shall be under load during 5 min. An identical test shall be carried out for the second pair of contact areas. In case where the load-transfer areas of a tank container are arranged symmetrically only one pair of contact areas shall be subjected to the test. During the test and after unloading, there shall be identified damages, elastic and permanent deformations of the tank, its fittings and framework.

3.7 DYNAMIC TEST

3.7.1 A tank container filled to its gross mass R shall be dynamically tested for a longitudinal impact with an overload of at least $4g$ for dangerous goods and $2g$ for non-dangerous goods within the time period representative for the impulses typical for the railway transport.



Contact areas

Fig. 3.6.1 Load-transfer area test

The procedure for impact tests shall comply with the requirements of Section 41, Part IV of the UN Manual of Tests and Criteria.

After the test, the damages and deformations of the tank, its fittings and frame shall be identified.

3.8 PRESSURE AND LEAKPROOFNESS TESTS

3.8.1 The pressure test shall be carried out after the completion of the test described in 3.1 to 3.7.

3.8.2 Each tank container shall be subjected to pressure test before shot-blasting or other tank surface treatment, installation of thermal insulation and protective covering (if provided).

3.8.3 Pressure and vacuum relief valves shall be removed prior to beginning the pressure test.

3.8.4 A Tank containers intended for transport of non-dangerous goods with maximum allowable working pressure not more than 0,7 MPa shall be subjected to pressure test by not less than 1,5 maximum allowable working pressure but not less than 0,045 MPa.

Tank containers intended for transport of classes 3 — 9 dangerous goods shall be subjected to pressure test, which shall be not less than 1,5 design pressure.

Tank containers intended for transport of non-refrigerated liquefied gases shall be subjected to pressure test, which shall be not less than 1,3 design pressure.

Tank containers intended for transport of refrigerated liquefied gases shall be subjected to pressure test, which shall be not less than 1,3 maximum allowable working pressure. For tank containers with vacuum insulation, pressure at hydraulic tests shall exceed not less than 1,3 times the sum of the maximum allowable working pressure and 0,1 MPa. The test pressure shall be maintained for the period of time necessary to enable a complete inspection of the tank and its fittings to be made but not less than 30 min. The tank testing procedure different from that set forth in this paragraph shall be subject to a special consideration by the Register.

3.8.5 Where the tank is provided with compartments, each compartment shall be tested. In this case compartments adjacent thereto shall be empty and the pressure in the compartments shall correspond to the atmospheric.

3.8.6 The test pressure shall be measured at the top of the tank or compartment; with the tank in its normal operational position.

3.8.7 The main membrane stresses arising in shell and heads of the tank under pressure test shall not exceed $0,75R_e$ ($0,75R_{p0,2}$, $0,75R_{p1}$) or $0,5R_{mi}$, whichever is lesser.

Note. R_e , $R_{p0,2}$, R_{p1} and R_{mi} see 2.2.

For metals characterized only by the minimum assured tensile strength, stresses shall not exceed $0,375R_m$.

3.8.8 If the results of pressure test are satisfactory, the tank assembled with operational and safety fittings shall be subjected to leakproofness test. The test is performed using pressurized air. The test pressure shall be taken with regard to the standing safety requirements relevant to the test location and shall be 0,25 to 0,9 times the maximum allowable working pressure, subject to special consideration by the Register in each particular case. Other tank leakproofness test procedures may be used, subject to the Register approval.

3.8.9 The refrigerating and/or heating systems, if provided for the tank container, shall be tested by pressure equal to 1,5 times the working pressure of the system. Duration of the test shall be such as is necessary for the system to be thoroughly inspected.

3.8.10 Other test procedures may be used if approved by the Register.

3.9 THERMOTECHNICAL TESTS OF TANK CONTAINERS INTENDED FOR TRANSPORT OF REFRIGERATED LIQUEFIED GASES

3.9.1 Thermotechnical tests shall be carried after the tests specified in 3.1—3.8.

3.9.2 Thermotechnical tests shall consist of two stages:

.1 check of effectiveness of insulation system (heat influx in watts);

.2 check of reference holding time for each refrigerated liquefied gas intended for the transport in tank container.

3.9.3 Check of insulation system effectiveness may be carried out by two procedures:

.1 constant pressure test (for instance, at atmospheric pressure) when loss of refrigerated liquefied gas is measured during the given period of time;

.2 closed system test when an increase of pressure in casing is measured during the given period of time.

When the tests are run at constant pressure, change of atmospheric pressure shall be considered. A correction for any change of ambient temperature shall be made during both tests assuming that ambient temperature is equal to 30 °C.

3.9.4 Reference holding time is checked for each refrigerated liquefied gas on the basis of the following data:

.1 effectiveness of the insulation system determined in accordance with 3.9.3;

.2 the lowest pressure, for which safety devices are adjusted;

.3 initial filling conditions (filling temperature and pressure);

.4 estimated ambient temperature is taken equal to 30 °C;

.5 physical properties of specific refrigerated liquefied gas intended for transport.

3.9.5 Test procedure shall be approved by the Register.

3.10 TESTING OF PRESSURE-RELIEF AND VACUUM VALVES

3.10.1 During testing of the pressure-relief valves the following parameters shall be determined:

.1 opening pressure of the valve;

.2 discharge capacity with the valve being fully open (at the prototype test);

.3 closing pressure of the valve.

3.10.2 The vacuum valves shall be tested for opening pressure.

3.11 INSPECTIONS

3.11.1 A tank container shall be subjected to inspections according to 3.17, Part II "General Cargo Containers".

3.11.2 After completion of tests all service equipment shall be tested in operation.

4 MARKING

4.1 MANDATORY MARKING

4.1.1 Tank containers shall be marked in accordance with the requirements set forth in Section 4, Part I "Basic Requirements".

4.2 TARE MASS

4.2.1 Tare mass to be marked on each tank container during manufacture shall be obtained by weighing each tank container as a complete unit after it has been painted. The actual tare mass shall lie within the limit of tolerances stated in the approved technical documentation.

4.3 IDENTIFICATION PLATE WITH TANK DATA

4.3.1 The identification plate in English shall be permanently attached to the tank container framework, in addition to the CSC and CCC Plates, for the indication of at least the following data.

1. Country of manufacture.
2. UN (UN designation and number of instruction on the tank in accordance with classification of the IMDG Code).
3. Approval country,
Approval number (Number of a Certificate of Compliance for Prototype Tank Container).
4. Letters of the design model (Designation of tank container design (name of model)).

5. Manufacturer's name or mark.
6. Manufacturer's serial number.
7. Authorised body for the design approval, Russian Maritime Register of Shipping.
8. Owner's registration number.
9. Month and year of manufacture.
10. Pressure vessel code, to which the shell is designed (tank calculation standard).
11. Test pressure, bar/MPa.
12. Maximum allowable working pressure (MAWP), bar/MPa*.
13. External design pressure, bar/MPa*.
14. Design temperature range, °C.
15. Water capacity at 20 °C, l.
16. Water capacity of each compartment at 20 °C (if any), l.
17. MAWP for heating/cooling system, bar/MPa*.
18. Shell material(s) and material standard reference(s).
19. Nominal thickness of the shell and heads.
20. Minimum equivalent thickness in reference steel, mm.
21. Insulation material (if applicable).
22. Lining material (if applicable).
23. Initial pressure test date and the Register brand.
24. Date and type of most recent periodic test(s), month, year, test pressure, bar/MPa*, stamp of the Register surveyor who witnessed the most recent test.

Notes: 1. In addition to the text in English it is allowed to give text in Russian or other language upon the customer's request.

2. Design reference temperature, °C, shall be specified on the identification plate of tank containers intended for transport of non-refrigerated liquefied gases; indication of protective covering and insulation is not required.

3. The following information shall be additionally specified on the identification plate of tank containers intended for transport of refrigerated liquefied gases.

3.1 Minimum design temperature, °C, instead of design temperature range.

3.2 The full name(s) of the gas(es), for which transport the tank container is approved.

3.3 Type of the insulation "thermally insulated" or "vacuum insulated" instead of "Lining material".

3.4 Effectiveness of the insulation system (heat influx), watts (W).

3.5 Reference holding time, days or hours.

3.6 Initial pressure, bar/MPa.

3.7 Degree of filling for each refrigerated liquefied gas approved for transport.

4. If the tank container is approved for handling at sea then the following inscription shall be written on the plate: "OFFSHORE TANK CONTAINER".

4.3.2 A blank space shall be provided on the plate for entering the dates of subsequent hydraulic tests, as well as for putting the Register brand.

4.3.3 The data marked on the plate shall be embossed on, or indicated on its surface in any other conspicuous way.

4.3.4 The plates shall be manufactured of corrosion-resistant and incombustible material. The letters shall be not less than 3 mm in height.

4.3.5 The identification plate shall be fixed as near as possible to the CSC and CCC Plates.

4.4 FITTINGS

4.4.1 All the fittings shall have inscriptions showing the intended purpose of the fitting concerned.

4.4.2 The vacuum relief valve shall bear the marking of the pressure to which it is set.

4.4.3 The pressure-relief valve shall be marked with the following data:

.1 pressure at which the valve starts to open, MPa or bar;

.2 air capacity at 0 °C with the valve being fully open, m³/h;

.3 manufacturer's name and identification number;

.4 valve model;

.5 the Register brand.

4.4.4 Safety devices (frangible disks, fusible elements) shall be plainly and permanently marked with the pressure or temperature at which they are set to operate, and such other markings as may be required by the Register.

4.4.5 Each branch pipe of tank container shall have clear marking of its purpose.

4.4.6 Stop devices shall be marked as follows:

.1 name or manufacturer's trademark;

.2 designation of the stop device model or number by catalogue;

.3 nominal diameter, mm;

.4 conditional pressure, MPa (may be indicated the maximum allowable working pressure and the permissible temperature);

.5 direction of medium flow;

.6 brand of body material.

4.5 INSTRUCTIONS

4.5.1 In immediate proximity to discharge/loading valves, a plate with the operation instructions made so as to be fit for continuous use shall be attached to the tank container at a readily visible place. The instructions shall be written both in the national and the English languages.

PART V. PLATFORM CONTAINERS

1 GENERAL

1.1 APPLICATION

1.1.1 The provisions of the present Part apply to 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B, 1BX, 1CC, 1C, 1CX platform containers.

1.1.2 Platform containers shall comply with requirements of Part I "Basic Requirements" as applied to the platform containers, and with requirements of the present Part.

1.2 DEFINITIONS AND EXPLANATIONS

1.2.1 For definitions and explanations related to the general terminology of the present Rules, see Part I "Basic Requirements". For the purpose of this Part, the following definitions and explanations have been adopted.

Platform (container) means a container having only a base with floor and equipped with top and bottom corner fittings.

Platform-based containers (platform containers), grouped as follows:

platform-based container with incomplete superstructure and fixed ends is a container having a base with floor and non-folding ends equipped with top corner fittings; longitudinal members between the ends other than at the base are not provided;

platform-based container with incomplete superstructure and folding ends is a container having a base with floor and folding ends equipped with top corner fittings; longitudinal members between the ends other than at the base are not provided;

platform-based container with complete superstructure is a container having a base with floor, top side rails and the ends equipped with top corner fittings, roof or open top.

Folding ends of a platform-based container mean the structures which may be laid on the floor for the purpose of transportation or stowage of empty containers.

Interlocking devices of platform-based container with folding ends are devices securing the end structure in vertical position, as well as those interconnecting empty containers in folded condition to form an interlocked pile (module).

1.3 SCOPE OF TECHNICAL SUPERVISION

1.3.1 Technical supervision of the Register shall cover:

- .1 base structure with floor;
- .2 corner fittings;
- .3 end structure of platform-based containers;
- .4 locking devices of end structure;
- .5 framework.

1.4 TECHNICAL DOCUMENTATION

1.4.1 For platform containers, the technical documentation specified in 1.3.3, Part I "Basic Requirements", shall comprise:

- .1 specification of the container;
- .2 test program and test procedure for the containers;
- .3 State Health Authorities approval of the coverings, the floor material with antiseptic impregnation, and the sealants;
- .4 drawings of the following parts, assemblies and general views, inclusive of the specified dimensions:
 - corner fittings;
 - bottom side rails;
 - bottom end rails;
 - corner posts, if any;
 - base structure with corner fittings, and the gooseneck tunnels;
 - end walls, if provided;
 - hinges and locking devices of end walls, in case of folding end structure;
 - interlocking devices connecting empty containers to form a pile (module) — only for platforms (containers) without end structure and platform-based containers with folding ends;
 - securing devices for cargo;
 - floor (fastening, caulking, size of panels and boards, construction of planking);
 - CSC Plate;
 - framework;
 - general views and markings of platform containers.

The extent of above documentation is the minimum required.

2 TECHNICAL REQUIREMENTS

2.1 DIMENSIONS

2.1.1 The dimensions of the base (width W and length L) for platform containers of all types are to comply with those shown in Table 2.1.2, Part I "Basic Requirements".

2.1.2 The length L of empty platform-based containers with fixed and folding ends, taken between the top corner fittings of the ends in erected position, may coincide with the figures shown in Table 2.1.2.

Table 2.1.2

Designation	L_{\max} of empty container, mm	L_{\min} of container laden to gross mass R , mm
1AAA, 1AA, 1A, 1AX	12202	12172
1BBB, 1BB, 1B, 1BX	9135	9105
1CC, 1C, 1CX	6068	6042
Note. Using L_{\max} and L_{\min} is not recommended.		

2.1.3 No part of the container shall project beyond the external dimensions given in Table 2.1.2 for platform containers with incomplete superstructure and in Table 2.1.2, Part I "Basic Requirements" for the rest of platform containers.

2.1.4 Series 1 platform containers with the ends of a height other than specified in Table 2.1.2, Part I "Basic Requirements" shall be specially considered by the Register in each particular case.

2.2 END STRUCTURE

2.2.1 The ends of platform-based containers with fixed or folding ends may be interconnected by top

rails or be constructed with no top rails as free-standing posts.

2.2.2 The ends designed with a top rail between them may be constructed as end walls.

2.2.3 Platform-based containers with folding ends shall be equipped with appropriate devices securing the top corner fittings at each end in folded condition to permit stacking, as well as with interlocking devices connecting empty containers with folded ends to form a module; the face supporting the upper container when stacking or forming a module shall protrude minimum 6 mm above the top of container in folded condition.

2.2.4 Any extending parts of the platform-based containers which in service may cause a dangerous situation to occur shall be equipped with fixing devices with external indication of the fixed position.

2.3 BASE STRUCTURE

2.3.1 The base structure shall be equipped with devices for securing the cargo (hooks, shackles, rings, etc.) so arranged as not to protrude above the face of floor and beyond the overall dimensions of the platform container. These devices shall be capable of withstanding the forces induced by longitudinal and lateral loads, unless other means of securing the cargo are provided.

2.3.2 The distance between the face of floor and the plane formed by upper faces of top corner fittings shall be not less than 6 mm.

2.3.3 Structural deflection in the base of unladen container is permitted.

3 TESTING

3.1 GENERAL

3.1.1 The requirements of this Section apply to platform containers specified in 1.1; irrespective of design and material involved.

3.1.2 Upon completion of each test, the platform containers shall show neither permanent deformations nor abnormalities which may render them unsuitable for the designed purpose.

3.1.3 A platform-based container with incomplete superstructure and folding ends shall have the ends in erected (service) condition.

3.2 STACKING

3.2.1 The test load and the stacking test procedure for platform containers are set out in 3.7, Part II "General Cargo Containers". The platforms shall be tested without internal loading while the platform-based containers shall have uniformly distributed internal loading such that the combined mass of the container and the test load is equal to $1,8R$.

3.3 LIFTING

3.3.1 The platform container under test shall have a uniformly distributed internal loading such that the combined mass of the container and test load is equal to $2R$.

3.3.2 When the container is lifted by the top corner fittings, the lifting devices shall be secured through the side apertures in such a way that the line of action of the lifting force is upright.

After lifting the container shall be suspended for 5 min and then carefully lowered to the ground.

3.3.3 When the container is lifted by the bottom corner fittings, the lifting devices shall be secured in such a way that the line of action of the lifting force and the outer face of the corner fitting shall be no further apart than 38 mm, with the lifting force applied at an angle to the horizontal of:

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

After lifting the container shall be suspended for 5 min and then carefully lowered to the ground.

3.4 RACKING

3.4.1 A platform is not to be subjected to racking test.

3.4.2 The test load and racking test procedure for platform-based containers with incomplete structure and fixed or folded ends, as well as for containers with complete superstructure, are set out in 3.10 and 3.11, Part II "General Cargo Containers".

3.4.3 When testing for longitudinal racking of platform-based containers with incomplete superstructure, external forces equal to 150 kN shall be distributed in the ratio 2:1 (75 and 50 kN) between each of the top corner fittings: at first, towards and then away from the corner fittings. The lesser force shall be applied to the side of vertical restraint.

During the test the measurements shall be taken to determine vertical movement of the top with respect to the base, which shall not exceed 42 mm.

3.4.4 Prior to testing for transverse racking of platform-based containers with incomplete superstructure and fixed and folding ends constructed as corner posts, the top corner fittings at each end may be interconnected by a top rail used for this test only. In such case, external forces equal to 150 kN shall be applied simultaneously to each of the top corner fittings on one side of the container.

If the corner posts are not interconnected by the top rail, external forces equal to 75 kN shall be applied separately to each top corner fitting.

In the course of testing the changes in lengths of the diagonals, the sum of which shall not exceed 60 mm, shall be measured.

3.5 END WALL STRENGTH

3.5.1 Subject to this test are the platform-based containers with complete superstructure, as well as those having incomplete superstructure and fixed and folding ends constructed as end walls.

3.5.2 The test load and the procedure of testing for end wall strength are set out in 3.13, Part II "General Cargo Containers".

3.6 LONGITUDINAL RESTRAINT (STATIC TEST)

3.6.1 The test load and the procedure of testing for longitudinal restraint of platform containers of the specified types are set out in 3.12, Part II "General Cargo Containers".

3.7 FLOOR STRENGTH

3.7.1 The test load and the procedure of testing for floor strength of platform containers are set out in 3.9, Part II "General Cargo Containers".

3.8 ADDITIONAL TESTS FOR PLATFORM-BASED CONTAINERS WITH INCOMPLETE SUPERSTRUCTURE AND FOLDING ENDS

3.8.1 Stacking of containers in folded condition.

3.8.1.1 The test shall be carried out to prove the ability of a platform-based container with folded ends to support under acceleration conditions the total mass of stacked containers of the same length as the platform container, loaded each to the mass R , account being taken of the relative eccentricities between the containers due to clearances.

3.8.1.2 External forces mentioned in 3.7, Part II "General Cargo Containers" shall be applied vertically and simultaneously to each of the four top corner fittings through test corner fittings or pads of the same plan dimensions as the top corner fittings of the container. The test corner fittings or pads shall be placed in such a way with respect to the top corner fittings as to cover all positions of their offset by 25 mm laterally and 38 mm longitudinally.

3.8.2 Lifting by the top.

3.8.2.1 The test shall be carried out to prove the ability of the platform container and its interlocking devices (see 2.2.3) to withstand the action of vertically applied forces when forming a modular groups of folded empty containers.

3.8.2.2 The platform container with folded ends shall be subjected to a loading equal to $(2N-1)T$ on each interlocking device (where N — number of containers in modular group, T — tare mass, kg) and shall be carefully lifted by all four top corners in a

way as to avoid significant acceleration forces being created.

3.9 INSPECTIONS

3.9.1 The platform containers of the specified types shall undergo the inspections stated in 3.17, Part II "General Cargo Containers" in so far as these inspections are applicable.

PART VI. NON-PRESSURIZED BULK CONTAINERS

1 GENERAL

1.1 APPLICATION

1.1.1 The provisions of the present Part apply to containers intended for the transport of non-pressurized solid bulk cargoes.

1.1.2 Non-pressurized bulk containers shall comply with requirements of Part I "Basic Requirements" and with requirements of the present Part.

1.1.3 Containers intended for the transport of dangerous solids in bulk are subject to special consideration by the Register in each case.

1.2 DEFINITIONS AND EXPLANATIONS

1.2.1 For definitions and explanations related to the general terminology of the present Rules see Part I "Basic Requirements". For the purpose of this Part, the following definitions and explanations have been adopted.

Non-pressurized bulk container means a container used for the transport and storage of unpackaged solid bulk cargoes, equipped with devices for gravity loading and discharge.

Non-pressurized bulk container of "box" type means a container with rectangular cargo space, provided with a door opening at least in one end wall and with gravity discharge. Such container may be used as a general cargo container.

Non-pressurized bulk container of "hopper" type means a container without door openings and having discharge devices arranged in horizontal plane.

Dry solids in bulk means assemblies of separate solid particles normally in contact with one another and capable of fluid flow.

Bulk density is the mass per unit volume of dry bulk solids.

Cargo capacity (body) means the space within the container bounded by the end and side walls, bottom and roof or a soft cover (tarpaulin, plastics, etc.) in case of non-hermetic containers.

1.3 SCOPE OF TECHNICAL SUPERVISION

1.3.1 Technical supervision of the Register shall cover:

- .1 framework (bearing structure);
- .2 walls, floor, roof, doors and door locks for the "box" type containers;
- .3 corner fittings;
- .4 walls, floor, roof, loading/discharge devices for "hopper" type containers.

1.4 TECHNICAL DOCUMENTATION

1.4.1 For bulk containers, the technical documentation specified in 1.3.3, Part I "Basic Requirements", shall comprise:

- .1 specification of the container;
 - .2 test program and test procedure for the container;
 - .3 State Health Authorities approval of the coverings, the floor material with antiseptic impregnation and materials;
 - .4 drawings of the following parts, assemblies and general views, inclusive of the specified dimensions:
 - corner fittings;
 - door locks, closures of manholes and discharge openings;
 - walls;
 - corner posts;
 - top and bottom side rails;
 - top and bottom end rails;
 - roof and manholes, if provided;
 - base structure with bottom corner fittings and gooseneck tunnel, if provided;
 - floor (fastening, caulking, size of panels and boards, construction of planking);
 - doors with their gaskets locks and closures of discharge openings, if provided in the door;
 - details covered by requirements of the CCC Convention;
 - CSC and CCC Plates;
 - general views and markings of the container.
- The extent of the above documentation is minimum required.

2 TECHNICAL REQUIREMENTS

2.1 "BOX" TYPE CONTAINER

2.1.1 No part of the side structure of the "box" type container, when test load is applied to its side walls, shall deflect by more than 40 mm beyond a plane formed by the side faces of corner fittings.

2.2 "HOPPER" TYPE CONTAINER

2.2.1 The walls of the "hopper" type container shall be firmly connected to the structural elements of the container. Supports and attachments of the cargo body to the framework shall not cause dangerous local stress concentration in the structure.

2.2.2 The container shall be capable of withstanding the inertia forces of the cargo, resulting from the motion of the vehicle.

2.2.3 When designing the "hopper" type container the forces of inertia shall be taken to be equivalent to forces of $2R_g$ longitudinally and vertically and R_g laterally. The loads corresponding to these forces may be considered to act individually; they shall be evenly distributed and act through the geometric centre of the cargo body.

2.2.4 With the "hopper" type container being fully laden under transverse restraint test, no part of side structure shall deflect by more than 50 mm beyond a plane formed by the outer faces of corner fittings.

2.3 ADDITIONAL STRUCTURES

2.3.1 The bulk containers may be provided with fork lift pockets, grapple arm lifting areas, goose-neck tunnel, as well as with ladders and walkways.

2.3.2 The container may be provided with one or several fumigation openings fitted with flanges.

2.3.3 The "hopper" type containers shall have manholes minimum 500 mm in diameter for the purpose of inspection, repair and other works.

2.3.4 The bulk containers shall have one or more loading openings, the number, construction and arrangement of which shall be such as to permit even distribution of cargo in the cargo body. Recommended arrangement of loading openings is shown in Fig. 2.3.4.

