

# RULES

## FOR THE CLASSIFICATION AND CONSTRUCTION OF CHEMICAL TANKERS

### PART I CLASSIFICATION

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**St. Petersburg  
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# **RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF CHEMICAL TANKERS**

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Rules for the Classification and Construction of Chemical Tankers of Russian Maritime Register of Shipping (RS, the Register) have been approved in accordance with the established procedure and come into force on 1 January 2022.

The present edition of the Rules is based on the 2021 edition taking into account the amendments developed immediately before publication.

The provisions of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) with relevant amendments thereto implemented by resolutions MSC.460(101) and MEPC.318(74) of the International Maritime Organization (IMO) have been taken into consideration in the Rules.

The Rules establish requirements, which are specific for ships carrying dangerous chemicals in bulk, and supplement the Rules for the Classification and Construction of Sea-Going Ships and Rules for the Equipment of Sea-Going Ships of Russian Maritime Register of Shipping.

The Rules are published in the following parts:

Part I "Classification";

Part II "Structure of Chemical Tanker";

Part III "Cargo Containment";

Part IV "Stability, Subdivision and Freeboard";

Part V "Fire Protection";