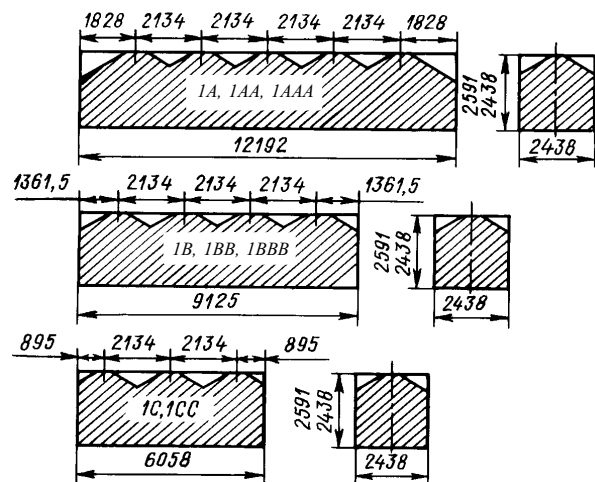


Fig. 2.3.4 Arrangement of loading openings

2.3.5 The bulk containers shall have one or more discharge openings, the number, construction and arrangement of which shall be such as to permit complete discharge of cargo by gravity or with the use of discharge devices that produce no vacuum within the cargo body.

3 TESTING

3.1 GENERAL

3.1.1 The requirements of the present Section apply to bulk containers of all designations, irrespective of their construction and materials involved.

3.1.2 To achieve the specified test loading, the container shall be loaded with suitable cargo. If the test loading cannot be met or the cargo is undesirable for use, the container shall be loaded with another

cargo, with application of a supplementary loading so that the specified value of test loading is reached.

3.1.3 Upon completion of each test, the container shall show neither permanent deformations, nor abnormalities which would render it unsuitable for the designed purpose.

3.1.4 Test loadings and test procedures for lifting, stacking, strength of roof (if any), strength of floor, racking, strength of side walls, longitudinal restraint and weathertightness of "box"

type containers are set out in Section 3, Part II "General Cargo Containers".

Test loadings during end wall strength test for 1AAA, 1AA, 1A, 1AX, 1BBB, 1BB, 1B and 1BX containers shall be equal to $0,4P_g$, while those for 1CC, 1C, 1CX, 1D and 1DX containers shall be equal to $0,6P_g$.

3.1.5 Test loadings and procedures for walkways and ladder strength tests are set out in Section 3, Part IV "Tank Containers".

3.1.6 Test loadings and procedures for "hopper" type containers are set out in Section 3, Part IV "Tank Containers", exclusive of 3.8.

3.2 AIRTIGHTNESS TEST

3.2.1 This test shall be carried out after completion of the tests stated in 3.1.4 or 3.1.6.

3.2.2 The container shall be in operating condition. Doorways, manholes and other openings shall be closed in the normal manner.

3.2.3 Air shall be supplied to the container through a connection precluding air leakages. A

pressure gauge shall be connected to the container itself. The measuring equipment used in testing shall be verified by a competent body and have an accuracy within the values specified in 4.2.3 of the Rules for Technical Supervision during Manufacture of Containers.

3.2.4 A positive pressure equal to 250 ± 10 Pa shall be produced in the container. The air supplied to the container shall maintain the said pressure. The air leakage from the container shall not exceed the following values:

for 1AAA, 1AA, 1A, 1AX containers, $30 \text{ m}^3/\text{h}$;

for 1BBB, 1BB, 1B, 1BX containers, $25 \text{ m}^3/\text{h}$;

for 1CC, 1C, 1CX containers, $20 \text{ m}^3/\text{h}$;

for 1D, 1DX containers, $15 \text{ m}^3/\text{h}$.

3.2.5 This test shall be carried out, if considered necessary.

3.3 INSPECTIONS

3.3.1 A bulk container shall be subjected to inspections according to 3.17, Part II "General Cargo Containers".

4 MARKING

4.1 The rear surface of a "hopper" type container shall bear inscription showing capacity of the container in m^3 .

If considered necessary, a plate with operation instructions made so as to be fit for continuous use

shall be attached to the container at a readily visible place, in immediate proximity to the discharge area.

The instructions shall be written both in the national and the English languages.

PART VII. OFFSHORE CONTAINERS

1 GENERAL

1.1 APPLICATION

1.1.1 The requirements of the present Part apply to offshore containers with maximum gross mass not exceeding 25000 kg.

1.1.2 The offshore containers shall comply with the applicable requirements of Part I "Basic Requirements", and with the requirements of the present Part. The containers intended for the transport of dangerous goods shall additionally comply with the requirements of the IMDG Code.

1.1.3 The offshore containers differing in design and dimensions from those defined in this Part are subject to special consideration by the Register in each particular case.

1.2 DEFINITIONS AND EXPLANATIONS

1.2.1 The definitions and explanations related to the general terminology of the present Rules are given in Part I "Basic Requirements". For the purpose of this Part, the following definitions and explanations have been adopted.

Offshore freight containers mean closed containers with doors for the transport of general cargo; open top containers for general or special cargo; tank containers for the transport of dangerous or non-dangerous goods; bulk containers; waste skips; special containers for the transport of special cargo.

Offshore service containers mean offshore containers designed and equipped for a special service task, usually as a temporary installation (laboratories, workshops, stores, control stations, etc.).

Primary structure means load carrying and supporting frames and load carrying panels of the container:

essential primary structure means main structural elements of the container which transfer the cargo load to the lifting equipment hook and include as least: top and bottom side rails, top and bottom end rails, corner posts, pad eyes;

Note. Other primary structure may also be considered as essential.

non-essential primary structure means other structural elements which do not fall under the definition of essential primary structure

(floor plates, protective frame members, etc.). Side and end panels, as well as the roof panels, are not considered to be part of the non-essential primary structure.

Secondary structure means container parts, which do not transfer the load to the lifting equipment hook. The secondary structure includes side and end panels, roof panels, doors, panel stiffeners, structural components used for protection of tank container vessels and cargo securing arrangements.

Lifting set means items of integrated lifting equipment used to connect the container to the lifting appliance (shackles, hooks, swivels, chains, rings, ropes, etc.).

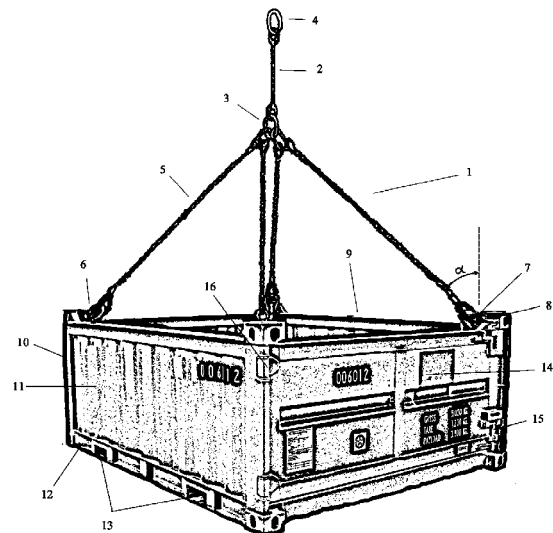


Fig. 1.2.1 Offshore container

1 — lifting set; 2 — fore runner; 3 — master link + intermediate links; 4 — master (top) link; 5 — sling; 6 — shackle; 7 — pad eye; 8 — ISO corner fitting; 9 — top side rail; 10 — corner post; 11 — left wall; 12 — bottom side rail; 13 — fork lift pockets; 14 — door; 15 — door lock; 16 — door hinge

1.3 SCOPE OF TECHNICAL SUPERVISION

1.3.1 Technical supervision of the Register shall cover the following container elements:

- .1 essential primary structure;
- .2 pad eyes;
- .3 corner fittings, if any;
- .4 tank (including material);
- .5 pressure units, cooling and heating appliances;

- .6 safety devices, piping, stop valves;
- .7 floor, loading and discharge devices (for bulk containers);
- .8 lifting set.

1.4 TECHNICAL DOCUMENTATION

1.4.1 The technical documentation submitted to the Register for approval shall comprise:

- .1 specification;
- .2 test program and procedure;
- .3 primary structure strength calculations;
- .4 drawings of parts, assemblies, general views, marking and plates, including materials and thickness, welding procedures and welded joints dimensions;
- .5 operation manual.

The extent of the above documentation is the minimum required.

2 TECHNICAL REQUIREMENTS

2.1 GENERAL

2.1.1 An offshore container shall have sufficient strength to allow loading and unloading from vessels offshore operating in a sea state with significant wave heights of 6 m.

2.1.2 To prevent the containers from overturning (tipping) on a moving deck, they shall be designed to withstand tilting at 30° in any direction, without overturning when loaded at its maximum gross mass, with the centre of gravity considered to be at the half height of the container.

2.1.3 Protruding parts on the outside of the offshore container that may catch other containers or structures shall be avoided. In any case, door handles, hatch cleats, or other protruding parts shall be so placed and so protected that they do not catch the lifting set.

2.1.4 Where containers are designed for stacking, the top corners of the container shall be raised to sufficient height above the roof and the top frame to prevent damage to the lifting set.

2.1.5 Top and bottom corner fittings complying with the requirements of Part I "Basic Requirements" may be mounted to the containers. Containers shall not be lifted offshore with shackles in these corner fittings.

2.1.6 The floor structure of open top container, which is liable to fill with water, shall have a suitable drainage facility.

2.1.7 Doors and hatches, including hinges and locking devices, shall be designed for at least the same horizontal forces as the primary structure. Locking devices shall be secure against opening of the doors during transport and lifting. Double doors shall have at least one such locking device on each door, locking directly to the top and bottom frame. Locking arrangements and door hinges shall be protected to prevent dislodgement by and damage from impact.

Doors shall be capable of being secured in the open position. If container weathertightness is required, the doors shall be equipped with seals.

2.1.8 The container shall be made of corrosion resistant materials and/or with the use of corrosion and paint protection.

2.1.9 Other structural elements: internal securing points, fork lift pockets, intermediate cargo decks shall be designed in accordance with the provisions of the standard EN 12079 and withstand the loads specified in the standard.

2.2 PAD EYES

2.2.1 Pad eyes shall be designed for a total vertical force of 3Rg.

Note. Design loads shall comply with the EN 12079 standard.

2.2.2 In order to prevent lateral bending moments on pad eyes, they shall be aligned together with the attached lifting set slings to the centre of lift, with a maximum manufacturing tolerance of $\pm 2,5^\circ$. The pad eyes set vertically and aligned to the centre of lift, allow to vary an angle of the lifting set slings to the vertical at the expense of using the lifting sets with slings of different length taking into account that this angle shall be equal to or less than 45°. Containers with pad eyes set at an angle to the vertical shall be provided with the lifting set which has the slings of the length precisely calculated for this angle.

2.2.3 Any difference in the diagonal measurements between lifting point centres shall not exceed 0,2 per cent of the length of a larger diagonal, or 5 mm, whichever is the greater.

2.2.4 Pad eye hole diameter shall not exceed 6 per cent of the nominal shackle bolt diameter. Maximum concentrated (bearing) stresses at the hole edges shall not exceed 2Re of the pad eye material at design load.

2.2.5 Inside width of shackle shall not exceed 25 per cent of the width of the pad eye.

2.2.6 Pad eyes shall be welded to the frame with full penetration welds. If the lifting force is trans-

ferred through the plate having a thickness greater than 25 mm, plates with specified through thickness properties shall be used.

3 STRUCTURAL STRENGTH

3.1 GENERAL

3.1.1 Equipment for offshore containers shall be designed and installed to withstand the dynamic loading and other environmental forces to which it may be exposed in service.

The following factors shall be used for equipment design:

- .1** dynamic factor $\psi = 3$;
- .2** design factor against breaking (safety factor) $s = 2$.

Equipment permanently installed on a container is considered to be part of the container for certification purposes.

3.1.2 The strength of a container shall be determined by calculation and proved by tests the scope of which is given in Section 8.

3.1.3 For design loads, no equivalent stress level shall exceed $0,85R_e$ for steel containers. The value of equivalent stress for containers made of other materials is subject to special consideration by the Register.

3.1.4 Design lifting and impact loads shall comply with the requirements of the EN 12079-1 standard.

3.1.5 Each container wall, including the doors, shall be designed to withstand an internal force of $0,6Pg$ evenly distributed over the whole surface.

3.1.6 The following minimum material thickness requirements shall apply to container structural members made of steel:

- .1** for external parts of corner posts and bottom rails for $R \geq 1000$ kg — 6 mm, for $R < 1000$ kg — 4 mm;
- .2** for other parts of the primary structure — 4 mm;
- .3** for parts of the secondary structure — 2 mm.

4 TANK CONTAINERS, BULK CONTAINERS AND THERMAL CONTAINERS

4.1 GENERAL

4.1.1 In addition to the requirements of this Part, the tank container frame shall be designed to protect the vessel and equipment.

4.1.2 Tank containers designed for the transport of liquids and non-refrigerated and refrigerated liquefied gases shall also comply with the applicable requirements of Part IV "Tank Containers".

4.1.3 Pressurized bulk tank containers shall also comply with the applicable requirements of Part IV "Tank Containers". Non-pressurized bulk containers shall comply with the applicable requirements of Part VI "Non-Pressurized Bulk Containers". Thermal containers shall also meet the applicable requirements of Part III "Thermal Containers".

4.1.4 Tank containers for dangerous goods shall additionally comply with the following requirements:

- .1** the top of the vessel and its fittings shall be protected by beams, plates or grating;

.2 no part of the vessel or its fittings shall extend to within 100 mm of the top of the framework;

.3 it shall not be possible for any part of the lifting set to foul fittings, manhole cleats or other protrusions on the vessel;

.4 protective beams shall be placed at or near the location where the vessel shell is nearest to the outer plane of the sides. Beams shall be spaced sufficiently close together to give the necessary protection;

.5 at the maximum calculated elastic deflection of any side member, the residual clearance between the member and any part of the vessel shell shall be at least 10 mm;

.6 no part of the vessel, the bottom valves, or other fittings, shall extend below a level 150 mm above the bottom of the framework. Any such part extending to within 300 mm of the bottom of the framework, shall be protected by beams or other equivalent means.

5 WELDING

5.1 GENERAL

5.1.1 Essential primary structural members shall be welded with full penetration welds. For other primary structure parts, welding without full penetration welds (fillet welds) may be used subject to special consideration by the Register, having regard

to the design and calculations. Intermittent fillet welding of secondary structure is acceptable.

5.1.2 Welding shall be carried out in accordance with the welding procedures approved by the Register by certified personnel in accordance with the requirements of the present Rules.

6 MATERIALS

6.1 GENERAL

6.1.1 Extra high strength steels, with yield stress above 500 N/mm² shall not be used in the container structure.

When materials of different galvanic potential are joined together, the design shall be such that galvanic corrosion is avoided.

6.1.2 The steels used for manufacturing the primary structure shall comply with the requirements

of Section 3, Part I "Basic Requirements". Samples impact test temperature for primary structure materials of more than 25 mm thickness shall be 20 °C lower than the minimum operating temperature.

6.1.3 Where other materials are used, they shall comply with the requirements of the EN 12079 standard and are subject to special consideration by the Register.

7 MARKING

7.1 MANDATORY MARKING

7.1.1 The tops of closed containers and the top rails of open top and framed containers shall be marked as follows:

.1 closed containers shall be marked with a continuous band 100 mm wide round the roof perimeter in a colour contrasting with the painting of container. If the roof of the container is recessed below the top perimeter rail, at least the top surface of the top rail shall be marked;

.2 open top and framed containers shall be marked with hatching in a colour contrasting with the painting of container.

7.1.2 Where a container is fitted with fork pockets designed for handling the container only when empty, then the words "empty lift only" shall be clearly displayed near each set of fork pockets in characters not less than 50 mm high.

Note. The marking may be in the national language that if required by the customer.

7.1.3 Each container shall have the manufacturer's number welded on in characters not less than 50 mm high.

7.1.4 Each container shall be marked with a container number issued by the owner. The container number shall be painted or applied by means of material with a glue film on all sides of the container in a colour contrasting with the painting of container. The characters shall be not less than 75 mm high. If a container has a roof, the container number shall be displayed on the roof, in characters not less than 300 mm high. Where character size is restricted by the roof design they shall be as large as practicable.

7.1.5 Each container shall be provided with the following marking:

.1 maximum gross mass, kg;

.2 tare mass, kg;

.3 payload, kg.

The characters shall be not less than 50 mm high.

7.1.6 Where applicable, marking for electrical hazard classification including a letter symbol for earth connection shall be displayed on the container.

7.1.7 If a container is intended for transport of dangerous goods, the requirements of the IMDG Code regarding marking shall also be complied with.

7.1.8 If the container is fitted with an intermediate cargo deck the payload on the deck shall be painted or applied by means of material with a glue film in a colour contrasting with the painting of

container inside the container at a place clearly visible at all times. The characters shall be not less than 50 mm high.

7.1.9 Thermal containers shall additionally be marked in accordance with the requirements of Section 4, Part III "Thermal Containers".

7.2 TABLES

7.2.1 Each container shall be fitted with two plates, the information plate and the inspection plate. The data may be combined onto a single plate, the information plate therewith shall be supplemented with the information required for the inspection plate. Plates shall be made of corrosion resistant material and fitted to a door, or, on containers with no doors, in a prominent position, in a manner designed to avoid unauthorized removal or damage. Aluminium rivets shall not be used for fixing the plates.

All the information on the plates shall be in the English language. In addition to that, provision for a national language may be made.

The text shall be permanently and legibly marked on the plates. The characters shall be not less than 4 mm high.

OFFSHORE CONTAINER DATA PLATE			
Date of manufacture:			
Manufacturer's No.:			
Maximum gross mass:	kg	at	°
Tare mass:	kg		
Payload:			
Container	kg		
Intermediate deck	kg		
Certificate No.:			
Design temperature:	°C		

Fig. 7.2.2 Information plate

Note. If confirmed that the requirements of the present Rules and of EN 12079-1 standard are met, the plate may be headed: OFFSHORE CONTAINER DATA PLATE RS/EN 12079-1.

7.2.2 Information plate.

A recommended format for the plate is shown in Fig. 7.2.2.

The plate shall contain the following information:

- .1** offshore container information plate;
- .2** RS;
- .3** date of manufacture;
- .4** manufacturer's number;

.5 maximum gross mass in kilograms, at the design sling angle;

.6 tare mass in kilograms;

.7 payload in kilograms, and intermediate deck payload (if applicable);

.8 Certificate number;

.9 minimum design temperature.

7.2.3 Inspection plate.

A recommended format for the plate is shown in Fig. 7.2.3.

The plate shall contain the following information:

- .1** offshore container inspection data;

Offshore Container Inspection Data		
Container No:		
Owner:		
Inspections:		

Fig. 7.2.3 Inspection plate

.2 owner's number;

.3 owner's name and international telephone numbers;

.4 dates of inspections. Provision shall be made on the plate to facilitate permanent marking to record a minimum of nine inspections.

Note. The frequency of surveys and the information to be marked on the plate are specified in relevant sections of the Rules for Technical Supervision of Containers in Service.

7.3 ADDITIONAL MARKING

7.3.1 A Register emblem of the approved type shall be marked on a container manufactured under the Register technical supervision.

7.3.2 Where the container is fitted with electrical equipment, on the customer's demand, the marking given below may be applied in plain view of the container depending on the level of the equipment safe type: "Electrical equipment with pressurized enclosure" or "Electrical equipment with flameproof enclosure" or "Electrical equipment of increased safety type". Where common electrical equipment is fitted, the container may be marked as follows: "ATTENTION! Electrical equipment of non safe-type! Connection to sources of electrical power in dangerous areas is PROHIBITED!".

7.3.3 The container owner may employ additional marking.

8 TESTS

8.1 GENERAL

8.1.1 The tests described in 8.2 to 8.3 are required for all offshore container types.

8.1.2 The test loads shall be evenly distributed over the container floor. If it is not possible to place all the test loads inside the container, some of it may be placed outside or under the container, provided that this gives a loading on the structure similar to the distribution of the container loading in operating condition.

8.1.3 If the container has an additional cargo deck, the test load shall be evenly divided between the floor and the cargo deck.

8.1.4 The test devices for creating the required test loads shall not interfere with free deflection of container sections under test.

8.1.5 Upon completion of each test the container shall show neither permanent deformations nor abnormalities which could render it incapable of being used for its designed purpose.

8.1.6 The Register may require to inspect the most loaded welds on completion of the non-destructive testing agreed with the Register.

8.2 LIFTING TEST

8.2.1 Basic requirements.

The container shall be carefully lifted in such a way that no significant acceleration forces occur. It shall be held for 5 min. The container shall be lifted by a lifting set with an angle to the vertical equal to the design angle. The lifting set normally fitted to the container during operation shall not be used at tests.

8.2.2 All-point lifting.

8.2.2.1 The container shall have a uniformly distributed load such that the combined mass of the container and test load is equal to $2,5R$ and be lifted using all the pad eyes.

8.2.2.2 No deflections during testing shall be greater than $1/300$ of the span of the member.

8.2.3 Two-point lifting.

A container fitted with four pad eyes shall be lifted from two pad eyes, situated diagonally opposite each other. The container shall have a uniformly distributed load such that the combined mass of the container and test load is equal to $1,5R$.

8.3 VERTICAL IMPACT TEST

8.3.1 The container, loaded to its gross mass R with a load secured inside the container, shall

be either lowered or dropped on to a rigid floor.

Notes: 1. This floor may be covered with a sheathing of wooden planks with a thickness not exceeding 50 mm.

2. If the container is tested by lowering, the lowering speed shall be as high as practicable.

8.3.2 In both cases, the container shall be so inclined that each of the bottom side and end rails connected to the lowest corner forms an angle of not less than 5° with the floor on to which the container is lowered or dropped.

8.3.3 The impacting corner shall be the one expected to have the lowest rigidity. On closed dry cargo containers with doors this will normally be at the door end.

8.3.4 No permanent deformation shall occur during the tests, which could render the container incapable of being used for its designed purpose. There may be minor cracks in welds and minor deformations which may be repaired.

8.3.5 The following test procedures may be used.

8.3.5.1 Drop test.

At drop test, the container shall be suspended from a quick release hook. When released, the container, inclined as per 8.3.2, shall drop freely for at least 50 mm to give it a speed at initial impact of at least 1 m/s.

8.3.5.2 Lowering test.

At lowering test, the container shall be lowered at a speed of not less than 1,5 m/s.

8.4 OTHER TESTS

8.4.1 The Register may require the performance of additional tests depending on the container design type.

8.4.2 Open top container with an overall length of 6,5 m or more, with fork pockets designed for loaded lifting shall be loaded to a total mass of $1,6R$ with no regard for the lifting set mass and lifted clear of the ground using the fork pockets. No deflections during testing shall be greater than $1/300$ of the span of any member. The offshore container shall show no permanent deformation or other damage after testing.

8.4.3 The tank of tank containers and its equipment shall be subjected to the applicable tests in compliance with the requirements of Part IV "Tank Containers".

8.4.4 Thermal containers shall be subjected to the applicable tests in compliance with the requirements of Part III "Thermal Containers".

9 LIFTING SET

9.1 GENERAL

9.1.1 Application.

The requirements of the present Section apply to the lifting sets and their items used on offshore containers.

9.1.2 Technical documentation.

The technical documentation to be submitted for approval shall contain the following.

9.1.2.1 For ready-assembled lifting sets:

- .1 specification with the data on applicable standards, materials, dimensions, maximum working loads, proof loads, breaking loads, etc.;
- .2 assembly drawings of the lifting set, drawings of components and items;
- .3 list of suppliers of the lifting set items;
- .4 description of a manufacturing procedure;
- .5 test programme for a prototype and serial products;
- .6 lifting set marking.

9.1.2.2 For lifting set items:

- .1 specification with the data on applicable standards, materials, dimensions, maximum loads, proof loads, breaking loads, etc.;
- .2 drawing of each item;
- .3 list of suppliers, if applicable;
- .4 description of a manufacturing procedure;
- .5 test programme for a prototype and serial products;
- .6 marking.

9.2 TECHNICAL REQUIREMENTS

9.2.1 The lifting set shall be designed for use on offshore containers. The lifting set shall not be withdrawn from the container in use unless for repairs or replacement.

9.2.2 The lifting set slings (wire ropes or chains) shall be fastened to pad eyes using shackles with bolts provided with devices preventing their self-unscrewing.

9.2.3 Slings shall be designed for use at a certain angle to the vertical of 45° and less.

9.2.4 In order to facilitate container handling and enhance safety, the lifting sets fitted with an additional fore runner and a master (top) link are recommended. The master (top) link shall have dimensions adequate for hooking on cargo handling

gear. The master (top) links of inner dimensions 270140 mm are recommended.

9.2.5 Hinged joints for lifting sets are not allowed.

9.2.6 For easy handling of containers the lifting set slings shall be of sufficient length to ensure the master (top) link being at a height of no more than 1,3 m above the container bottom with the slings hanging over the longest side of the container.

9.3 STRENGTH

9.3.1 In order to determine the characteristics and dimensions of lifting sets and items thereof, the required minimum working load limits (WLL_{min}) specified in Table 9.3.1 shall be used. To allow for the dynamic amplification that will be experienced in offshore containers lifting, the maximum gross mass of containers specified in Table 9.3.1 shall be multiplied by a corresponding enhancement factor.

9.3.2 The minimum required working load limits for the lifting set items (chains, ropes, links, shackles) shall be determined by Table 9.3.2.

9.3.3 For additional fore runners and master (top) links: $WLLS_{min} = WLL_{min}$.

9.3.4 The lifting set items shall be selected considering the $WLLS_{min}$ values calculated according to recognized standards.

9.4 LIFTING SETS ITEMS

9.4.1 The lifting set items like chains and ropes, shackles, connecting, intermediate and master links shall comply with the requirements of the present Rules, the applicable provisions of the Rules for the Cargo Handling Gear of Sea-Going Ships and the recognized national and international standards.

9.4.2 Ropes shall be of steel wire and may have a steel or fibre core. Ropes shall be of type 6 × 19 or 6 × 36. The termination of ropes shall be a ferrule secured thimble. Ferrules which permit the tail end of the rope to be visible are recommended.

9.4.3 Shackles shall be restricted to bolt type pin with hexagon head, hexagon nut and split cotter pin. The tolerance on the nominal diameter of the shackle pin shall be 0 + 3 %.

Table 9.3.1

Maximum gross mass (R), kg	Enhancement factor	Minimum required working load limit (WLL_{min}), kg
500	—	7000
1000	—	7000
1500	—	7000
2000	3,500	7000
2500	2,80	7200
3000	2,600	7800
3500	2,403	8410
4000	2,207	8830
4500	1,962	8830
5000	1,766	8830
5500	1,766	9710
6000	1,766	10590
6500	1,733	11260
7000	1,700	11900
7500	1,666	12500
8000	1,633	13070
8500	1,600	13600
9000	1,567	14100
9500	1,534	14570
10000	1,501	15010
10500	1,479	15530
11000	1,457	16020
11500	1,435	16500
12000	1,413	16950
12500	1,391	17380
13000	1,368	17790
13500	1,346	18180
14000	1,324	18540
14500	1,302	18880
15000	1,280	19200
15500	1,267	19640
16000	1,254	20060
16500	1,240	20470
17000	1,227	20860
17500	1,214	21240
18000	1,201	21610
18500	1,188	21970
19000	1,174	22310
19500	1,161	22640
20000	1,148	22960
20500	1,143	23440
21000	1,139	23920
21500	1,135	24390
22000	1,130	24860
22500	1,126	25330
23000	1,121	25790
23500	1,117	26250
24000	1,112	26700
24500	1,108	27150
25000	1,104	27590

9.5 MATERIALS

9.5.1 The materials used for manufacture of the lifting set items shall meet the requirements of recognized standards, possess sufficient ductility at low temperatures and withstand dynamic loads.

9.5.2 The steels used for manufacture of the lifting set items shall be impact tested in accordance with the requirements of 3.2.8, Part I "Basic Requirements" at the minimum working temperature. The minimum average impact energy in testing shall be not less than 42 J.

9.5.3 For welded lifting set items (chains links, rings, etc.), it shall be sufficient only to take impact test samples in the weld with the notch centred in the fusion line. The position of the weld shall be accurately identified by etching with a suitable reagent before cutting the notches. The minimum average impact energy of the weld shall be not less than 27 J.

9.6 TESTING

9.6.1 Materials shall be tested in compliance with 9.5.

9.6.2 Tests of the assembled lifting set prototypes and the items thereof, as well as tests in serial production shall be conducted at the manufacturer or at the laboratory recognized by the Register in the presence of the Register surveyor.

9.6.3 The scope of tests shall comply with the standards according to which the lifting set items have been manufactured.

Note. Where the requirements set forth in Section 10 of the Rules for the Cargo Handling Gear of Sea-Going Ships exceed those of recognized standards, the Register requirements shall be applied.

9.6.4 No permanent deformations and damages preventing the safe use of the lifting set and its items according to their purpose shall be detected after testing.

Table 9.3.2

**Minimum required working load limits
for the lifting set items ($WLLS_{min}$)**

four-leg sling	two-leg sling	one-leg sling
$WLL_{min}/3\cos\alpha$	$WLL_{min}/2\cos\alpha$	WLL_{min}
α = angle between the lifting set sling and the vertical.		

9.7 MARKING

9.7.1 The lifting set units shall be marked in accordance with the requirements of applicable standards and the present Chapter.

9.7.2 Shackles shall be indelibly marked with a unique identification.

9.7.3 The lifting set shall be provided with a metal identification tag permanently attached to its top assembly. An example of the tag recommended is shown in Fig. 9.7.3.

9.7.4 The tag shall be 8-square for chains and round for ropes.

9.7.5 The marking on identification tags shall include:

- .1** RS abbreviation;
- .2** identification number of the lifting set;
- .3** number of slings;
- .4** diameter of slings, including the fore runner;

.5 working load limit (WLL) of the lifting set, in tonnes;

.6 maximum sling angle to the vertical;

.7 working load limit (WLLS) of shackles, in tonnes;

.8 mass of the lifting set, in kg;

.9 survey type mark (in compliance with the Rules for Technical Supervision of Containers in Service), mark of the survey body and the survey date in YYYY-MM-DD format;

.10 identification numbers of shackles.

Note. The identification tag may appear as follows: RS/EN 12079.

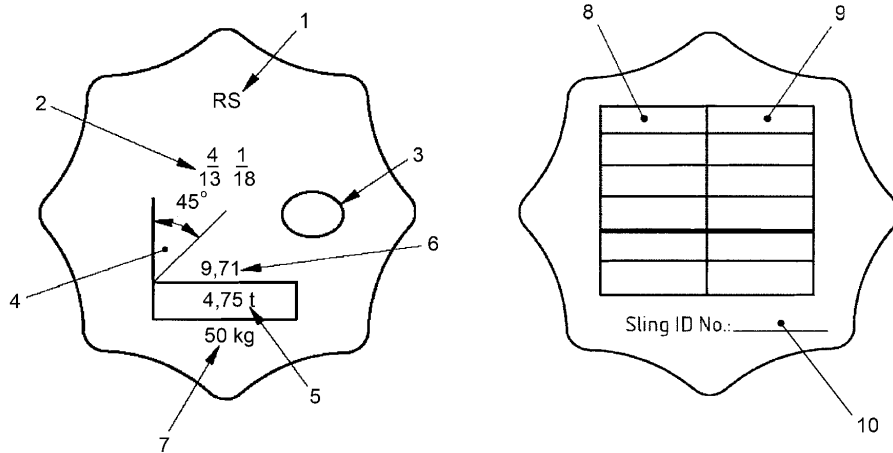


Fig. 9.7.3 Example of identification tag for the lifting set with chain slings.

- 1 — RS abbreviation; 2 — 4 chain slings of 13 mm and chain fore runner of 18 mm; 3 — manufacturer's mark;
 4 — maximum sling angle to the vertical; 5 — working load limit of shackles, in tonnes; 6 — working load limit of the lifting set, in tonnes;
 7 — mass of the lifting set, in kg; 8 — survey type mark, mark of the survey body and survey date in YYYY-MM-DD format;
 9 — identification numbers of shackles; 10 — identification number of the lifting set

**RULES FOR THE APPROVAL OF CONTAINERS
FOR THE TRANSPORT OF GOODS UNDER
CUSTOMS SEAL**

1 GENERAL

1.1 APPLICATION

1.1.1 The present Rules apply to containers with maximum gross mass of 10 t and more, intended for international transport of goods.

1.2 DEFINITIONS AND EXPLANATIONS

1.2.1 For the purpose of the present Rules the following definition has been adopted.

C o n t a i n e r is an article of transport equipment: fully or partially enclosed to constitute compartment intended for containing goods; of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the carriage of goods by one or more modes of transport, without intermediate reloading.

Notes: 1. The term "container" shall include accessories and equipment appropriate for the type concerned, provided that such accessories and equipment are carried with the container.

2. The term "container" shall not include vehicles, accessories or spare parts of vehicles, as well as packaging.

1.3 APPROVAL PROCEDURES

1.3.1 General.

1.3.1.1 The containers may be approved for the transport of goods under Customs seal:

- .1** at the manufacturing stage, by design type (approval at the manufacturing stage);
- .2** at any stage subsequent to manufacture, either individually or by batches of the same container type (approval at any stage subsequent to manufacture).

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

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

1.3.2 Procedure for approval at the manufacturing stage.

1.3.2.1 Where the approval of containers for the transport of goods under Customs seal is desired at the manufacturing stage, the manufacturer shall

submit to the Register an application in writing for approval by design type.

1.3.2.2 The manufacturer shall state in his application the identification numbers and letters which he assigns to the design type of container covered by the application. The application shall be also accompanied by technical documentation (see 1.3.2.3) submitted for the approval and by an assurance in writing (see 1.3.2.5).

1.3.2.3 The technical documentation for approval of container by design type shall at least include:

- .1** design specification of the container stating its construction, characteristics of materials involved, welding procedures, as well as the methods of assembling;
- .2** general arrangement plans, sectional views with scantlings, assemblies and elements, with indication of places for affixing Customs seals;
- .3** views of door locking devices with indication of materials involved, as well as places and methods of affixing Customs seals;
- .4** sketches of the container sheet, if used, with indication of fastening methods and places for affixing Customs seals.

The above documentation shall be generally submitted in triplicate.

Any other additional documentation may be required by the Register, if considered necessary.

1.3.2.4 If necessary, the Register may require that certain changes be introduced into the container design type submitted for the approval.

1.3.2.5 The manufacturer shall assure in writing that he will:

- .1** submit to the Register such containers of approved design type as he may wish to examine;
- .2** permit the Register to examine further containers at any time during series production to the approved design type;
- .3** advise the Register of any change, of whatever magnitude, in drawings or specifications, before proceeding with such change;
- .4** affix to the container the CCC Plate with indication of all the required markings thereon (see 3.1);
- .5** keep record of containers manufactured to the approved design type.

1.3.2.6 One or more containers, manufactured according to approved technical documentation, shall be submitted to the Register for survey.

1.3.2.7 If satisfied with the results of survey, the Register issues to the manufacturer a Certificate of Approval stating that the container design type concerned complies with technical conditions set out in Section 2 "Technical Requirements" of the present Rules.

The Certificate of Approval shall be issued as a single copy and is valid for all containers manufactured in conformity with technical documentation approved by the Register for the design type concerned.

The Certificate of Approval shall entitle the manufacturer to affix to every container manufactured to the approved design type, the CCC Plate.

1.3.3 Procedure for approval at a stage subsequent to manufacture.

1.3.3.1 If approval of containers for the transport of goods under Customs seal is desired at any stage subsequent to manufacture, the owner of containers shall submit an application in writing to the Register.

The application shall state the manufacturer's number placed on each container.

The containers mentioned in the application shall be produced to the Register for survey individually or by batches of the same design type.

1.3.3.2 If satisfied with the results of survey, the Register issues to the owner a Certificate of Approval stating that containers comply with technical conditions set out in Section 2 "Technical Requirements" of the present Rules.

The Certificate of Approval shall be issued as a single copy, and shall entitle the owner to affix to every container, approved according to this procedure, the CCC Plate.

2 TECHNICAL REQUIREMENTS

2.1 GENERAL

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

.1 no goods can be removed from, or introduced into, the sealed part of container without leaving visible traces of tampering or without breaking the Customs seal;

.2 Customs seal can be simply and effectively affixed to them;

.3 they contain no concealed spaces where goods may be hidden;

.4 all spaces capable of holding goods are readily accessible for Customs inspection.

2.2 STRUCTURE OF CONTAINERS

2.2.1 The constituent parts of a container (sides, floor, doors, roof, uprights, frames, cross-pieces, etc.) shall be assembled either by means of devices which cannot be removed and replaced from the outside without leaving visible traces or by such methods as will produce a structure which cannot be modified without leaving visible traces.

When the sides, floor, doors and roof are made of various materials, these shall meet the outlined requirements and be of sufficient strength. Where joining devices (rivets, screws, bolts, nuts, etc.) are used, a sufficient number of such devices shall be inserted from outside, traverse the assembled constituent parts, protrude inside and there be firmly secured (e.g. riveted, welded, bushed, bolted, and riveted or welded on the nut). However, conventional rivets (i.e. rivets which placing requires handling from

both sides of the assembly) may also be inserted from inside. Notwithstanding the above, container floors may be secured by means of self-tapping screws or self-drilling rivets or rivets inserted by means of an explosive charge or pins inserted pneumatically, when placed from inside and passing at right angles through the floor and metallic cross-pieces underneath, on condition, except in case of self-tapping screws, that their ends be flush with the level of the outside part of the cross-piece or be welded on to it.

The Register shall determine that the joining devices meet the above requirements and shall make sure that the constituent parts so assembled cannot be removed or replaced without leaving visible traces.

Joining devices which can be removed or replaced from one side without leaving visible traces, i.e. without requiring handling from both sides of the constituent parts to be assembled (e.g. expansion rivets, blind rivets and the like), shall not be allowed.

Where, due to technical reasons, it is not practicable to secure the constituent parts in the manner described above, they may be joined by means of devices which placing can be effected only from one side, provided that the joining devices used on the inner face of the wall are not accessible from outside.

2.2.2 Doors and other closing systems, including stopcocks, manhole-covers, flanges, etc. shall be fitted with a device on which Customs seals can be fixed. This device shall be such that it cannot be removed and replaced from outside the container without leaving visible traces, or the door or fastening be opened without breaking the Customs seals.

The Customs seals shall be adequately protected.

Containers having a large number of such closures, as valves, stopcocks, manhole covers, flanges etc. shall be so constructed as to reduce the number of Customs seals to a minimum. To this end, neighbouring closures shall be joined together by a common device requiring

only one Customs seal, or shall be provided with a cover meeting the same purpose.

2.2.3 Containers with opening roofs shall be so constructed as to permit sealing with a minimum number of Customs seals.

2.2.4 Butt-hinges, strap hinges, hinge-pins and other details for hanging doors and the like shall be secured by welding or riveting, by means of bushes, bolts, by riveting or welding on the nuts. Moreover, the various components of such devices (e.g. hinge-plates, pins or swivels) shall be so fitted that they cannot be removed or dismantled when the container is closed and sealed without leaving visible traces.

Where a door or closing device has more than two hinges, only those two hinges nearest to the extremities of the door need be fixed in conformity with requirements of this paragraph.

Exceptionally, in the case of thermal containers only, the Customs sealing device, the hinges and any fittings the removal of which would give access to the interior of the container or to spaces in which goods could be concealed, may be fixed to the doors of such containers by means of set bolts or set screws which are inserted from outside but which do not otherwise meet the requirements of 2.2.1, on condition that:

the tails of the set bolts or set screws are fixed to a tapping plate or similar device fitted behind the outer layer (layers) of the door structure;

the heads of an appropriate number of set bolts or set screws are so welded to the Customs sealing device, hinges, etc., that they are completely deformed and that the set bolts or set screws cannot be removed without leaving visible traces (Fig. 2.2.4).

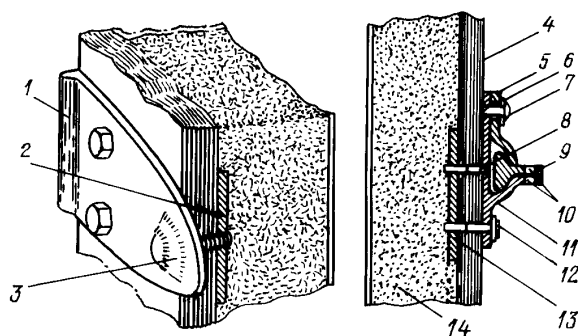


Fig. 2.2.4 Example of hinge (a) and Customs sealing device (b) on doors of thermal containers

- 1 — hinge blade; 2 — tapped metal plate;
3 — head of set bolt or screw fully welded and completely deformed; 4 — door; 5 — pivoting section;
6 — pivot bush; 7 — pivot; 8 — set screw head completely deformed by welding, not accessible when door sealed;
9 — lever; 10 — holes for Customs seals;
11 — back plate; 12 — head of set bolt or set screw completely deformed by welding; 13 — tapped metal plate;
14 — insulating material

2.2.5 The Customs sealing devices (Figs. 2.2.5-1 and 2.2.5-2) shall:

.1 incorporate holes of not less than 11 mm in diameter or slots of at least 11 mm in length and 3 mm in width;

.2 be so designed that, once the container has been closed and sealed, the device cannot be removed without leaving visible traces;

.3 be secured by welding.

The Customs sealing devices shown on Fig. 2.2.5-2 may also be fixed to doors of thermal containers. Such devices may be secured by means of at least two set bolts or set screws fixed into a metal tapped plate inserted behind the outer layer of the door. In such cases the heads of set bolts or set screws shall be so welded that they are completely deformed.

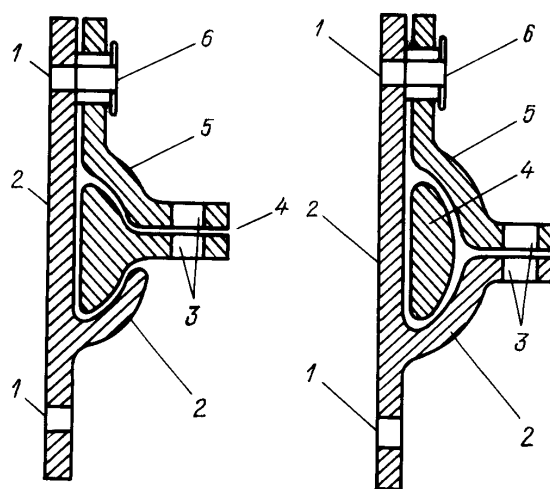


Fig. 2.2.5-1 Customs sealing device

- 1 — hole for rivet, screw, bolt, etc. (to be secured from inside of the door); 2 — back plate;
3 — hole for Customs seal; 4 — lever; 5 — pivot section;
6 — rivet, screw, bolt, etc. affixing pivot section

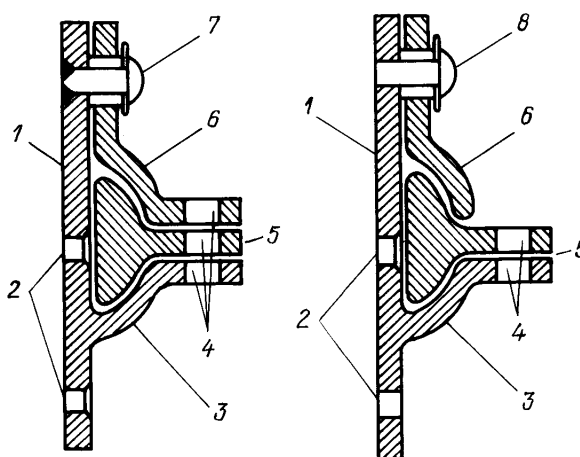


Fig. 2.2.5-2 Customs sealing device

- 1 — back plate; 2 — hole for rivet, screw, bolt, etc. (to be secured from the inside of the door); 3 — lever retainer;
4 — hole for Customs seal; 5 — lever; 6 — pivoting section;
7 — rivet welded to back plate; 8 — rivet, screw, bolt, etc. affixing pivoting section

2.2.6 Ventilation and drainage apertures shall be provided with a device preventing access to the interior of the container. This device shall be such that it cannot be removed or replaced from outside without leaving visible traces. The maximum dimension of vent apertures shall not exceed 400 mm and that of drainage apertures shall not exceed 35 mm.

Ventilation and drainage apertures permitting access to the goods, shall be obstructed by means of wire gauze or perforated metal screen with maximum hole dimension 3 mm in both cases and shall be protected by a welded metal lattice work with maximum hole dimension 10 mm.

The ventilation apertures not permitting direct access to the goods (e.g. because of elbow or baffle-plate systems) shall be provided with devices outlined in the foregoing paragraph, the hole dimensions being, however, as much as 10 and 20 mm respectively.

For the drainage apertures, which do not permit direct access to the goods, the devices, mentioned in the foregoing paragraph, may be omitted, on condition that the apertures are provided with a reliable baffle system readily accessible for inspection from inside of the container.

If vent openings are made in sheets, the above mentioned blocking devices shall be provided. However, blocking devices in the form of a perforated metal screen, fitted outside, and wire or other gauze, fitted inside, are admissible.

Identical non-metal devices may be allowed provided that the holes are of requisite dimensions and the material used is strong enough to prevent the holes from being substantially enlarged without visible damage. In addition, it shall be impossible to replace the said devices by working from one side of the sheet only.

2.2.7 Notwithstanding the requirement of 2.1.1.3, constituent part of the container which, for practical reasons, have to include empty spaces (for example, between the partitions of a double wall) shall be permitted. In order that the said spaces cannot be used to conceal goods, the lining inside the container shall be so fitted that it cannot be removed and replaced without leaving obvious traces; or the number of the said spaces shall be kept to a minimum and these spaces shall be readily accessible for Customs inspection.

2.3 CONTAINERS CAPABLE OF BEING FOLDED OR DISMANTLED

2.3.1 The containers capable of being folded or dismantled shall comply with requirements stated in 2.1 and 2.2.

In addition, such containers shall be fitted with a bolting system which locks the various parts together

once the container has been erected. This bolting system shall be so designed as to enable sealing by Customs seals, if it is fitted on the outside of the container after assembly.

2.4 SHEETED CONTAINERS

2.4.1 Containers fitted with sheets shall comply with requirements stated in 2.1, 2.2 and 2.3 in so far as these requirements are applicable to such containers. The sheets of such containers shall comply with the requirements of 2.4.2 to 2.4.11.

2.4.2 The sheet shall be either of strong canvas or of plastic-covered or rubberized cloth, which shall be of sufficient strength and unstretchable. It shall be in good condition and made up in such a way that once the closing device has been secured, it is impossible to gain access to the load compartment without leaving obvious traces.

2.4.3 If the sheet is made up of several pieces, their edges shall be folded into one another and sewn together with two seams at least 15 mm apart (Fig. 2.4.3-1).

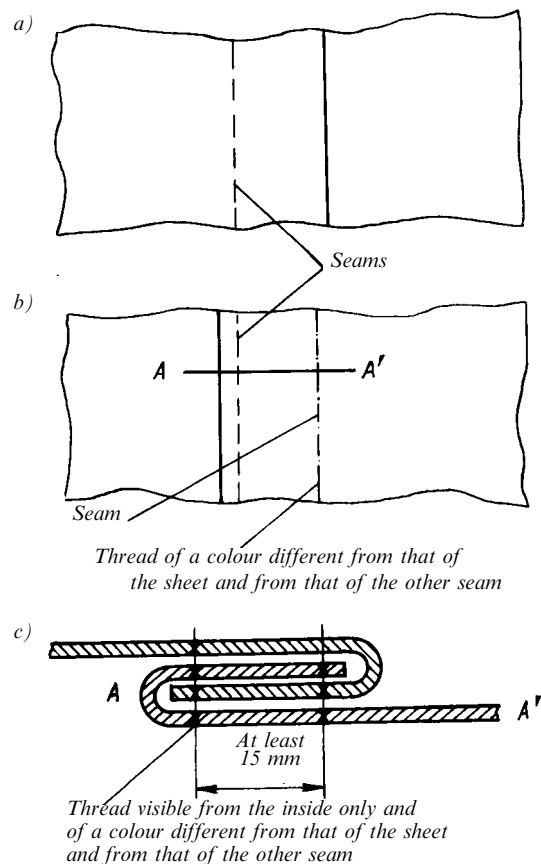


Fig. 2.4.3-1 Sheet made of several pieces of cloth sewn together by means of seams:
a — outside view; b — inside view; c — section A-A'
Double flat seam

However, if for certain parts of the sheet (such as flaps at the rear or at reinforced corners) it is not possible to assemble the pieces in that way, it will be sufficient to fold the edge of the top portion and make the seams so as shown in Figs 2.4.3-2 and 2.4.3-3. One of the seams shall be visible only from the inside and the colour of the thread used for that seam shall be clearly different from the colour of the sheet itself and from the colour of the thread used for the other seam. All seams shall be machine-sewn.

The cloth of which pieces of the sheet are made shall meet the requirements of 2.4.2.

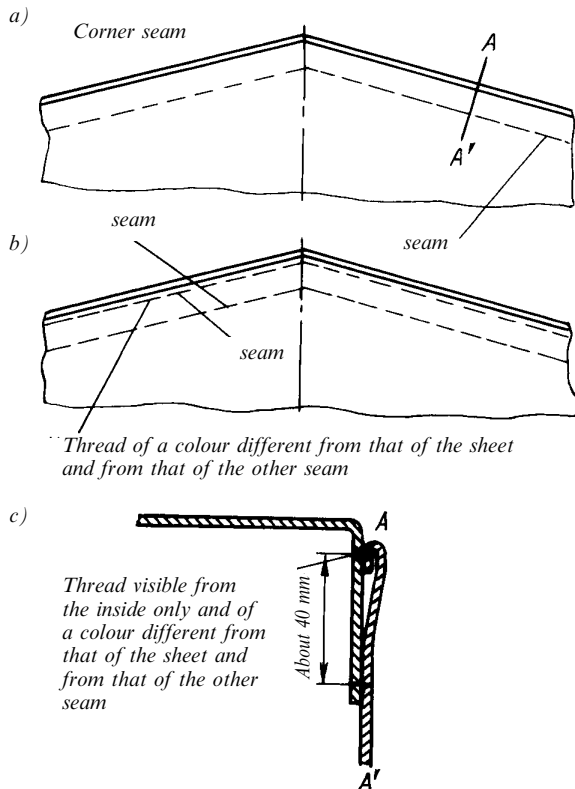


Fig. 2.4.3-2

Sheet made of several pieces of cloth:
a — outside view; b — inside view; c — section A-A'

2.4.4 If the sheet is made up of several pieces of plastic-covered cloth, the pieces shall be alternatively soldered together (Fig. 2.4.4). The edges of the pieces shall overlap by at least 15 mm. The pieces shall be fused together over the whole width of the overlap. The edge of the outer sheet shall be covered with a band of plastic material of at least 7 mm wide, affixed by the same fusing process. The plastic band and a width of at least 3 mm on each side shall have a well-marked uniform relief stamped on it. The pieces shall be bound in such a way that they cannot be separated and rejoined without leaving visible traces.

2.4.5 Any arrangement of pieces is permitted for making up a sheet, provided the pieces are assembled according to provisions of 2.4.3.

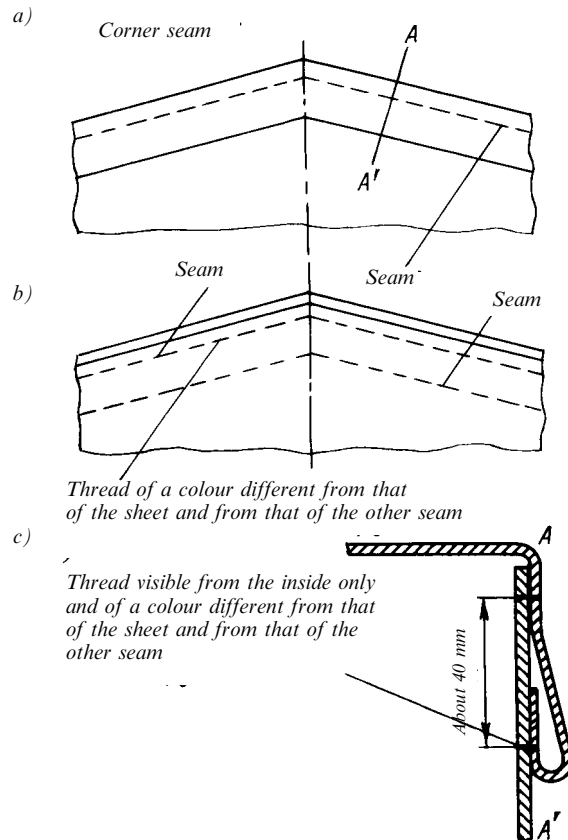


Fig. 2.4.3-3

Sheet made of several pieces of cloth:
a — outside view; b — inside view; c — section A-A'

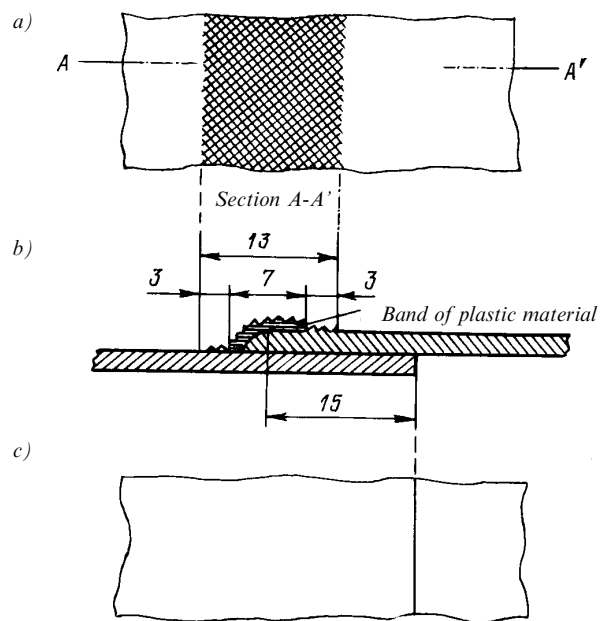


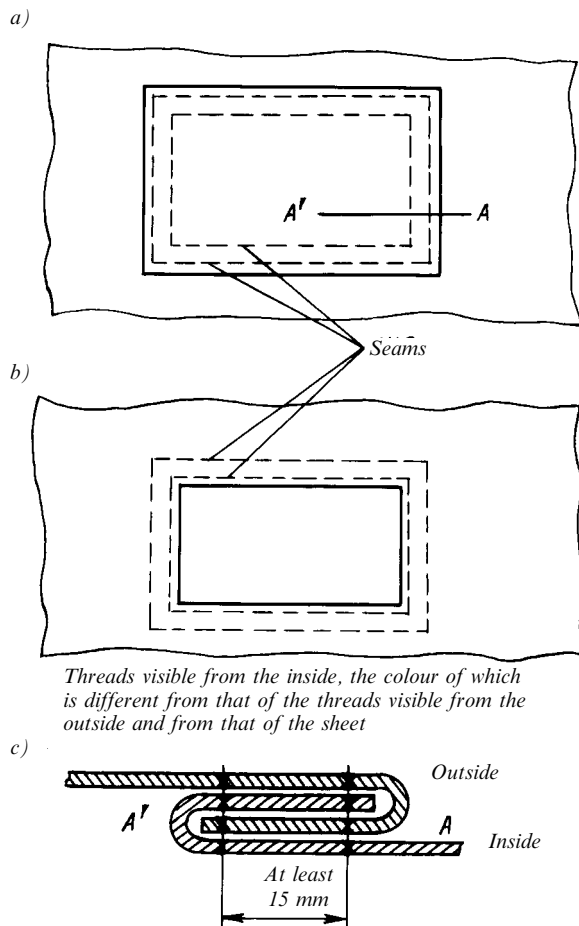
Fig. 2.4.4

Sheet made of several pieces soldered together
(dimensions are shown in mm):
a — outside view; b — section A-A'; c — inside view

2.4.6 The method for repairing the sheet is shown in Fig. 2.4.6. The edges to be sewn shall be folded into one another and sewn together with two clearly visible seams at least 15 mm apart; the colour of the thread visible from the inside shall be different from that of the thread visible from the outside and from the colour of the sheet itself. All seams shall be machine-sewn.

When a sheet which has been damaged near the edges is repaired by replacing the damaged part by a patch, the seam may also be made according to 2.4.3 and Fig. 2.4.3-1.

Sheets of plastic-covered cloth may alternatively be repaired by the method described in 2.4.4, but in that case the plastic band shall be affixed to both sides of the sheet, while the patch shall be fitted on the inside of the sheet.



Threads visible from the inside, the colour of which is different from that of the threads visible from the outside and from that of the sheet

Fig. 2.4.6 Repair of the sheet
a — outside view; b — inside view; c — section A-A'

2.4.7 The sheet shall be affixed to the container according to provisions set forth in 2.1.1.1 and 2.1.1.2 by one of the following types of fastening:

- metal rings fixed to the container;
- eyelets let into the edge of the sheet;

a rope or a wire passing through the rings above the sheet and visible from the outside for its entire length.

Where the edges of the sheet shall be permanently attached to the body of the container, the sheet shall be held in place by one or more strips of metal secured to the body of the container by joining devices meeting the requirements of 2.2.4.

Examples of construction systems of affixing container sheet as well as the sheet around the container corners, acceptable from a Customs point of view, are shown in Figs 2.4.7-1 and 2.4.7-2.

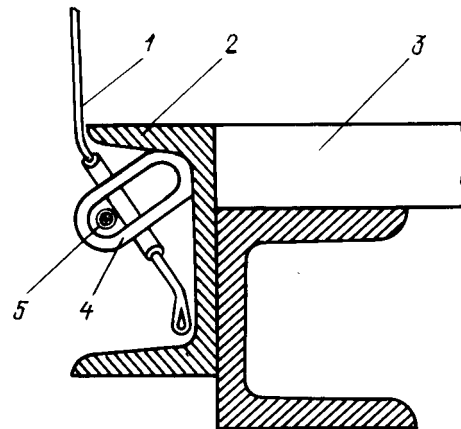


Fig. 2.4.7-1
Device for affixing the container sheet:
1 — sheet; 2 — steel girder; 3 — floor;
4 — securing ring; 5 — sheet-retaining rope

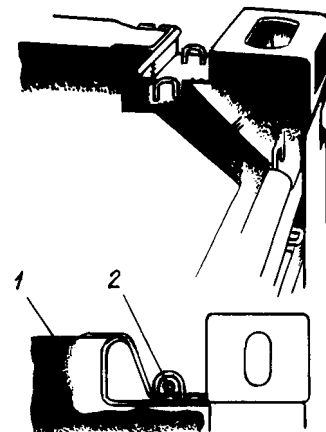


Fig. 2.4.7-2
Device for affixing the sheet around container corners:
1 — sheet on the roof; 2 — sheet-retaining rope

2.4.8 The fastenings of a sheet shall comply with the following requirements:

- .1 the spaces between the rings and the spaces between the eyelets shall not exceed 200 mm. The spaces may, however, be greater but shall not exceed

300 mm between rings and eyelets on either side of the upright if the construction of the container and the sheet is such as to prevent all access to the interior of the container. The eyelets shall be reinforced;

.2 the space between the eyelets of the portion of the sheet overlapping the upright (cross-members of the roof) and the space between the corresponding rings on the container shall not exceed 300 mm, on condition that the rings are recessed in the side boards and the eyelets are oval and so small that they can just pass over the rings;

.3 the steel wire rope shall be at least 3 mm in diameter. The wire rope may be encased in a transparent unstretchable plastic sheath;

.4 a wire rope comprising a textile core surrounded by strands of steel wire shall also be at least 3 mm in diameter (exclusive of the transparent plastic sheath, if any);

.5 the rope shall be of hemp or sisal of at least 8 mm in diameter, encased in a transparent unstretchable plastic sheath;

.6 each cable or rope, whatever the material, shall be in one piece and have metal end-pieces at each end. The fastening arrangement of each metal end-piece shall include a hollow rivet passing through the cable or rope so as to allow the introduction of a thread or strap of the Customs seal. The rope or cable shall remain visible on either side of the hollow rivet so that it is possible to make sure that the rope or cable is in one piece. Fig. 2.4.8.6 shows a specimen of the end-piece;

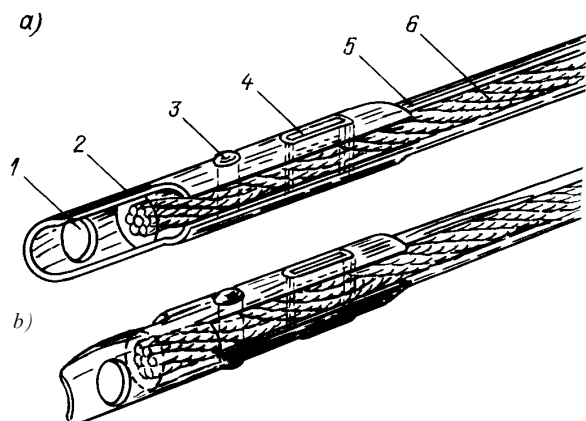


Fig. 2.4.8.6

Specimen of end-piece (side view):
a — front; b — back

1 — hole for closing by carrier; 2 — hard metal end-piece;
3 — solid rivet; 4 — hollow rivet for passing the thread
or the strap of the Customs seal (minimum dimensions
of the hole: width — 3 mm, length — 11 mm);
5 — transparent plastic sheath; 6 — rope

.7 metal securing rings sliding on metal bars (Fig. 2.4.8.7) are acceptable provided that:

the bars are affixed to the container at maximum spacings of 600 mm in such a manner that they cannot be removed and replaced without leaving obvious traces;

the rings are made with double hoop or equipped with a central bar and made in one piece without the use of welding;

the sheet is fixed to the container in accordance with requirements of 2.1.1.3.

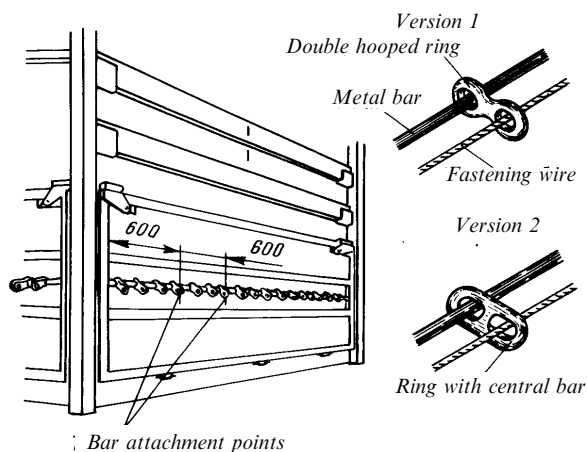


Fig. 2.4.8.7 Sheeted containers with sliding rings

2.4.9 Where the sheet is provided with openings used for loading/unloading, the two edges of the sheet shall adequately overlap and be fastened by:

.1 a flap sewn or soldered in accordance with 2.4.3 or 2.4.4 from the inside of the sheet. A flap may not be required if a special device (e.g. baffle plate, etc.) is fitted which prevents access to the goods. The flap is not required for containers with sliding sheets. Such device is shown in Fig. 2.4.9.1;

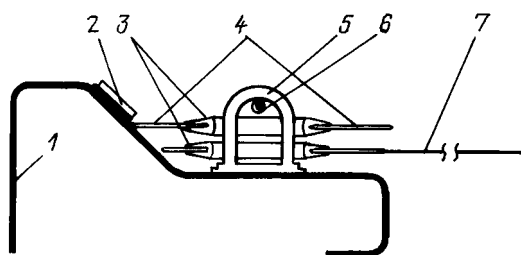


Fig. 2.4.9.1 Device for affixing container sheets:

1 — wall; 2 — metal bar, riveted; 3 — eyelets;
4 — flap; 5 — securing ring; 6 — sheet retaining rope;
7 — sheet

.2 small individual flaps each pierced by one eyelet secured to the outside surface of the sheet and spaced at such distances as will permit an adequate tensioning of the sheet;

.3 rings and eyelets complying with requirements of 2.4.8;

.4 a thong made of appropriate unstretchable material, in one piece, at least 20 mm wide and 3 mm thick, passing through the rings and holding together the two edges of the sheet and the flap. The thong shall be secured inside the sheet and have an eyelet to take the cable or rope mentioned in 2.4.8.

The thongs may be manufactured of leather, unstretchable textile materials, including plastic-covered or rubberized cloth, provided that such materials cannot after severance be welded or reconstituted without leaving visible traces. Furthermore, the plastic material used to cover thongs shall be transparent and smooth-surfaced.

2.4.10 The sheet shall overlap the solid part of the container by at least 250 mm, measured from the centre of securing rings, unless the construction of the container by itself prevents all access to the goods.

2.4.11 In no case shall the sheet conceal the marking of container.

2.5 CONTAINERS WITH SLIDING SHEETS

2.5.1 Containers with sliding sheets shall meet the requirements of 2.1 to 2.4, as far as applicable, and also the requirements of the present Chapter.

2.5.2 The sliding sheets, floor, doors and all other constituent parts of the container shall meet either the requirements of 2.4.7 to 2.4.9 or the requirements set forth below.

2.5.2.1 The sliding sheets, floor, doors and all other constituent parts of the container shall be

assembled in such away that they cannot be opened or closed without leaving obvious traces.

2.5.2.2 The sheet shall overlap the solid parts at the top of the container by at least $\frac{1}{4}$ of the actual distance between the tensioning straps. The sheet shall overlap the solid parts at the bottom of the container by at least 50 mm. The horizontal opening between the sheet and the solid parts of the container measured perpendicular to the longitudinal axis of the container shall not exceed 10 mm at any place when the container is secured and sealed for the Customs purposes.

2.5.2.3 The sliding sheet guidance and other movable parts shall be assembled in such a way that closed and the Customs-sealed doors and other movable parts cannot be opened or closed from the outside without leaving obvious traces. The sliding sheet guidance and the other movable parts shall be assembled in such a way that it is impossible to gain access to the container without leaving obvious traces. The like system is shown in Fig. 2.5.2.3.

2.5.2.4 The horizontal distance between the rings, used for the Customs purposes, on the solid parts of the container shall not exceed 200 mm. The space may, however, be greater, but shall not exceed 300 mm between the rings on either side of the upright if the construction of the container and the sheets is such as preventing all access to the container. In any case, the conditions set forth in 2.5.2.2 shall be complied with.

2.5.2.5 The distance between the tensioning straps shall not exceed 600 mm.

2.5.2.6 The fastenings used to secure the sheets to the solid parts of the container shall meet the requirements of 2.4.8.3 to 2.4.8.6.

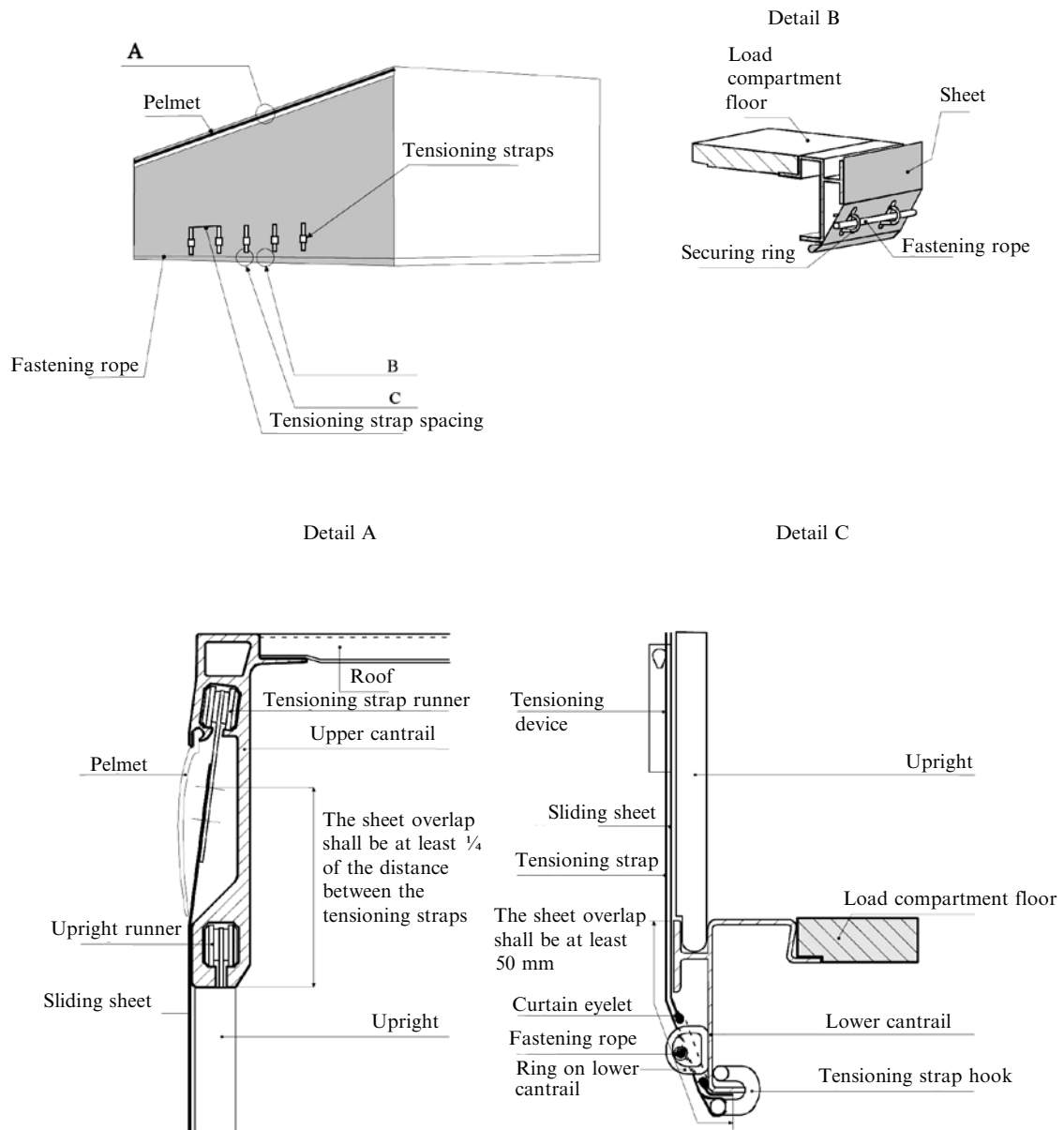


Fig. 2.5.2.3 Container with a sliding sheet

3 MARKING

3.1 THE CCC PLATE

3.1.1 The applicant to whom the Register has issued the Certificate of Approval (see 1.3.2.7 and 1.3.3.2) shall affix to every approved container the CCC Plate.

3.1.2 The CCC Plate is a metal plate of rectangular shape measuring not less than 200×100 mm, and bearing the following particulars in the English language (Fig. 3.1.2):

.1 "approved for transport of goods under Customs seal";

.2 type;

.3 manufacturer's No. of the container.

The height of letters for the title of the CCC Plate (see 3.1.2.1) shall be minimum 8 mm. The height of all other letters and figures shall be not less than 5 mm.

The title and the particulars on the plate shall be stamped into, embossed on, or indicated on its surface in any other permanent and legible way.

The CCC Plate shall be made of durable, non-corrosive and fire-proof material.

3.1.3 The CCC Plate shall be permanently affixed to the container at a clearly visible place where it cannot be easily damaged.

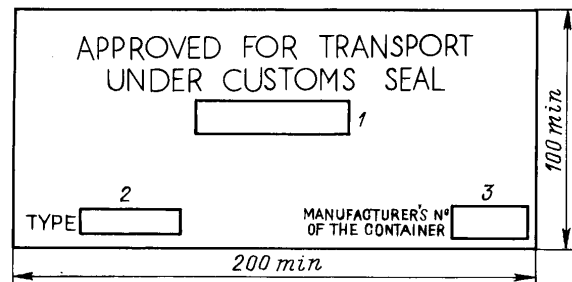


Fig. 3.1.2 The CCC Plate

Notes:

1. There shall be indication of the number of the Certificate of Approval issued by the Register.

2. Type means the identification numbers and letters assigned to the design type of container by the manufacturer, and is indicated on the CCC Plate only if the container has been approved by design type.

3. There shall be indicated the serial number assigned to the container by the manufacturer.

3.2 CONTAINER MARKING

3.2.1 The owner's code, owner's number and check digit of the container, and also the tare weight of the container shall be marked on the latter.

3.2.2 The inscriptions and signs shall be arranged in compliance with 4.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

RULES FOR TECHNICAL SUPERVISION DURING MANUFACTURE OF CONTAINERS

1 ORGANIZATIONAL REGULATIONS FOR THE TECHNICAL SUPERVISION OF CONTAINERS

1.1 APPLICATION

1.1.1 The present Rules for Technical Supervision during Manufacture of Containers¹ are applied by the Russian Maritime Register of Shipping² during technical supervision of the manufacture of containers intended for the carriage of goods by water, rail and road and of the manufacture of materials and products for the said containers.

1.1.2 The requirements of the Rules for providing the necessary supervision conditions are mandatory for all firms and individuals involved in design, manufacture and testing of containers and/or engaged in the manufacture of materials and products for them. When the technical supervision is performed in other countries the provisions of the Rules may be applied regarding salient features and differences in the production processes typical of each particular country.

1.1.3 The Nomenclature of Items of the Register Technical Supervision³ is given in Table 2.1.2 of the General Regulations for the Technical Supervision of Containers.

1.1.4 Matters not covered by the Rules are settled by the Register Head Office.

1.2 DEFINITIONS

1.2.1 For the purpose of the Rules the following definitions have been adopted.

Materials mean metal, welding, sealing materials, plastics, wood, plywood, clothes covered by the requirements of the Rules for the Manufacture of Containers.

Product means a machinery, an appliance, a pressure vessel, an apparatus, a device, an item of equipment or outfit intended for the containers covered by the requirements of the Rules for the Manufacture of Containers.

Prototype means a container representative of those manufactured or intended to be manufactured in a definite design type-series.

Type-series container means any container manufactured in accordance with the approved design type.

Normative documents mean standards, regulations, technical requirements, norms, calculation procedures, instructions, guidelines and other documents, which specify structural, technical or production requirements for manufacture and testing of materials, products and containers.

1.3 TECHNICAL SUPERVISION

1.3.1 The scope and procedure of surveys and tests of the items of the Register technical supervision carried out at the manufacturer's are specified in the List of the Items of Technical Supervision⁴ which is given in Appendix 2.

1.3.2 The items of technical supervision are surveyed by the Register at the final stage of production (finished products) or after completion of works upon submission thereof by the manufacturer's Inspection Department.

In specific cases, where it is motivated by the production process and/or design of the product, at the Register (surveyor) discretion, the surveys may be performed on a step-by-step basis and simultaneously with the manufacturer's control.

1.3.3 During technical supervision the Register has the right to set forth:

.1 additional requirements for the items of technical supervision;

.2 requirements for the items not subject to technical supervision if it appears that application thereof has resulted or is likely to result in violation of the requirements of the Rules for the Manufacture of Containers.

1.3.4 During technical supervision at the manufacturer's the surveyor checks adherence to the conditions of issuance of the Recognition Certificates and/or Contracts on Technical Supervision.

1.3.5 During technical supervision the surveyor may allow deviations from the approved technical documentation only within his authorities.

1.4 TYPES OF TECHNICAL SUPERVISION

1.4.1 The Register may perform the technical supervision activity at the firms involved in the manufacture of containers, materials and/or products in the form of:

¹ Hereinafter referred to as "the Rules".

² Hereinafter referred to as "the Register".

³ Hereinafter referred to as "the Nomenclature".

⁴ Hereinafter referred to as "the List".

.1 the Register technical supervision;

.2 technical supervision on behalf of the Register.

1.4.2 Table 2.1.2 of the General Regulations for the Technical Supervision of Containers specifies forms of documents issued or certified by the Register upon the technical supervision results. When selecting between the issuance of a certificate filled in and signed by the Register surveyor (C) and a certificate filled in by the manufacturer and certified by the Register surveyor (C3) preference is given to C; where the direct technical supervision is impossible or unreasonable (difficult), it is recommended to issue C3.

1.4.3 Technical supervision on behalf of the Register is subject to special consideration by the Register Head Office in each particular case.

1.5 REQUESTS, CONTRACTS AND AGREEMENTS ON TECHNICAL SUPERVISION

1.5.1 The Register technical supervision activity at firms involved in the manufacture of containers, materials and products for them is based on contracts and written requests to carry out technical supervision and to guarantee payment of the Register services, reimbursement of the Register expenses, as well as with the confirmation of familiarization and agreement with the General Conditions for Rendering Services (Performing Works) by the Register. The General Conditions for Rendering Services (Performing Works) by the Register are constituent and integral part of all the contracts concluded by the Register.

1.5.2 The request shall provide the information to an extent sufficient for review and execution thereof.

1.5.3 Upon reviewing the request depending on the particular conditions of the future technical supervision (scope and item of supervision, duration, etc.), the Register, being guided by the regulations in force, decides on the necessity to conclude a contract on technical supervision or carries out technical supervision based on the request without concluding the contract.

1.5.4 The contract on technical supervision by the Register at the manufacturer's specifies the items of technical supervision and regulates mutual relations, rights and responsibilities of the parties in the course of the Register technical supervision.

For concluding the contract for the Register technical supervision, use is made of the established forms or the contract may be drawn up in a free form.

1.5.5 In justified cases, for certain items of technical supervision (C3 in Table 2.1.2 of the General Regulations for the Technical Supervision of Containers) the Register can entrust the manufacturer's technical

personnel with performance of the check tests or part thereof, to which effect an Agreement on Survey (CO) is signed with the manufacturer.

For signing the CO use is made of the established form or the CO may be signed in a free form.

The CO is made based on survey of the manufacturer carried out to the extent and according to the procedure described in 1.5, Part I "Basic Requirements" of the Rules for the Manufacture of Containers and type approval of the material or product.

Rights and responsibilities of the manufacturer, responsibilities of the Register and terms of payment to the Register for technical supervision are stated in the CO.

In order to provide adherence to the Register requirements for products, to draw up covering documentation and to fulfill the terms and conditions of the CO, an official competent in production and quality control of the items of technical supervision shall be appointed at the manufacturer's.

Based on the CO concluded, items of technical supervision shall be delivered with C3 to be filled in and signed by the manufacturer's official and drawn up (certified) by the Register. The CO may be cancelled if desired by parties who signed it.

1.5.5.1 The CO comes into force from the date of signing and remains valid for at most 5 years subject to:

.1 satisfactory results of survey of the item of technical supervision and the firm in accordance with the requirements of 1.5, Part I "Basic Requirements" of the Rules for the Manufacture of Containers, to be carried out not less than once every 2,5 years;

.2 the validity of approval of the type item of technical supervision as certified by the Type Approval Certificate.

1.5.5.2 The validity of the CO is extended for the next period not exceeding 5 years subject to compliance with the requirements set out in 1.5.5.1 and 1.5.5.2.

1.6 PROVISION OF TECHNICAL SUPERVISION

1.6.1 The manufacturer shall provide all the conditions necessary for the Register to carry out technical supervision, namely:

.1 to ensure for a surveyor:

free access to all places where containers are manufactured and tested;

safety of the surveyor during survey;

availability of the officials authorized to present to the surveyor containers for survey and testing;

timely information of the time and place of surveys and tests;

possibility of inspection of any part and assembly of the container with the use of necessary means and tools;

.2 to present to a surveyor:

necessary documentation;

manufacturer's quality control documents;

standards and other normative documents;

possibility of inspection of any container out of the batch presented.

1.6.2 The manufacturer's notices are drawn up on the work stages or the items of technical supervision readiness for survey and on the invitation of the Register surveyor.

1.6.3 Where the conditions required for performance of surveys are not fulfilled by the manufacturer, the surveyor has the right to refuse to carry out surveys and to witness tests of the item of technical supervision.

1.7 DOCUMENTS

1.7.1 During the Register technical supervision of the manufacture of containers, materials and pro-

ducts for them the documents provided for by the List of Documents of the Russian Maritime Register of Shipping to be Issued during Technical Supervision and specified in 1.4 of the General Regulations for the Technical Supervision of Containers are drawn up.

Note. It is also necessary to be guided by the Procedure for the Application of the Register Rules and the Requirements Established by Administrations during Technical Supervision of Containers during Manufacture and in Service.

1.8 TECHNICAL DOCUMENTATION

1.8.1 Prior to commencement of the technical supervision during the manufacture of containers, materials and products for them the surveyor shall make sure that the firm is provided with necessary and duly drawn up technical documentation meeting the requirements of Section 3 of the General Regulations for the Technical Supervision of Containers.

2 TECHNICAL SUPERVISION AT THE FIRMS INVOLVED IN THE MANUFACTURE OF PRODUCTS FOR CONTAINERS

2.1 GENERAL

2.1.1 Technical supervision is aimed at the determination and ascertainment by the Register of the conformity of the manufactured products for containers with the approved technical documentation.

2.1.2 The scope of the technical supervision includes:

.1 control of the availability at the firm of a full set of technical documentation approved by the Register for an item of technical supervision;

.2 familiarization with production process and quality system. In cases specified by the Rules, the welding procedures shall be approved by the Register;

.3 agreement upon of the List (see 1.3.1) and establishment of the Register technical supervision procedure;

.4 survey and tests of the prototypes of items of technical supervision;

.5 survey and tests of products at the established production in case where the Certificate C is issued.

2.2 TECHNICAL SUPERVISION OF THE USED MATERIALS AND COMPONENT PARTS FOR THE PRODUCTS

2.2.1 During technical supervision of the manufacture of products the surveyor checks the used materials and component parts (according to the manufacturer's documents) for conformity thereof with the approved technical documentation.

2.2.2 The surveyor may require incoming control of materials and component parts when he is doubtful of their conformity with the Register requirements or if it is found that in case where they are used the items of technical supervision will not meet those requirements.

In case of unsatisfactory results of the incoming control the use of such materials (component parts) is not allowed, regardless of availability of certificates and other documents certifying their conformity with the requirements of technical documentation.

2.2.3 Where substantial defects are revealed the results of survey are presented in the form of the Register Report (Form 6.3.29); a copy of the Report is forwarded to the manufacturer.

2.3 TECHNICAL SUPERVISION DURING MANUFACTURE OF PRODUCTS

2.3.1 The minimum scope of surveys is specified in Tables 2.3.1 and 2.3.9.

2.3.2 During survey of products, attention shall be given to the following:

.1 necessary measurement assurance of the firm and observance of the dates of calibrating devices, tools, repeatedly used jigs (benches);

.2 effective operation checking by the Inspection Department and identification of rejected products;

.3 observance of the production process of the products manufacture and of the welding procedures approved by the Register;

.4 availability of the Welder Approval Test Certificates issued by the Register to the welders involved in the manufacture of containers.

2.3.3 During survey of tanks, tank hatches, own heating appliances and cargo level gauges, it is necessary to check conformity thereof with the approved technical documentation. Documents confirming such conformity shall be drawn up in accordance with Table 2.1.2 of the General Regulations for the Technical Supervision of Containers.

Table 2.3.1

Item of technical supervision	Inspection of						Tests
	used materials	machining of parts	welding operations	manufacture of parts and assemblies	assembly of products	in operation	
Framework elements:							see Appendix 1
Corner fittings	+	+	—	—	—	—	
End frames	+	—	+	—	+	—	
Welded parts	+	—	+	—	—	—	
Tanks	+	—	+	+	+	—	
Vessel shells	+	+	+	—	—	—	
Heads	+	+	+	—	—	—	
Doors (including locks)	+	+	+	+	+	+	
Manholes (hatches)	+	—	+	+	+	+	—

2.3.4 During survey of the corner fittings batches, the Register conducts inspection of geometric dimensions of fittings chosen out of the batch, as well as of the results of radiographic examination, results of strength tests and results of other tests required by the Rules for the whole batch carried out by the manufacturer. In case of doubts on the thickness of the fitting walls or internal casting defects the Register may require additional radiographic or ultrasonic examination or inspection by other methods for the fittings chosen by it out of the submitted batch.

Note. Additional provisions for performance of technical supervision during manufacture of corner fittings — see Appendix 1.

2.3.5 When presenting end frames with doors in assembly with locking devices, in addition to the provisions of Table 2.3.1, attention shall be given to the following:

straightness of bars;

abutment of locking "cams" against the contact surface of the "pads" in position simulating closing of the door.

2.3.6 During survey of tanks, inspection of the assembly and welding of the tanks shall be conducted.

In this case attention shall be given to:

observance by the manufacturer of welding procedures;

inspection results of all welds;

correctness of welding of the manholes, hatches, branch pipes, connecting flanges, heating/cooling piping, etc. to the tank;

geometric dimensions.

2.3.7 During survey of assemblies and parts of frameworks of tank containers and similar structures, inspection of assembly and welding thereof shall be conducted. Along with that, attention is given to ensuring stability of work performance quality in jigs (benches), observance of geometric dimensions of welds and quality of welding of corner fittings and supports to the container.

2.3.8 The minimum scope of technical supervision during manufacture of the tank fittings is given in Table 2.3.9.

2.3.9 Technical supervision during manufacture of fittings shall include inspections of:

.1 conformity of the material brand, its mechanical properties, chemical composition and other regulated parameters with the requirements of technical documentation;

.2 absence of surface defects (cracks, breaks, blow-holes, etc.) as well as defects at connections to pipes;

.3 operation of local and remote actuators, availability and correctness of installation of the "open/closed" position indicators;

.4 availability of flame arresters, if provided for;

.5 results of hydraulic pressure tests according to 3.8, Part IV "Tank Containers" of the Rules for the Manufacture of Containers;

.6 results of leakproofness (air) tests of the fittings assembled according to 3.8, Part IV "Tank Containers" of the Rules for the Manufacture of Containers;

.7 certificates or other documents of the material manufacturer to verify conformity of the material with the requirements of the approved technical documentation and its service life.

2.3.10 The pressure-relief and measuring fittings are subject to test in operation to confirm the working characteristics specified in the technical documentation.

2.3.11 During technical supervision of the prototypes of fittings, in addition to the above, it is necessary to check continuous operation thereof under vibration conditions, limiting values of temperatures and pressures, as well as under special conditions depending on the purpose of the fittings. In this case, it is essential to determine the maximum values of the working parameters which can be ensured by the fittings without failing their single components.

2.3.12 The pressure-relief valves capacity is checked on their prototypes. Where a flame arresting mesh is available, inflammability of combustible mixture vapours at specified temperature shall be checked.

Table 2.3.9

Item of technical supervision	Inspection of used materials	External examination	Inspection of welding procedures	Proof pressure test	Test in operation (adjustment)
Stop valves	+	+	+	+	+
Pressure-relief valves (spring-controlled)	+	+	+	+	+
Frangible disks	+	+	—	—	—
Sealing materials	+	+	—	—	—
Sections of pipes (with elements to be welded to) under pressure	+	+	+	+	—

**2.4 TECHNICAL SUPERVISION DURING
MANUFACTURE OF MATERIALS**

2.4.1 The materials specified in the Nomenclature of Items of the Register Technical Supervision (Table 2.1.2 of the General Regulations for the Technical Supervision of Containers) shall be manufactured under the Register technical supervision.

2.4.2 Technical supervision during manufacture of materials is performed in accordance with the requirements of Part III "Technical Supervision During Manufacture of Materials" of the Rules for Technical Supervision During Construction of Ships and Manufacture of Materials and Products for Ships.

2.4.3 The characteristics of the material shall comply with the requirements of technical documentation approved by the Register for a particular container model for the manufacture of which the material will be delivered.

2.5 TECHNICAL SUPERVISION DURING TESTS

2.5.1 Technical supervision during tests of products includes:

.1 the surveyor participation in tests of prototypes and serial products at the established production;

.2 the surveyor participation in tests of prototype products.

2.5.2 Tests are conducted in accordance with programs approved by the Register.

2.6 DOCUMENTS AND BRANDING

2.6.1 Based on the results of surveys and tests the surveyor issues the appropriate Register documents for the items of technical supervision and in prescribed cases puts brands thereon (see Table 2.1.2 of the General Regulations for the Technical Supervision of Containers and 1.7).

2.6.2 The following shall be attached to the documents:

.1 tests results (test reports, chemical composition, strength characteristics for each heat) and non-destructive testing results (radiographic examination or examination by other methods) carried out on the samples of the batch presented;

.2 data on thermal treatment performed if specified in technical documentation.

2.6.3 Upon the satisfactory results of tank survey, the Register brand shall be put on the identification plate of the tank after the data on pressure and leakproofness tests.

2.6.4 Where defects are detected, the product or equipment is not approved for use irrespective of the availability of the Inspection Department and the Register brands and the prescribed documents. In case of doubts on the quality of the products manufactured the necessary repeat surveys and tests shall be carried out.

3 TECHNICAL SUPERVISION DURING MANUFACTURE OF CONTAINERS

3.1 GENERAL

3.1.1 The purpose of the technical supervision is to determine and ascertain by the Register the conformity of the containers manufactured with the approved documentation with respect to:

- .1 specified dimensions;
- .2 strength and safety in service;
- .3 fulfillment of structural requirements imposed on containers for international transport of goods under customs seals.

3.1.2 The scope of survey is specified in Appendix 2.

3.2 TECHNICAL SUPERVISION DURING MANUFACTURE OF PROTOTYPE CONTAINERS

3.2.1 In order to survey the prototype container the firm shall submit to the Register a request for technical supervision stating the prototype test program approved by the Register.

3.2.2 During technical supervision the following shall be checked by the Register:

- availability of documents (the manufacturer's certificates or the Register documents for items subject to technical supervision) for materials, products and equipment supplied under cooperation agreements and used during manufacture of containers, the Inspection Department documents for fittings, door locks and other products if they are manufactured by the firm in question;

- availability of the Inspection Department reports indicating that the containers have passed satisfactorily the operation and acceptance checking by the Inspection Department and preliminary test with preparation of sheets of container measurement, as well as the results of weld inspection by non-destructive methods during manufacture of tank containers and offshore containers (see Table 3.2.3);

- conformity of all dimensions of containers with the dimensions specified in the Rules for the Manufacture of Containers;

- quality of welds (absence of pores, undercuts, cracks, conformity of dimensions and types of welds with technical documentation), especially at places where corner fittings are welded to the framework;

- absence of cracks in the framework components, especially on corner posts, cross-members and rails of the base and roof;

- correct installation of the door locks through repeated opening and closing of doors by one person (satisfactory operation of the door locks is character-

ized by simultaneous entry of the top and bottom cams into the cam retainers when closing the door and correct abutment of the sealing rubber without curling of edges of the rubber section on the outside and inside when the door is closed);

- wood intended for the manufacture of containers — for absence of sap and other defects the number and size of which shall not exceed allowed values specified in normative documents;

- documents on impregnation of the floor boards by wood preservatives;

- workmanship of the floor — attachment of boarding to the base rails and cross-members, application of sealing and protective materials at places specified in the documentation, adhesion of the sealing materials with sealing surfaces;

Note. When verifying the floor boarding made of glued panels, it is necessary to pay attention to defects in gluing as applied to seams and butts of the bars and boards. It is allowed to manufacture glued panels from timbers with faces prepared for rabbeted joints for gluing. The seams of the floor boards and glued panels shall be made as rabbeted joints. Cracks and defects in gluing of the panels shall be revealed by illumination of the container bottom on the outside.

- correct installation and attachment of tank in the framework (particular attention shall be given in this case to attachment of the tank in the framework supports so as not to cause local stresses in the supports and tank exceeding the allowed ones);

- correct installation of fittings, piping, safety devices, vacuum valves, temperature, pressure and level gauges, own heating appliances and pressure units;

Notes: 1. Painting and/or application of thermal insulation shall be carried out only after the pressure test of the tank.

2. Internal coating inspection (rubber, polyurethane, enamel, etc.), if applicable, of the tank container shall be exercised by the method approved by the Register after the pressure test of the tank.

- application of thermal insulation;

- results of the internal coating inspection;

- compliance with the requirements of the Rules for the Approval of Containers for the Transport of Goods under Customs Seal. During survey of containers, attention shall be given to availability and reliability of the door locking bars which make possible sealing of the door lock of only one door half, preventing opening of the second door half without opening of the first one (sealed), obstacles preventing access to the container interiors (guard nets, restriction of the apertures dimensions, etc.).

Based on the results of technical supervision including technical supervision during tests, a Report (Form 6.3.18) is issued.

3.2.3 During technical supervision of the prototype which involves surveys at intermediate stages of container manufacture, the provisions of 3.3.1 and 3.3.2 shall be met.

Table 3.2.3

Category of structural members	Inspection type			
	Visual examination	Magnetic powder method	Ultrasonic method ¹	Radio-graphic method ¹
Primary structure	100 %	100 %	100 % of principal welds of pad eyes and 20 % of other welds	10 %
Secondary structure	100 %	— ²	— ²	— ²

¹ — depending on the material thickness and applicability.
² — the surveyor may require to perform random inspection.

3.3 TECHNICAL SUPERVISION DURING MANUFACTURE OF CONTAINERS AT ESTABLISHED PRODUCTION

3.3.1 The Register technical supervision at the firms at established production of containers consists in survey of items of technical supervision at the intermediate stages of manufacture and in survey and tests of finished containers.

3.3.2 During survey of items of technical supervision at the intermediate stages of manufacture inspection is exercised over the assembly and welding of containers, their assemblies and components. Subject to inspection are:

- .1 preparation of components for welding;
- .2 preparation of assemblies and framework for welding;
- .3 execution of welds;
- .4 manufacture of floors;
- .5 results of strength tests and their conformity with the approved documentation (e.g. testing of end frames of tank containers by method of tension by the top corner fittings with applying a force of $1/2P$ to each fitting with the bottom fittings fastened);

Note. The number of frames for tension testing is established by the Register depending on stability of the products workmanship.

.6 performance of operation checking by the Inspection Department.

3.3.3 During survey of finished containers the Register reviews the documents submitted by the firm on performance of operation checking and measurement of not less than 1 out of 10 containers of the batch presented in accordance with the approved

procedure (during survey of tank containers each container shall be subjected to operation checking and measurement), and checks:

.1 conformity of container dimensions with those specified in the Rules for the Manufacture of Containers;

Note. Even if one dimension does not correspond to the specified one, the surveyor shall require:

- to establish and eliminate the causes for the non-conformity between the dimensions;
- to inspect the entire batch of containers by dimensions;
- to submit an official document on fulfillment of the requirements set out in the present Note;
- to present repeatedly the batch of containers after checking by the Inspection Department.

.2 correct application of marking;

.3 correct execution, location and attachment of a Safety Approval Plate (CSC) and a Customs Approval Plate for Containers (CCC);

.4 results of testing of each container for weathertightness;

.5 results of pressure and leakproofness tests of each tank container;

.6 results of testing of thermal containers for airtightness in accordance with 3.4, Part III "Thermal Containers" of the Rules for the Manufacture of Containers;

.7 results of testing of thermal containers with refrigerating/heating plant for operability thereof in accordance with 3.7, Part III "Thermal Containers" of the Rules for the Manufacture of Containers;

.8 results of weighing of each tank container;

.9 results of weld inspection (see Table 3.2.3) and lifting tests of offshore containers (see 2.12 of Appendix 2).

3.3.4 Where during survey of containers or products violations of the requirements of normative documents or deviations from the technical documentation approved by the Register are revealed, the surveyor issues a Report (Form 6.3.29) or an entry is made in the relevant check documentation (acceptance book, process sheet, etc.) specified in the Contract on Technical Supervision.

3.4 QUALIFICATION

3.4.1 Only certified welders having passed the tests under the programs prepared in compliance with the requirements of Section 5, Part XIV "Welding" of the Rules for the Classification and Construction of Sea-Going Ships and additional requirements set forth in Appendix 3, and having received the Welder Approval Test Certificate (Form 7.1.30) shall be approved for performance of welding operations during manufacture of containers.

3.4.2 During serial manufacture of tank containers intended for the carriage of dangerous goods, the managers and specialists engaged in design and manufacture shall be appropriately trained and certified.

3.5 TECHNICAL SUPERVISION OF USED MATERIALS AND PRODUCTS SUPPLIED UNDER COOPERATION AGREEMENTS

3.5.1 All the materials used in manufacture of containers shall comply with the technical documentation approved by the Register and be suitable for service at temperatures specified in the approved documentation.

3.5.2 Technical supervision of the products and components supplied under cooperation agreements at the manufacturer's is performed by means of verification of documentation and availability of the Register brands in accordance with Table 2.1.2 of the General Regulations for the Technical Supervision of Containers or documents and brands of other classification societies if authorized by the Register. The documents of other classification societies not authorized by the Register may be recognized on consideration by the Register in each particular case.

3.6 TECHNICAL SUPERVISION OF WELDING CONSUMABLES

3.6.1 During technical supervision at the manufacturer's, the welding consumables shall be checked for conformity with the requirements of the technical documentation approved by the Register.

Where necessary, the Register surveyor may require check tests of welding consumables.

3.7 PRODUCTION PROCESSES

3.7.1 Changes made in the adopted production processes shall be communicated to the Register prior to their implementation in the production.

The surveyor shall satisfy himself that the change in the production process did not involve changes in or violation of the requirements of the technical documentation for a container approved by the Register, changes in strength characteristics and did not affect the workmanship of products.

The welding procedures shall be approved in accordance with the requirements of Section 6, Part XIV "Welding" of the Rules for the Classification and Construction of Sea-Going Ships. The

Welding Procedure Approval Test Certificate (Form 7.1.33) is issued subsequently also in accordance with the requirements of the present Section.

3.8 TECHNICAL SUPERVISION OF CONTAINER MARKING AND EXECUTION OF CSC AND CCC PLATES

3.8.1 During survey of containers attention shall be given to availability and conformity of the following marking with the requirements of the approved documentation:

- .1** the Register emblem;
- .2** code of the owner, identification number of the owner and reference number (correctness of calculation of the reference number shall be checked);

Note. Location of mandatory particulars and symbols, registration of the owner's code, algorithm of the reference number calculation, codes of container sizes and types are in conformity with the ISO 6346 and GOST R 52524 standards.

- .3** code of the owner's country¹, code of type and code of size;
- .4** gross mass and tare mass of the container on the rear wall surface of the container, and for tank containers — tank capacity;
- .5** date of the next container examination;
- .6** manufacturer's serial number in the right bottom back corner fitting;
- .7** particulars indicating purpose of the fittings;
- .8** marking of vacuum valves and safety devices.

3.8.2 The CSC and CCC plates shall be checked for:

- .1** conformity of dimensions, location, method of attachment and method of indication of particulars and content thereof with the requirements of the International Convention on Safe Containers, 1972, as amended in 1981, 1983, 1991 and 1996 (see 4.1, Part I "Basic Requirements" of the Rules for the Manufacture of Containers) and the Customs Convention on Containers, 1972 (see Section 3 of the Rules for the Approval of Containers for the Transport of Goods under Customs Seal);

Note. The surveyor shall satisfy himself that the plate is made of durable, non-corrosive and fire-proof material.

- .2** correct indication of the load values in the CSC Plate;
- .3** conformity of the maximum gross mass of the container with the value indicated on the CSC Plate and directly on the container.

3.8.3 Availability and content of the Identification Plate with Tank Data shall be checked. Along with that, the surveyor shall satisfy himself that the requirement of the Note to 3.8.2.1 is fulfilled and the Plate is attached in an accessible place and the letters and figures are not less than 3 mm in height.

¹ If available in the approved documentation.

The particulars on the plates shall conform to the requirements of 4.3, Part IV "Tank Containers" of the Rules for the Manufacture of Containers.

3.8.4 The identity of the manufacturer's numbers on the plates and the corner fitting shall be checked.

3.8.5 On offshore containers and lifting sets for them the conformity of the marking, plates and particulars indicated on them with the requirements of Section 7 and 9.7, Part VII "Offshore Containers" of the Rules for the Manufacture of Containers shall be checked.

4 TECHNICAL SUPERVISION DURING TESTING OF CONTAINERS

4.1 SURVEY AND RECOGNITION OF TESTING LABORATORIES

4.1.1 Testing laboratories conducting tests of containers, materials and products for them shall be recognized in accordance with 1.5, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

4.1.2 Testing benches for containers at the manufacturer's of containers are surveyed as a part of the manufacturer's equipment, and in this case issuance of the Recognition Certificate of Testing Laboratory is not required.

4.1.3 Survey of testing benches is carried out during the tests contemplated in programs approved by the Register. Consideration in this case shall be given to:

.1 availability of equipment, devices and measuring instruments which make it possible to conduct all the required tests and measurement of container deformations;

.2 design of equipment, capability of appliances to provide application of external loads to the container in accordance with the requirements of the Rules for the Manufacture of Containers and approved methods;

.3 availability of documents on inspection of the equipment and devices of testing benches performed by competent bodies and conformity of technical characteristics of the equipment and devices with the specified data of the benches;

.4 provision for stowing and securing of the container during:

stacking tests (provision shall be made for all variants of displacement of the test fittings and pads in longitudinal and transverse directions in relation to the top corner fittings of the container);

tests for longitudinal and transverse racking (provision shall be made for securing all the bottom corner fittings against vertical movement by means of

3.9 NORMATIVE DOCUMENTS

3.9.1 Technical supervision during the manufacture of containers is performed having regard to the Procedure for the Application of the Register Rules and the Requirements Established by Administrations during Technical Supervision of Containers during Manufacture and in Service.

anchor device, while against transverse movement — only at corners diagonally opposite to those at which forces are applied);

tension and compression tests of the bottom frame (provision shall be made for restraint of each pair of the bottom end corner fittings when the bottom is asymmetrical in construction);

dynamic test of tank container;

longitudinal restraint tests (provision shall be made for securing all the bottom corner fittings by means of anchor device in which case the pair of the bottom fittings is secured against vertical and transverse movements, while the pair of top fittings — only against transverse movements);

.5 availability of measuring testing loads to create various internal loading conditions with appropriate layouts thereof in the container; along with that, the loads shall be:

weighed, marked with the Inspection Department report issued;

checked by the Register surveyor for availability of marking;

.6 conformity of the testing truck with the requirements of the Rules for the Manufacture of Containers and its capability of manoeuvre over the entire floor area;

.7 availability of appliances to conduct strength tests of the end and side walls of the container;

.8 availability of a bench (facility) for testing each container for weathertightness in accordance with the requirements of the Rules for the Manufacture of Containers; in this case subject to inspection shall be nozzle diameter, pressure (at nozzle outlet), speed of stream, as well as the possibility of coverage of all the external surfaces of the container;

Note. When testing the container with the use of several nozzles, each nozzle shall meet the requirements of the Rules for the Manufacture of Containers.

.9 availability of a bench (facility) to conduct pressure and leakproofness tests of tank containers;

.10 availability of devices and measuring instruments to ensure the necessary check measurements before, during and after the container tests.

4.2 TECHNICAL SUPERVISION DURING TESTS

4.2.1 Tests of the prototype containers and containers at established production are conducted under the Register technical supervision.

The scope and procedure of testing is specified in Appendix 2 to the present Rules and in the Rules for the Manufacture of Containers.

4.2.2 Subject to technical supervision during tests are:

- .1** fulfillment by the firm of the requirements of the Rules for the Manufacture of Containers and approved test programs;
- .2** scope and conditions of tests;
- .3** correct container securing and application of loads;
- .4** measurement of container deformations;
- .5** conformity of the measurement methods with those specified in the procedure;
- .6** pattern and magnitude of deformation of the container components during tests and evaluation of residual deformations of these after unloading;
- .7** correct taking of readings of devices and measuring instruments and calculation of deformations;
- .8** taking of check measurements of the container with the mass being checked on each container subjected to tests;
- .9** strength of welded joints.

Note. Where crackling occurs during the tests, the container shall be carefully examined under sufficient illumination from the inside and outside in order to reveal damages of welds or other structural defects.

4.2.3 The measuring instruments used during tests shall be calibrated by a competent body and have a relative error not exceeding the following values:

- pressure gauges — 2 % (accuracy rating 2);
- flow meters — 2 % (accuracy rating 2);
- thermometers — 1 % (accuracy rating 1);
- electrical measuring instruments — 2 % (accuracy rating 2);
- tape measures — 2 % (accuracy rating 2);
- mass measuring instruments — 2 % (accuracy rating 2).

4.3 EVALUATION OF TEST RESULTS

4.3.1 The container test report is drawn up by the testing laboratory or by the manufacturer in accordance with the form agreed with the Register, and shall be certified by the persons authorized to conduct tests and submitted to the Register for consideration.

4.3.2 The test results are considered as satisfactory provided that:

- .1** elastic and residual deformations of the container components do not render the container incapable of being used for its designed purpose;
- .2** standards of leakproofness and special characteristics corresponding to each container type are complied with;
- .3** critical safety margins for tank containers are ensured;
- .4** regulated container dimensions as based on check measurements after all tests correspond to those given in the Rules for the Manufacture of Containers.

5 BRANDING

5.1.1 Each container which has been surveyed and tested with satisfactory results shall have the brand of the Register of approved type on the CSC Plate (adjacent to the date of the next survey) and on the Identification Plate with Tank Data for tank containers (adjacent to the date of testing), as well as adjacent to the manufacturer's serial number at the right rear bottom corner fitting.

5.1.2 When branding, it is necessary to be guided by the applicable provisions of Appendix 2 to Part I "General Regulations for Technical Supervision" of the Rules for Technical Supervision During Construction of Ships and Manufacture of Materials and Products for Ships.

6 KEEPING RECORD OF CONTAINERS

6.1.1 The Register keeps records of containers in accordance with the Regulations for Keeping Record of Containers in the Register and Registration of the

Code of Container Owner in the Bureau International des Containers.

APPENDIX I

TECHNICAL SUPERVISION DURING MANUFACTURE OF FITTINGS

1 GENERAL

1.1 The present provisions apply to corner and intermediate fittings intended for use in manufacture of containers.

1.2 The dimensions of fittings and test loads shall meet the requirements of 2.1 and 2.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers. At the Register demand, working drawings of fittings shall be submitted for approval.

1.3 Upon agreement with the Register, the fittings may be manufactured by casting or other technique. The same technique may be applied for manufacture of built-up fittings with the use of welding, namely:

fittings completely welded from individual elements — side and end faces;

cast or stamped fittings with weldable plate (additional wall which develops box-shaped fitting according to ISO 1161 standard).

1.4 Where fittings shall be manufactured by series, the manufacturer shall submit to the Register for consideration documentation in accordance with 1.4.1, Part I "Basic Requirements" of the Rules for the Manufacture of Containers, as applied to the manufacture of fittings, and shall be subjected to the procedure of the manufacturer survey by the Register surveyor including tests of fittings in accordance with the program approved by the Register. Where the results of consideration of the technical documentation and survey are satisfactory, the Register draws up the Report on Survey of the Manufacturer and concludes the Contract on Technical Supervision During Manufacture of Fittings.

1.5 The manufacturer of fittings shall apply to the Register with a written request. Enclosed with the request shall be the specification for fittings where the chemical composition and mechanical properties of the fitting materials, thermal treatment procedures and the procedure used in the manufacture and repair of fittings by welding shall be stated.

2 STEEL FITTINGS MANUFACTURED FROM CASTINGS

2.1 Requirements for castings.**2.1.1 Chemical analysis.**

Castings shall be manufactured in electric furnaces or oxygen-converter or other process on agreement with the Register and steel shall be killed.

Chemical composition of steel shall meet the requirements of Table 3.2.4.1, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

2.1.2 Use of other material compositions (including low-alloyed and oxygen-manganese micro-alloyed ones) may be allowed subject to agreement with the Register, provided that they conform to the approved specifications and good weldability thereof in the process of the manufacture of containers is confirmed.

2.1.3 The chemical composition of steel including grain refining elements is established by approved specification depending on mechanical properties given in Table 3.2.4.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers. Sensivity to cold cracks (carbon equivalent C_{eq}) when evaluating weldability shall be calculated from the data of the ladle analysis in accordance with the formula given in the note to Table 3.2.4.1, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

2.1.4 Weldability shall be demonstrated by the manufacturer of fittings in the process of the production approval by the Register.

2.1.5 When selecting material composition for fittings it is necessary to take into account the range of ambient working temperatures in service. In any case, the capacity of the material to resist brittle failure within the range of the item (container) operational temperatures from $-40\text{ }^{\circ}\text{C}$ up to $+50\text{ }^{\circ}\text{C}$ shall be assured. In this case, the value of impact strength shall meet, as a minimum, the requirements of Table 3.2.4.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers. Other temperature ranges may be accepted subject to agreement with the Register and the customer in accordance with the requirements of national standards.

2.1.6 Thermal treatment.

All the castings shall be treated according to conditions given in the agreed specification.

2.1.7 Mechanical properties.

The mechanical properties of the castings material after thermal treatment according to procedures given in the technical documentation approved by the Register shall comply with the requirements of Table 3.2.4.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

2.1.8 Workmanship.

All castings shall have clean surface in accordance with the requirements of the specification. Defects which can affect operational properties of the corner fittings, such as noticeable in size non-metallic

inclusions, shrinkage cavities, gas cavities and cracks are not allowed. They can be removed by one of the methods given in 2.5.

2.2 Survey and tests.

2.2.1 General.

The manufacturer may either submit the quality control system to the Register for approval or submit each batch of fittings for survey by the Register surveyor.

2.2.2 Chemical analysis.

The manufacturer shall determine chemical composition of each heat (ladle analysis).

2.2.3 Mechanical tests and impact tests.

Samples to make test specimens for determining mechanical properties may be taken either from a cast fitting or from a separately cast sample (ladle analysis) subjected to similar thermal treatment procedure. At least one specimen shall be tested for tension and three V-type sharp-notch specimens shall be subjected to impact test. The impact tests are conducted in accordance with Table 3.2.4.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

2.2.4 External examination and checking of dimensions.

The manufacturer shall carry out external examination and measurement of 100 % castings from a batch. Castings shall be submitted to the Register surveyor for random inspection to check their compliance with the requirements of 2.1 and 2.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

2.2.5 Non-destructive testing.

One casting from each heat, but not more than from a batch of 400 castings shall be subjected to non-destructive testing in compliance with the standards agreed with the Register.

2.2.6 Strength tests.

The tests are conducted using loads in compliance with the requirements of 2.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers. 1,5 % of fittings from the presented batch of fittings, but not less than from a batch of 800 fittings shall be subjected to tests.

Other methods to confirm the strength characteristics may be accepted subject to agreement with the Register Head Office.

2.3 Marking and branding.

2.3.1 The marking shall satisfy the requirements of 2.2.4, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

2.3.2 The Register surveyor puts the Register brand on each inspected fitting. When issuing an affirmed Certificate, the brand may be put by a designated official which shall be specified by the Agreement on Survey (see 1.5.5, Part I "Basic

Requirements" of the Rules for the Manufacture of Containers).

2.4 Certificates.

For each batch the manufacturer shall submit to the Register surveyor a Certificate or specification containing, as a minimum, the following information:

- customer and number of contract (order);
- type of fitting and casting material category;
- number of drawing and/or specification;
- method of manufacture;
- number of heat and chemical composition;
- thermal treatment procedures;
- quantity and mass of castings;
- results of non-destructive testing and mechanical

tests;

- results of castings measurements.

2.5 Correction of defects.

2.5.1 Conditioning.

Minor defects shall be removed by conditioning provided that the depth of conditioning shall not exceed the allowable negative tolerances.

2.5.2 Welding.

Defects which cannot be removed only by conditioning shall be corrected by welding with preliminary conditioning of the defective places provided that the depth of defect occurrence does not exceed 40 % of the casing wall thickness. When defects of the fittings are corrected by welding, the following requirements shall be fulfilled:

- pre-heating shall be provided prior to welding if the ambient temperature is below 5 °C or moisture is present in the welding area;

- welding shall be performed by certified welders;

- after correction all the cast fittings shall be subjected to thermal treatment with the use of procedures agreed with the Register;

- welded up places shall be conditioned and checked for defects by one of the non-destructive testing methods approved by the Register.

3 FITTINGS MANUFACTURED WITH THE USE OF WELDING

3.1 Requirements for the basic materials.

3.1.1 The built-up fittings shall be manufactured of the following material compositions:

- carbon-manganese steel with chemical composition according to Table 3.2.4.1, Part I "Basic Requirements" of the Rules for the Manufacture of Containers, when manufactured by casting;

- carbon-manganese micro-alloyed steels, low-alloyed steels when the fittings are rolled or stamped.

3.1.2 Steel for fitting components manufactured of rolled products, stamping, castings with the use of

welding shall be manufactured in accordance with the approved national standards and be delivered fully deoxidized, treated by grain refining elements and thermally treated.

3.1.3 Content of chemical elements in steel shall consider the carbon equivalent C_{eq} according to 2.1.

3.1.4 Minimum requirements for the mechanical properties of steel used for the components of built-up fittings despite the manufacturing method (casting, forging, rolling) shall comply with Table 3.2.4.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers.

3.1.5 Steel which differs in mechanical properties is subject to special agreement with the Register.

3.2 Requirements for welding consumables and welding.

3.2.1 Welding consumables intended for welding of built-up fittings shall be approved by the Register and meet the requirements of standards agreed with the Register.

3.2.2 Welding consumables shall be selected with due regard for the mechanical characteristics and chemical composition of the base material and in this case the range of working temperatures shall be taken into account in the same manner as during selection of the base materials.

3.2.3 The built-up fittings manufactured of cast, stamped and rolled elements shall be welded using welding consumables with controllable content of diffusible hydrogen. Use of austenitic welding consumables is allowed subject to agreement with the Register.

3.2.4 Welded joints of components (walls, surfaces) of fittings bearing main loads shall be made with full penetration.

3.2.5 The need for pre-heating before welding and thermal treatment after welding depends on chemical composition of the base material and welding consumables and the method of manufacture of welded fitting components (casting, forging, rolling). The requirements of 2.5 shall be taken into account during manufacture of welded fittings with the use of cast components.

3.2.6 All the welding procedures used during manufacture of built-up corner fittings shall be approved by the Register, based on the results of tests conducted under the program approved by the Register, in the surveyor's presence.

3.2.7 The welding procedures of the manufacturer shall comply with the requirements of the Register rules and national or international standards which shall be attested by the Register surveyor during certification of the welding procedure.

3.2.8 All welding operations shall be performed by welders having Welder Approval Test Certificate (Form 7.1.30) in conformity with the welding procedures approved by the Register.

3.3 Testing and inspection.

3.3.1 To check the quality of welds and manufacture of fittings of each type when starting production the following types of inspection are performed:

external examination and measurement of dimensions;

non-destructive testing (ultrasonic or X-ray radiographic examination, subject to agreement with the Register);

check of mechanical properties of the base metal and welded joints;

testing by working loads in accordance with the Rules for the Manufacture of Containers.

3.3.2 Subject to external examination and measurement of dimensions are all the fittings or their welded joints, and the quality of welded joints is evaluated in conformity with the standards agreed with the Register.

3.3.3 Subject to ultrasonic or X-ray radiographic examination are 2 % of fittings from each batch (in accordance with the definition of batch given in Appendix 2), but not less than three pieces. The quality is assessed in accordance with national or international standards agreed with the Register. The welded joints shall be free from cracks, poor fusion. Where a quality control system approved by the Register is used by the manufacturer and also where the stable workmanship of fittings over a long period of time is confirmed, at the discretion of the Register surveyor, the scope of the radiographic (ultrasonic) examination may be reduced or the latter may be replaced by magnetic powder inspection or by penetrate inspection.

3.3.4 Subject to check of mechanical properties of the base metal and welded joints of fittings are each charge or each batch of fittings numbering 400 pieces, and the following mechanical tests are carried out in this case:

tension test using three specimens of welded joints;

impact test (three specimens in the weld area and three specimens in the heat-affected area);

test to determine hardness of the heat-affected area of the fillet weld with full penetration on macrosection.

3.3.5 Mechanical tests of welds shall be carried out in conformity with requirements of national or international standards agreed with the Register, and the ultimate breaking strength of the welded joint shall not be less than that for the base metal and shall comply with the value given in Table 3.2.4.2, Part I "Basic Requirements" of the Rules for the Manufacture of Containers. The impact energy during the test of the metal of weld and heat-affected area shall not be less than 27 J at the test temperature of -20°C , hardness shall be not more than 350 HV.

3.4 Marking and documentation.

Marking of welded fittings as well as accompanying documents for each batch shall comply with 2.3 and 2.4.

APPENDIX 2

LIST OF ITEMS TO BE SUBMITTED TO THE REGISTER FOR TECHNICAL SUPERVISION^{1, 2}

Nos	Item of technical supervision	Minimum scope of surveys and tests	Survey and test procedure	Presentation of survey results
1. Manufacture of container prototypes (not less than two samples)^{1, 2}				
1.1	Products for containers manufactured by the container manufacturer, indicated in Table 2.1.2 of the General Regulations for the Technical Supervision of Containers	Each product is subject to survey with performance, where necessary, of tests under program approved by the Register ^{3, 4}	See provisions of 2.3 and 2.4, Section 2 and Appendix 1	The manufacturer's documents and/or Report (Form 6.3.29) or the document in accordance with Table 2.1.2 of the General Regulations for the Technical Supervision of Containers
1.2	Materials and products supplied under cooperation agreement	Verification of the manufacturer's documents, the Register certificates or documents of another classification society (see 3.6.2) ⁵ Inspections during mounting and tests	See provisions of 3.6, Section 3	Where non-conformities are identified, the documents contemplated by the RS QMS procedures are issued
1.3	Monitoring of assembling and welding procedures of accessories and parts	According to the list of the items of technical supervision agreed with the manufacturer	See provisions of 3.3, Section 3	The manufacturer's documents or Report (Form 6.3.29)
1.4	Assembled container	Survey including verification of the Technical Supervision Book (process sheet) and other documents of the manufacturer's Inspection Department	See provisions of 3.3, Section 3	Issue of documents completing container assembly and welding. A Report (Form 6.3.29) is issued for test approval
1.5	Tests of container	Participation in tests conducted under program approved by the Register	See provisions of Section 4	Issue of the Report (Form 6.3.29) and Report on Container Tests by the laboratory
1.6	Installation of insulation, painting, marking, etc	Final survey	See provisions of Section 4	Report (Form 6.3.18), Certificates (Forms 6.5.23, 6.5.28, 6.5.29), Certificate of Approval by Design Type (Forms 2.3.1, 2.3.2, 2.3.3, 2.4.1, 2.4.2) and Certificate of Compliance (Form 2.3.4)

Nos	Item of technical supervision	Minimum scope of surveys and tests	Survey and test procedure	Presentation of survey results
2. Manufacture of containers at established production				
2.1	Products manufactured by the container manufacturer	According to provisions of 2.3 and 2.4 ^{3,4,6} , Section 2	In accordance with Table 2.3.1, Section 2	The manufacturer's documents and/or Report (Form 6.3.29) or the document in accordance with Table 2.1.2 of the General Regulations for the Technical Supervision of Containers
2.2	Materials and products supplied under cooperation agreements	Verification of the manufacturer's documents, the Register certificates or documents of another classification society (see 3.6.2) ⁵	See provisions of 3.6, Section 3	Where non-conformities are identified, the documents contemplated by RS QMS procedures are issued
2.3	Survey of assembled containers after manufacture (except for the specialized ones)	5 % of the submitted batch ⁷ , but not less than two containers	As indicated in 3.4.3, Section 3	Where defects are found a Report (Form 6.3.29) on survey results is issued
2.4	Survey of tank containers	Survey of each tank container	As indicated in 3.4, Section 3	Certificate (Form 6.5.29). Where defects are found during survey, a Report (Form 6.3.29) is issued
2.5	Weathertightness test of containers	Each container	As indicated in 4.1.3.10, Section 4	Where defects are found, a Report (Form 6.3.29) on survey results is issued
2.6	Pressure and leakproofness tests of tanks, test of heating appliances and pressure units of container	Each tank container and each item of equipment is subjected to tests	As indicated in 3.4, Section 3	Where defects are found, a Report (Form 6.3.29) on survey results is issued
2.7	Sampling tests of general cargo containers	On a sampling basis, by the Surveyor's direction one container out of the batch of 500 containers satisfactorily surveyed ⁸ , is tested to the extent agreed with the Register and the customer	According to the approved test program	1. Container Test Report (to be issued by the laboratory). 2. Report (Form 6.3.18). 3. Certificate (Form 6.5.29)
2.8	Sample tests of tank containers	On a sampling basis, by the surveyor's direction tank containers are tested under prototype test program, in case of customers' claims and depending on stability of workmanship of type-series containers. The size of tank containers batch from which containers are sample tested is determined subject to agreement with the Register Head Office	According to the approved program of prototype tank container testing	1. Container Test Report (to be issued by the laboratory). 2. Report (Form 6.3.18). 3. Certificate on Tank Container ⁹ (Form 6.5.29)
2.9	Airtightness tests of thermal containers	Number of containers is established by the Register in each particular case depending on container design and stability of workmanship	As indicated in 3.3, Section 3	Certificate (Form 6.5.28). Where defects are found during survey a Report (Form 6.3.29) is issued

Nos	Item of technical supervision	Minimum scope of surveys and tests	Survey and test procedure	Presentation of survey results
2.10	Performance tests of containers with refrigerating/heating plants	Tests of thermal containers with refrigerating/heating plant for performance thereof	According to 3.7, Part III "Thermal Containers" of the Rules for the Manufacture of Containers	Certificate (Form 6.5.28). Where defects are found during survey, a Report (Form 6.3.29) is issued
2.11	Sample tests of thermal containers	On a sampling basis, by the surveyor's direction one container out of a batch of 500 containers satisfactorily surveyed ⁸ is tested for lifting, floor strength and heat transfer	According to the approved test program	Test Report is issued by the laboratory, Certificate (Form 6.5.28). Where defects are found, a Report (Form 6.3.29) is issued
2.12	Four points lifting test of offshore containers	On a sampling basis, by the surveyor's direction 10 % of containers out of batch satisfactorily surveyed ⁸ , but not less than two containers	In accordance with 8.2, Part VII "Offshore Containers" of the Rules for the Manufacture of Containers	Test Report is issued by the laboratory, Certificate (Form 6.5.36). Where defects are found, a Report (Form 6.3.29) is issued
3. Manufacture of accessories and parts for containers				
3.1	Survey of corner and intermediate fittings	Check of results of tests conducted by the manufacturer (2.2 of Appendix 1) and inspection in accordance with 2.2.4 of Appendix 1	As indicated in Appendix 1	Certificate (Form 6.5.30). Where defects are found during survey, a Report (Form 6.3.29) is issued
3.2	Survey and testing of end frames	To be established by the Register in each particular case	As indicated in 3.4.2.5, Section 3	A Report (Form 6.3.29) is issued
3.3	Tanks	Each tank is subjected to survey and testing	As indicated in 2.3, Section 2	Where defects are found during survey, a Report (Form 6.3.29) on survey results is issued
3.4	Closure fittings, safety devices, vacuum valves	Survey and testing of 10 % of products out of the batch submitted. Where non-conformities are identified, each product shall be surveyed and tested	As indicated in 2.3, Section 2	Certificate (Form 6.5.30 or 6.5.31) or a Report (Form 6.3.29) where defects are found as a result of survey
3.5	Pressure units and heating appliances	Each item of equipment shall be surveyed and tested	As indicated in 2.3, Section 2	Certificate (Form 6.5.30 or 6.5.31) or a Report (Form 6.3.29) where defects are found as a result of survey
3.6	Refrigerating/heating plants for thermal containers	Performance test of each plant. Number of plants for checking operational performance of the container with the refrigerating plant in operation at elevated ambient temperature and for checking of operational performance of the refrigerating plant is established subject to agreement with the Register Head Office in each case depending on stability of production and technical supervision experience at the firm	Tests in accordance with 3.1.7, 3.6 and 3.7, Part III "Thermal Containers" of the Rules for the Manufacture of Containers	Certificate (Form 6.5.30) or a Report (Form 6.3.29) where defects are found as a result of survey

<p>¹ Containers satisfactorily surveyed after manufacture.</p> <p>² When granting approval in accordance with CSC Convention one tank container is subjected to dynamic test (in case where the tank containers are intended for the carriage of dangerous goods).</p> <p>³ The batch of the remaining products shall consist of products in number necessary to manufacture not more than 100 containers of the same design type.</p> <p>⁴ Depending on the workmanship, the number of corner fittings or other products from a batch to be surveyed and tested may be increased at the surveyor's demand.</p> <p>In case where the results of survey of increased number of corner fittings are unsatisfactory, the entire batch shall be corrected and repeatedly submitted to the Register. When the batch is repeatedly submitted, the number of corner fittings or other products contained in the batch shall be doubled as compared to that specified in the present Appendix.</p> <p>⁵ In case of doubts upon the conformity of materials used in manufacture of containers, with the documentation submitted thereon or if the materials in the parts, accessories and structures of containers are faulty, the surveyor may require additional tests of materials according to 2.2, Section 2.</p> <p>⁶ Certificate (Form 6.5.30) or Report (Form 6.3.29) where defects are found as a result of survey.</p> <p>⁷ The batch of containers shall consist of not more than 500 containers of the same design type, manufactured at the firm in question in conformity with the approved technical documentation.</p> <p>⁸ Based on the results of container survey, the Register surveyor may require additional tests (for tension and compression of frames, strength of end walls, etc.) to be conducted on other containers from the batch submitted. It is necessary to carry out additional tests on doubled number of containers selected by the surveyor from the batch submitted, when the results associated with at least one type of tests are unsatisfactory. Where the additional tests results are unsatisfactory even for one of the containers tested, the whole batch from which containers have been selected, is rejected or repaired according to the procedure approved by the Register with repeated survey of assembled containers and tests thereof as newly manufactured.</p> <p>⁹ Certificate (Form 6.5.29) is issued for each tank container.</p>	<p>Notes: 1. Branding is performed in accordance with Table 1.1.3 of Section 1.</p> <p>2. During technical supervision of the manufacture of containers of other types than those specified by the present Table, the list of the items of supervision shall be agreed with the Register Head Office.</p>
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APPENDIX 3

RULES FOR THE CERTIFICATION OF WELDERS TO PERFORM WELDING DURING THE MANUFACTURE AND REPAIR OF CONTAINERS**1 GENERAL**

1.1 Rules for the certification of welders are set out in Section 4, Part III "Technical Supervision during Manufacture of Materials" of the Rules for Technical Supervision During Construction of Ships and Manufacture of Materials and Products for Ships.

This Appendix contains amendments as per the certification of welders for approval thereof to perform welding during the manufacture and repair of containers.

1.2 Certification of welders may be carried out by a standing commission on certification the members of which are approved by the order for the firm.

1.3 The commission shall include:

chief engineer of the firm — chairman of the commission;

welding engineer — deputy chairman of the commission (Secretary);

head of the Quality Control Department or Inspection Department;

head (supervisor) of the production site;

safety engineer;

representative of the Register (on agreement).

2 SCHEDULE OF WORK OF THE COMMISSION ON CERTIFICATION. ISSUE OF DOCUMENTS

2.1 The commission shall check the theoretical knowledge of welders, be present during welding of samples, consider the test results in order to make a decision regarding these results.

2.2 All the members of the commission shall be notified of the date of its meeting:

employees of the firm — not less than 3 days before the date;

employees from other organizations — not less than 10 days before the date;

2.3 The following documents shall be submitted to the commission:

program of welders certification;

list of welders to be certified with indication of education, rate and professional experience;

certificates of welders;

conclusion based on the results of testing of test assemblies (in case of retests);

reference of the quality of welders' works signed by the Quality Control Department (Inspection

Department) in order to exempt the welder from retests.

2.4 The decision of the commission is considered to be legitimate if not less than 60 % of its members are present at the meeting.

2.5 When practical tests are performed, presence of two members of the commission (Head of the Quality Control Department/ Inspection Department and Welding Engineer) to supervise performance of welding and assess the quality of samples visually, and the representative of the Register will be sufficient.

2.6 Proceeding from the results of the practical and theoretical examinations of welders, the certifying commission executes a protocol in accordance with the form recommended in Appendix 3 to Section 4, Part III "Technical Supervision during Manufacture of Materials" of the Rules for Technical Supervision During Construction of Ships and Manufacture of Materials and Products for Ships.

2.7 Based on the protocol of welders' certification and provided that all the requirements of the Rules for the Manufacture of Containers to the certification of welders the Register draws up and issues a Welder Approval Test Certificate (Form 7.1.30).

3 CHECKING OF PRACTICAL SKILLS

3.1 Welders performing welding of parts and accessories with corner fittings shall carry out tee butt welding (see Fig. 1).

3.2 For welders carrying out welding on automatic (mechanized sets, their work on container parts and accessories being welded shall be checked with subsequent visual inspection and measurement. A welder shall demonstrate skills in adjustment of the facility, correction of welding conditions and other necessary parameters.

3.3 The materials of samples to be welded shall be identical to those used in container design. The quality of steel shall be confirmed by certificates. Other materials welding is not allowed.

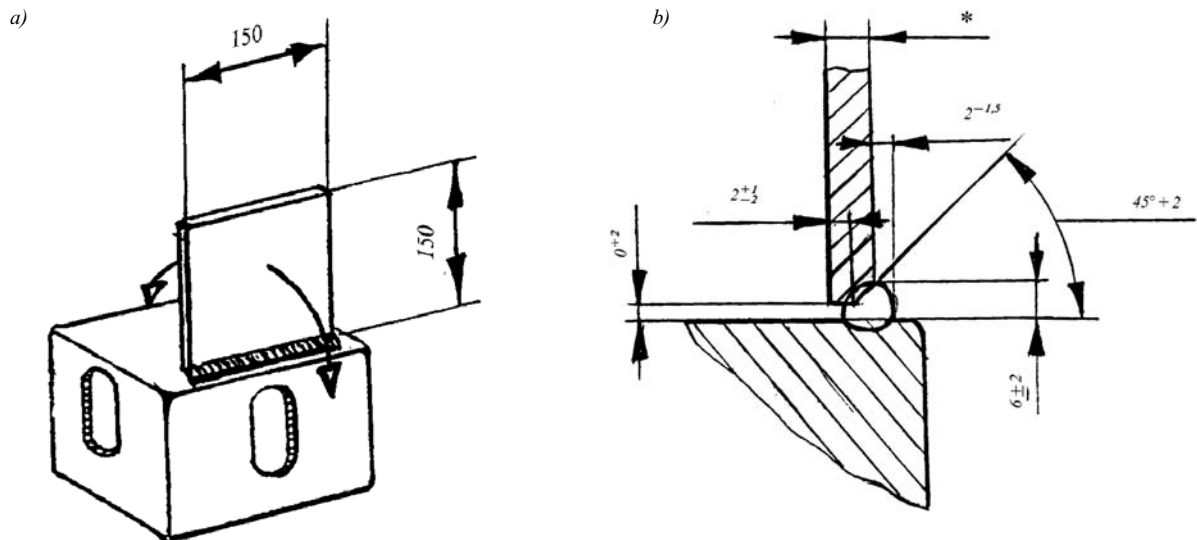
3.4 The dimensions of plates for samples to be welded are given in Appendix 1 to Section 4, Part III "Technical Supervision during Manufacture of Materials" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships and in Figs 1 and 2.

3.5 Where the results of visual examination are unsatisfactory, a welder has the right to carry out

rewelding of the check sample; where results of welding of the repeated sample are unsatisfactory the welder shall be excluded from the list of welders to be certified.

4 QUALITY OF WELDS

4.1 The quality of welds is evaluated in accordance with the provisions of 4.4.5, Section 4, Part III "Technical Supervision during Manufacture of Materials" of the Rules for Technical Supervision During Construction of Ships and Manufacture of Materials and Products for Ships.



* Minimum 4 mm or the maximum thickness used in structure.

Fig. 1 Special tee-joint sample tested for fracture:
a) general view; b) sectional view

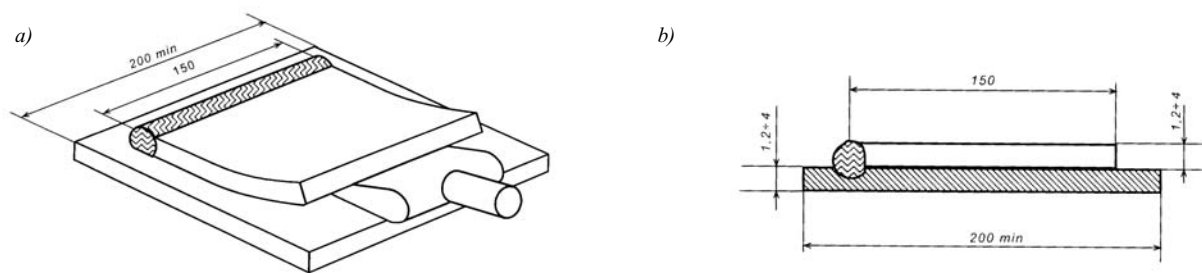


Fig. 2 Overlap joint sample tested for separation of plates:
a) general view; b) sectional view

**RULES FOR TECHNICAL SUPERVISION
OF CONTAINERS IN SERVICE**

1 GENERAL

1.1 APPLICATION

1.1.1 The requirements of the present Rules apply to the containers complying with the requirements of CSC Convention and IMDG Code.

1.2 DEFINITIONS

1.2.1 For the purpose of the present Rules the following definition has been adopted.

Surveys are examinations, gauging, tests and checks in operation as well as checking of the prescribed marking and stamping.

2 TECHNICAL SUPERVISION

2.1 GENERAL

2.1.1 The responsibility for submission of containers for surveys within the terms of the present Rules and in the stipulated cases, presentation of necessary documents, as well as testing, gauging and inspecting for defects rests with the owner of containers.

The CCC Convention gives the owners of container power to choose survey procedures:

submission of containers for examinations at time intervals given in 3.2 (special survey scheme);

submission of containers for survey in accordance with ACEP program approved by the Register.

2.1.2 The responsibility for maintaining containers in proper condition for safe operation thereof rests with the owner of containers. At time intervals between prescribed surveys the owner shall ensure the necessary checkings and examinations to reveal possible defects and faults, availability of marking of the containers and its compliance with the provisions of the CSC Convention, IMDG Code and the

requirements of the Rules for the Manufacture of Containers.

2.1.3 If an approved container has ceased to comply with the provisions of the CSC Convention and the requirements of the Rules for the Manufacture of Containers, due to structural or manufacturing defects revealed during service, and such occurrence is observed on a considerable number of containers out of the approved series, the Register may cancel the approval.

2.1.4 In the case of loss of a CSC and/or CCC Plate, approval of an individual container for further service is subject to special consideration by the Register in each particular case.

2.1.5 When the approved containers undergo modification all documents relative to such modification shall be submitted to the Register. Based on the results of consideration of the documentation submitted and the results of the prototype container testing to be performed, if considered necessary, the Register may grant a new approval.

The scope of testing shall be established by the Register in each particular case.

3 SURVEYS

3.1 GENERAL

3.1.1 Containers are surveyed on application in writing from owners or lessees (the lessee shall have an appropriate agreement with the owner, which shall establish responsibility of the lessee for satisfaction of requirements set out in 2.1.1).

3.2 SPECIAL SURVEY SCHEME IN ACCORDANCE WITH CSC CONVENTION

3.2.1 The Register performs the following surveys of containers under the special survey scheme:

1 first special survey, not later than 5 years after the date of manufacture;

Note. The date (month, year), before which a container shall undergo its first special survey is indicated on the CSC Plate affixed to the container after manufacture and may be indicated on both marked panels of the container side walls (when these are not provided, in the bottom portion of both side walls, in way of the owner code and number marking).

.2 subsequent special surveys, at intervals not exceeding 30 months;

Note. The date (months, year), before which a container shall undergo a special survey is indicated on the CSC Plate or on the container itself, near the CSC Plate, and may be indicated on both marked panels of the container side walls (when these are not provided, in the bottom portion of both side walls, in way of the owner code and number marking).

.3 occasional surveys to be held on application from owners of the containers or other organizations concerned.

3.2.2 Special surveys of the containers include:

.1 external examination including examination of the roof, base and internal volume of empty container as well as examination of marking;

.2 examination with provisions of access for examination, opening-up or dismantling of machinery (units), thermal insulation etc. at the discretion of the Register surveyor, depending on technical condition of the container;

.3 tests and inspections at the discretion of the Register, depending on technical condition of the container.

3.2.3 In specific cases, depending on the technical condition of the tank container, the Register may require a diagnostic examination of the container to be made by methods approved by the Register.

3.2.4 The scope of special surveys of thermal containers shall comply with the requirements of 3.2.2 and moreover, in accordance with the application from the owner or lessee, survey may be extended for the objects listed in Table 3.2.4.

3.2.5 Criteria for safe operation of containers set forth in 4.1.5 are minimum requirements for survey for compliance with the present Rules and the CSC Convention.

3.3 APPROVED CONTINUOUS EXAMINATION PROGRAM (ACEP)

3.3.1 The containers shall be surveyed under ACEP in accordance with 2.1.1 by means of:

.1 complete surveys which constitute surveys carried out upon major repair, updating, modification or taking on/off lease;

.2 examinations in service, which are considered as re-inspections performed with the aim to detect any damage or wear which can necessitate corrective measures.

3.3.2 Containers, examination of which shall be made under ACEP, shall be subjected to complete survey in cases specified in 3.3.1.1 but at any case not less than once every 30 months.

3.3.3 The ACEP Program to be submitted to the Register Head Office for approval, shall contain, at least, the following information:

.1 number of containers included in the Program;
.2 approval Nos. according to the CSC Convention for each design type of container;

.3 date of manufacture of container;

.4 date of the last survey;

.5 nature and frequency of examinations;

.6 dates of surveys and measures enabling the container to be surveyed not less than once every 30 months;

.7 availability of control system over the survey terms;

.8 owner's assurance that the containers will be surveyed to full extent as outlined in 3.2.2;

.9 names of organizations and works which will carry out maintenance (repair) of containers;

.10 measures that will be taken by the owner in respect to containers which no longer comply with requirements of the CSC Convention and these Rules.

3.3.4 If satisfied with the results of consideration of the submitted ACEP Program, the Register shall notify the owners and other parties concerned as to approval of the Program.

3.3.5 A sign containing letters with the name of country and the Register approval number shall be marked on the CSC Plate or in immediate proximity thereof to indicate that the container is operated in conformity with the approved ACEP Program.

3.3.6 The ACEP Program does not cover tank containers.

3.3.7 Works and organizations carrying out maintenance, repair and tests of the containers shall be recognized by the Register.

3.4 PERIODICAL SURVEYS OF TANK CONTAINERS INTENDED FOR THE TRANSPORT OF DANGEROUS GOODS

3.4.1 Tank containers intended for the transport of dangerous goods and complying with the IMDG Code requirements shall be subjected to periodical surveys every 2,5 years from the date of manufacture.

Periodical surveys of such tank containers are usually carried out together with the special surveys for compliance with the CSC Convention excluding the first after manufacture (not required according to CSC Convention).

3.4.2 The required technological equipment, testing bench for fittings and control instrumentation having valid documents after state calibration shall be mounted at a firm where periodical survey of tank containers is going to be held.

Preparation of tank containers for survey and tests (testing of safety devices, hydraulic tests and leakproofness tests of tanks) shall be carried out by specialists of sufficient qualification in this area.

Table 3.2.4

Scope of survey of thermal containers

Nos	Scope of survey	Survey
I	Insulated container	CH
II	Refrigerated and/or heated container	
1	Refrigerating unit (as a whole)	OP
2	Components of refrigerating unit	
2.1	Compressor	OPH
2.2	Fans	P
2.3	Refrigerant pressure vessels and apparatus	OH
2.4	Safety valves (devices)	OPH
2.5	Refrigerant pipes and fittings	OPH
2.6	Starting and control arrangements of refrigerating unit	P
2.7	Instrumentation	E
2.8	Automatic equipment of refrigerating unit:	
2.8.1	Control devices	P
2.8.2	Protection devices	OP
3	Thermal insulation of container and of closing devices thereof	C
4	Air pipes and air ducts, drainage arrangements	OP
5	Electrical equipment	
5.1	Source of electrical power, if any	OPM
5.2	Distribution gears	OEPM
5.3	Cables	OM
5.4	Plugs	OM
5.5	Electrical drives of fans and compressors	OPM
5.6	Alarms and protective devices	OP
5.7	Heating unit, if any	OPM
6	Drive of electrical power source, if any	OPM
III	Refrigerated container with expendable requirement	
1	Refrigerant pressure vessels	C
2	Fans	P
3	Refrigerant sublimation or evaporation control devices	P
4	Instrumentation	E
5	Thermal insulation of container and of closing devices thereof	C
6	Air pipes and air ducts, drainage arrangements	OP
¹ Symbols: O — examination with provision of access, opening-up or dismantling of machinery (units), thermal insulation upon consideration of the Register surveyor depending on the container technical condition; C — external examination (inclusive of internal volume of the container); M — gauging of wear, clearances, insulation resistance of electrical equipment, nondestructive sampling inspection of welds; H — tests (thermal, hydraulic, leakage tests); E — checking of availability of the documents and/or brands of classification societies or appropriate competent authorities; P — testing of machinery (units) in service and external examination thereof.		

3.4.3 The tank containers prepared for survey by the Register surveyor shall be cleaned, degassed and have the document issued by a cleaning station, which specifies the last cargo carried and the cleaning method, as well as the valid document on the gas analysis of tank atmosphere with the conclusion on a possibility of work performance inside the tank. The tests shall be carried out according to the programme approved by the Register and to the test procedure.

3.4.4 Criteria of safe operation of containers set forth in 4.1.5 and 4.1.6 are minimum ones for periodical surveys.

3.4.5 Survey every 2,5 years.

3.4.5.1 The scope of survey of tank containers shall include the following:

.1 assessment of technical condition of all frame members (fittings, longitudinal, transverse frame

members, corner posts, attachments of the tank to the framework, welds etc);

.2 tank survey consisting of:

.2.1 assessment of technical condition of internal surface;

Notes: 1. Where the corrosion of the tank material, the character and dimensions of which cannot be determined without using the special diagnostic means, has been revealed and it may result in the reduced thickness of the tank shell below the minimum value required by the construction, in order to determine the character and dimensions of damage, the Register may demand conducting the diagnostic examination using the methods agreed with the Register.

2. Tank containers operating for more than 10 years from the date of manufacture are subject to mandatory diagnostic examination by methods approved by the Register during periodical surveys each five years within the scope prescribed by Surveyor to the Register upon results of the examination.

3. Diagnostic examination includes tank wall thickness measurements, examination of tank welds and points of attachment of the tank to the framework.

4. Internal examination of tank containers with the vacuum insulation is carried out at intervals specified by the manufacturer.

.2.2 assessment of technical condition of external surface;

Note. The Register may require full or partial dismantling of insulation if a suggestion that a tank is damaged appeared during internal or external examination.

.3 assessment of completeness and technical condition of operating equipment, safety devices, devices for producing and maintaining of pressure and temperature, meanwhile:

.3.1 efficiency of all stop valves and vents shall be checked. In case of any doubts about proper functioning of any equipment, it shall be dismantled and checked;

.3.2 all pressure-relief valves and rupture disks shall be dismantled and inspected. Pressure-relief valve turn-on pressure shall be inspected for compliance with the value specified on valve marking keeping due note of pressure required by the international and national normative documents. Pressure-relief valves shall close at pressure, which is at least by 10 per cent less than the turn-on pressure and remain closed at all lower pressures;

Note. This inspection shall be carried out at the test bench approved by the Register.

.3.3 the rupture disks shall be inspected for integrity and compliance of the breakdown pressure specified on a plate to the pressure required by the international and national normative documents (rupture disks without a plate or with unreadable information on a plate shall be replaced). Rupture disks fitted on tank containers shall have the Register Certificate;

.3.4 instrumentation shall be calibrated and have valid documents and marking;

.4 tests.

Leakproofness tests shall be carried out in accordance with procedure described in 3.8, Part IV "Tank Containers" of Rules for the Manufacture of Containers without removal of insulation and protective coating.

A tank shall be kept under pressure for at least 10 min. Absence of leaks in a tank, its fittings and joints is checked during tests using suds or other effective method of finding a leak;

.5 inspection of marking:

.5.1 check of availability of all required plates, correctness and readability of notes;

Note. Recovery of plates with tank data, CSC and CCC Plates in case of their loss is a matter of special consideration by the Register in each particular case.

.5.2 check of compliance of the tank container marking with the requirements of Section 4, Part IV "Tank Containers" of Rules for the Manufacture of Containers.

3.4.6 Survey every five years.

3.4.6.1 In addition to the scope of survey set forth in 3.4.5 the following tests shall be carried out:

.1 hydraulic test of a tank by pressure specified on a plate with tank data without removal of insulation and protective coating as well as hydraulic test of refrigerating or heating systems.

Notes: 1. Prior to hydraulic test of a tank pressure-relief and vacuum valves shall be removed and replaced by hermetic corks of the relevant design and strength. For the purpose of hydraulic tests the gasket of a manhole may be replaced by the rubber one. A tank shall remain under pressure for at least 30 min.

2. In particular cases, the Register may consider other means of determining the technical condition of the tank and diagnostic methods.

Absence of a leak and pressure drop in a tank, its fittings and refrigerating or heating systems shall be checked during a test;

.2 if hydraulic tests are completed successfully the leakproofness test shall be carried out in accordance with the procedure specified in 3.4.5.1.4;

Note. Prior to the leakproofness test sealings of material required for operation shall be fitted to all connections between the tank and equipment, as well as to a manhole.

.3 check of efficiency of devices for producing and maintaining of pressure and temperature in a tank.

3.5 PERIODICAL SURVEYS OF OFFSHORE CONTAINERS

3.5.1 The scope and frequency of surveys of offshore containers shall comply with the requirements of Table 3.5.1.

3.5.2 The scope of visual examination shall comply with that specified in 3.2.2. Special attention is paid to condition of welds of lifting eyes and members of container.

3.5.3 Non-destructive testing of lifting eye welds and mating elements shall be carried out by magnetic particle inspection check and dye penetrant inspection. The Register may require diagnostic examination by other methods.

Note. Non-destructive testing report shall be attached to the container survey report.

3.5.4 Offshore tank containers intended for the transport of dangerous goods shall in addition pass surveys listed in 3.4.

Table 3.5.1

Interval	Test/survey			
	Lifting test ¹	Non-destructive testing of lifting eyes	Visual examination	Marking on inspection plate ²
Regular, at intervals not exceeding 12 months	Up to Surveyor to the Register discretion	Up to Surveyor to the Register discretion	+ ³	T or VN or V
Regular, at intervals not exceeding 48 months	Up to Surveyor to the Register discretion	+	+	T or VN
After major repair or modernization ⁴	+	+	+	t

¹ Lifting test procedure shall comply with the procedure given in 8.2.1 and 8.2.2, Part VII «Offshore Containers» of Rules for the Manufacture of Containers. No residual deformation preventing use of a container for its purpose shall remain after testing.
² T — marking denoting visual examination, lifting test and non-destructive testing;
 VN — marking denoting visual examination and non-destructive testing;
 V — marking denoting visual examination only.
³ + — is carried out.
⁴ The major repair or modernization means repair or modernization of members of container affecting its structural strength.

3.5.5 The survey scope and periodicity of the lifting sets of offshore containers shall meet the requirements of Table 3.5.5.

3.5.6 The Register may require the diagnostics performance by other methods.

3.5.7 The survey and proof load tests of lifting sets and items thereof shall be carried out in compliance with the applicable provisions of 10.4 of the Rules for the Cargo Handling Gear of Sea-Going Ships.

3.5.8 In survey, it is necessary to make sure that the lifting set WLL indicated on the marking plate corresponds to the requirements of 9.3, Part VII "Offshore Containers" of the Rules for the Manufacture of Containers for the container the lifting set is attached to, as well as that the slings are attached to the container and the fore runner, if any, without twisting.

3.5.9 In testing chain slings, a load equal to $2 \times WLL \pm 2\%$ shall be statically applied to each sling. The load shall be applied for a minimum of 5 min.

Note. The WLL value for each sling of the lifting set shall be taken according to the standard the sling has been manufactured to, and also in compliance with 9.3.2 to 9.3.4, Part VII "Offshore Containers" of the Rules for the Manufacture of Containers.

3.5.10 No permanent deformations and damages preventing the safe use of the lifting set and its items according to their purpose shall be detected after testing.

Note. To assess the lifting set items condition during survey, the provisions of 10.6 of the Rules for the Cargo Handling Gear of Sea-Going Ships may be applied.

Table 3.5.5

Interval	Application	Tests/survey			
		Load test	Non-destructive testing ¹	Visual examination	Stamping of identification tag ²
Special surveys at interval not exceeding 12 months	Assembled lifting set	—	—	+ ¹	V
Special surveys at interval not exceeding 48 months	Lifting set items but shackles	Load test or non-destructive testing ³		+	T or VN
	Shackles	—	—	+	—
After substantial repair or modernization	Assembled lifting set	+	+	+	T

¹ The magnetic particle method is used for the non-destructive testing of the lifting set items but steel wire ropes.
² T means the performance of visual examination, load test and non-destructive testing;
 VN means the performance of visual examination and non-destructive testing;
 V means the performance of visual examination only.
³ + means the performance of the tests specified.

4 TECHNICAL SUPERVISION OF CONTAINERS UNDER REPAIR

4.1 GENERAL

4.1.1 Containers which sustained damages during operation, involving impairment of strength performance of bearing structures shall be repaired under the Register technical supervision.

Among these are damages requiring:

- replacement of one or more corner fittings;
- full or partial replacement of bearing structural elements (corner posts, side rails, cross-members);
- full or partial (more than 1/3 area) replacement of side and end panels, as well as roof panels;
- full replacement of floor.

4.1.2 In addition to damages listed in 4.1.1, the following damages and malfunctions of the thermal containers shall be repaired under the Register technical supervision:

- damage of insulation;
- damage of cold (heat) generation means;
- impairing of weathertightness;
- damage of drainage system;
- damage of closures;
- malfunction of control, protection and monitoring devices;
- malfunction of electrical equipment.

4.1.3 In addition to damages listed in 4.1.1 the following damages of tank containers shall be remedied under technical supervision of the Register:

- damage of tank shell and heads;
- damage of supports and fastenings;
- damage of safety devices;
- damage of pipes and fittings;
- damage of monitoring devices;
- damage of cold (heat) generation means, if any;
- damage of thermal insulation, if any.

4.1.4 In addition to damages listed in 4.1.1, the following damages of offshore containers shall be repaired under the Register technical supervision:

- damages to bearing structure;
- damages to lifting eyes.

Note. One shall consider the requirements of 4.1.2 and 4.1.3 in respect of offshore tank containers and thermal containers.

4.1.5 As criteria for defining possibility of safe operation of the general cargo containers which sustained damages, the Register recommends to use those listed below:

.1 for corner fittings:

dimensions of corner fitting apertures shall not be in excess of ISO tolerances;

corner fitting shall have no cracks, notches and shall not be detached from structural elements of the container;

.2 for corner posts:

depth of a single deformation shall not exceed 25 mm, irrespective of its length and location;

with two or more indentations, none of these shall exceed 15 mm in depth;

cracks, ruptures and punctures shall be repaired regardless of their size;

deformation of corner posts shall not cause the external dimensions of the container to change so as to exceed ISO tolerance by more than 5 mm;

deformation of the rear corner post shall not render the doors inoperable and impair the watertight integrity;

.3 for top and bottom side rails and cross-members:

top side rails and cross-members:

deformations of top side rails and the front rails (dents, bendings, etc.) shall not exceed 25 mm in depth;

deformation of rear top rail shall not exceed 35 mm, render the doors inoperable and impair the watertight integrity;

bottom side rails:

deformations on the webs of side rails shall not exceed 50 mm in depth;

bottom end rails:

deformations on a web shall not exceed 50 mm in depth;

deformation of the rear bottom cross-members shall not render the doors inoperable and impair the watertight integrity;

deformation of the cross-member shall not cause the external dimensions of the container to change so as to exceed ISO tolerance by more than 5 mm;

deformation shall not cause the length of diagonals between the corner fitting apertures to change in excess of ISO tolerance;

cracks, ruptures and punctures shall be repaired, irrespective of their size;

.4 for walls and roof

front and side walls:

no deformation, such as dents, bendings, etc. on a plane portion of the side and front wall where marking shall be applied, or on internal or external corrugations, shall exceed 35 mm;

any two deformations existing on the opposite walls and facing one another shall not cause the distance between walls to decrease by more than 50 mm as against the constructional dimension;

no deformation involving the length or height of a wall shall lead to the reduction of internal dimensions by more than 50 mm;

any deformation of the side walls shall not exceed ISO tolerance by more than 10 mm, any deformation of the front wall shall not exceed ISO tolerance by more than 5 mm;

any deformation which may result in sharp edges liable to cause damage to cargo shall be eliminated;

cracks and punctures, irrespective of their dimensions, shall be repaired;

roof:

deformation shall not exceed 35 mm in depth no deformation involving the length or width of a roof shall lead to the reduction of internal dimensions by more than 50 mm;

punctures, cracks, ruptures shall be repaired, irrespective of their dimensions;

.5 for floor boardings:

cracks, cleavings shall not exceed 15 mm in depth, irrespective of the damage length or shall not exceed 5 mm when the damage width is more than 150 mm;

difference in height between the faces of the adjoining boards shall not exceed 5 mm;

any through holes, spillings of material, splittings shall be repaired;

floor boardings shall be dry, clean and shall not emit specific odour;

.6 for bottom cross-members:

no deformation on a web of cross-members, or on the top plate of fork lift pockets and gooseneck tunnel shall exceed 50 mm;

deformations on a top flange shall not intrude more than 50 mm into the container;

clearance between the top face plate of the cross-member and the floor boardings shall not exceed 10 mm;

in no instance shall the deformations on the bottom flange of cross-members, fork lift pockets and gooseneck tunnel project below the plane 1 mm above the plane of the bottom faces of bottom corner fittings;

any cracks, notches, ruptures shall be repaired;

no deformation of fork lift pockets and gooseneck tunnel shall cause their dimensions to change so as to exceed ISO tolerances by more than 10 mm.

.7 for doors:

no deformation of the door panel shall exceed 35 mm;

no deformation shall render the doors inoperable and shall cause the ISO tolerance for external dimensions to be exceeded by more than 5 mm;

doors shall not have cracks, punctures and other damages which may entail failure of the container watertightness;

.8 for door lock:

broken or notched cams, cam retainers, hinges, hinge bolts, door locking bars shall not be allowed;

bent door locking bars and door locking handles preventing the door from being properly opened or closed, shall be repaired or replaced;

.9 for other damages:

partial or complete lack of marking shall not be allowed.

Note. The Register may approve the use of other international or national regulations and guidelines based on the provisions of the CSC and CCC Conventions and submitted by the owners of containers, repair works or surveying companies.

4.1.6 In addition to the requirements of 4.1.5 the Register recommends to use the following criteria defining possibility of safe use of tank containers:

.1 for the tank container in general:

absence of any damage leading to impossibility of the use of tank container for the purpose it is intended for;

absence of any deformation leading to excess of ISO tolerances for outer dimensions by more than 5 mm for end surfaces and by 10 mm – for side surfaces;

.2 for the framework and elements attaching a tank to a framework:

cracks, cuts, ruptures, punctures etc. shall be repaired regardless of their size;

when the bottom rear end rail is deformed the gap between a rail and securing device of the bottom discharge shall not be less than 5 mm;

deformation of the diagonal braces in side, end, bottom and top surfaces of a frame shall not exceed 20 mm;

deformation of elements attaching the tank to the framework shall not exceed 13 mm;

corrosion of framework members and welds shall not lead to reduction of tank container strength;

.3 for the tank:

cracks, ruptures, punctures, etc. shall be eliminated regardless of their size;

corrosion of tank material or welds shall not result in reduction of the tank shell thickness below the minimum value required;

Note. The minimum value required is determined basing on the requirements of the relevant sections of Chapter 6.7 of the IMDG Code regarding the type and design of the tank container.

depth of scratches, grooves, machining traces shall not exceed 5 per cent of the tank metal thickness;

no tank repairs made by fitting patches on the inner surface;

deformation of the tank shell within the upper third of the tank cross-section shall not exceed 6 mm;

deformation of the tank shell within the lower two thirds of the tank cross-section shall not exceed 10 mm;

.4 for thermal insulation and coating:

cracks, cuts, ruptures, punctures etc. shall be repaired regardless of their size;

exfoliation of thermal insulation covering in the place of butts, joints etc, loss of components and fastenings shall be eliminated.

4.1.7 On completion of the repair, containers with the CCC Plates shall comply with requirements of the Rules for the Approval of Containers for the Transport of Goods Under Customs Seal.

4.1.8 Materials used for repairing containers shall have characteristics equivalent to those of the materials used for the manufacture of containers or exceeding to them. Material, used for repairing vessels of tank containers shall have a document confirming technical supervision of the Register.

4.1.9 Tank container vessels shall be repaired keeping due note of calculation standards for pressure vessels used for the design of the tank container.

4.1.10 Repair of container members listed in 4.1.1 to 4.1.4 shall be performed by welders certified by the Register and having the Welder Approval Test Certificate of due form.

4.2 TECHNICAL DOCUMENTATION FOR REPAIR OF CONTAINERS

4.2.1 Repair of container members listed in 4.1.1 to 4.1.4 shall be performed in accordance with the technical documentation approved by the Register.

4.2.2 The technical documentation submitted for repairs shall contain:

.1 description of repair procedure based on the national and international normative documents agreed or recognized by the Register;

.2 necessary drawings;

.3 the table of welding procedures and welding materials, and in the case of repair of tank containers intended for the transport of pressurized goods, Welding Procedure Approval Test Certificate of due form;

.4 description of weld quality control methods;

4.2.3 The Register may approve technical documentation and repairing procedures for a particular type of containers.

4.3 RECOGNITION OF WORKS PERFORMING MAINTENANCE (REPAIR) OF CONTAINERS

4.3.1 Recognition of repair works.

4.3.1.1 Recognition of repair works means that their capability of performing repair of containers has been recognized by the Register.

4.3.1.2 To receive recognition, the repair works shall submit a written application to the Register Head Office stating the name of the organization, its address, bank details, types and dimensions of

containers which may be repaired, list of normative documents used in the inspection for defects and in repairs, guarantee of payment for the Register services and the travelling expenses, as well as the technical documentation specified in 4.2.2 and the following information:

.1 company's structure including its subsidiaries;

.2 list of experts performing the examination, inspection for defects, acceptance of containers, welding, adjustment (if any) and tests (if any), and their qualification;

.3 company's experience in repairing containers;

.4 description of testing equipment (if any);

.5 copies of previously issued certificates and licenses (if any);

.6 production capacity of the works (list of equipment for container repairs, availability of facilities for containers storage and examination, methods of containers transportation);

.7 container repair organizational chart implemented at the repair works with indication of the location of test areas, production process monitoring, storage of materials, accessories, etc.;

.8 information on the quality control system implemented at the repair works;

.9 welders' certification program complying with the general provisions set forth in Appendix 3 of the Rules for Technical Supervision during Manufacture of Containers;

.10 welding procedures for their approval by the Register in case of repair of tank containers intended for the carriage of pressurized cargoes.

4.3.1.3 The repair works shall state that it undertakes to:

.1 submit to the Register for inspection the containers under repair at various stages of repairing;

.2 agree with the Register any alterations in the technical documentation on repairs and in repairing procedures;

.3 fulfil the Customs requirements for containers design;

.4 keep records in compliance with the applicable provisions of 1.4.2.6, Part I "Basic Requirements" of the Rules for the Manufacture of Containers;

.5 submit certificates and relevant documents for accessories and materials used in repairing containers.

4.3.1.4 To recognize the repair works, the procedure and the applicable requirements of 1.5.1, Part I "Basic Requirements" of the Rules for the Manufacture of Containers shall be used.

4.3.1.5 Upon satisfactory results of the repair works inspection, the Register issues to it a Recognition Certificate for Container Repairs.

4.3.1.6 Maintenance of the conditions for issuing the Recognition Certificate is subject to periodical checks by the Register.

4.4 INSPECTIONS AND TESTS

4.4.1 The scope of technical supervision of containers repair at works, which does not possess the Recognition Certificate for Container Repairs, is determined by the Register in each specific case.

4.4.2 The scope of technical supervision of containers repair at the works recognised by the Register is established by the agreement on technical supervision.

4.4.3 On completion of repair of the general cargo containers the steps to be, at least, performed are:

.1 examination to assure that the repair has been properly made;

.2 examination to assure that the Customs requirements are complied with;

.3 inspection of the prescribed dimensions and marking of the container;

.4 weathertightness testings.

Note. In particular cases the Register may require additional tests.

4.4.4 Thermal containers and tank containers, in addition to tests specified in 4.4.1, may be subjected to special tests prescribed for containers concerned, within the scope established by the Register.

5 DOCUMENTS. MARKING AND BRANDING

5.1 DOCUMENTS

5.1.1 Based on the results obtained from survey of a container, the Register, in accordance with the list of documents to be issued, shall draw up a survey report stating technical condition of the container.

5.2 MARKING AND BRANDING

5.2.1 After performing the surveys according to the special survey scheme, the stamp of the Register of approved type and date (month, year) of subsequent survey shall be marked on the CSC Plate or as close thereto as possible. The date may be also marked on the sticker of the approved type without branding.

5.2.2 Following survey of tank containers, the Register brand of approved type shall be put in the appropriate column of the identification plate with tank data, and the date (month and year), pressure in leakproofness tests and the applicable units of measurement shall be specified.

Note. On identification plates of tank containers manufactured in accordance with the Rules for the Manufacture of Containers, issued before 2003 without taking into consideration the subsequent amendments, indication of the type of survey and test pressure is not required.

5.2.3 After performing the surveys under ACEP a survey report shall be drawn up and availability of

the ACEP label ascertained without putting the Register brand and the survey date.

5.2.4 Marking of the container shall comply with the requirements of these Rules, Rules for the Manufacture of Containers and Rules for the Approval of Containers for the Transport of Goods under Customs Seal.

5.2.5 Containers with dangerous goods or toxic atmosphere inside, in addition to marking according to 5.2.4 shall bear signs in conformity with the applicable rules for the carriage of dangerous goods.

5.2.6 After survey of offshore containers the stamp of the Register of approved type and date (month, year) of the performed survey and marks in accordance with Table 3.5.1 shall be marked on the Inspection Plate.

Note. Offshore tank containers intended for the transport of dangerous goods shall be additionally marked in accordance with 5.2.2.

5.2.7 According to the results of the lifting sets of offshore containers survey, the Register brand of approved type shall be put in the first column of the identification tag of the lifting set (see 9.7.5, Part VII "Offshore Containers" of the Rules for the Manufacture of Containers), and the date of the survey conducted in format YY.MM.DD and the marks according to Table 3.5.5 shall be specified.

Note. Where the lifting set shackles were replaced, the appropriate alterations shall be entered in the identification tag or the latter shall be replaced.

**ЛИСТ УЧЕТА ЦИРКУЛЯРНЫХ ПИСЕМ, ИЗМЕНЯЮЩИХ / ДОПОЛНЯЮЩИХ
НОРМАТИВНЫЙ ДОКУМЕНТ**

(номер и название нормативного документа)

№ п/п	Номер циркулярного письма, дата утверждения	Перечень измененных и дополненных пунктов



RUSSIAN MARITIME REGISTER OF SHIPPING
HEAD OFFICE

CIRCULAR LETTER

No. 382-02-777_c

dated *03.12.2014₂*

Re:

Recognition of firms performing inspection of freight containers

Item of technical supervision:

freight containers complying with the International Convention for Safe Containers (CSC) except for tank containers

Implementation upon receipt

Valid: till re-publication of ND No. 2-090201-008

Validity period extended till

Cancels / Amends/ Supplements Circular Letter No.

Number of pages: 12

Appendices: Reports on Survey (forms 6.3.46-2 and 6.3.58-1), Recognition Certificate for the Firm Performing Freight Container Inspection (form 7.1.4.5)

Technical Director – Head of Classification Directorate Vladimir I. Evenko

Amends General Regulations for the Technical Supervision of Containers, Rules for Technical Supervision of Containers in Service, ND No. 2-090201-008

The Circular Letter introduces amendments to the General Regulations for the Technical Supervision of Containers and Rules for Technical Supervision of Containers in Service. The amendments are given in the Appendix to the Circular Letter. The amendments introduced establish the requirements to the firms performing inspection of freight containers in service (except for tank containers) subject to the International Convention for Safe Containers (CSC) in compliance with the CSC requirements and the procedure of their recognition by RS.

The above amendments will be introduced to ND No. 2-090201-008 during its re-publication.

It is necessary to do the following:

- 1) Familiarize the surveyors of the RS Branch Offices involved in technical supervision of containers with the content of the Circular Letter.
- 2) Apply the provisions of the Circular Letter upon its receipt.
- 3) Bring the content of the Circular Letter to the notice of the RS surveyors, interested organizations and persons within the area of the RS Branch Offices' activity.

Person in
charge:

Yury N. Vikhrov

Dept. 382

2077

DMS "THESIS"
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Российский морской регистр судоходства
Общие положения по техническому наблюдению за контейнерами
Правила изготовления контейнеров
Правила допущения контейнеров к перевозке грузов под таможенными печатями и пломбами
Правила технического наблюдения за изготовлением контейнеров
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2009 г.

Russian Maritime Register of Shipping
General Regulations for the Technical Supervision of Containers
Rules for the Manufacture of Containers
Rules for the Approval of Containers for the Transport of Goods under Customs Seal
Rules for Technical Supervision during Manufacture of Containers
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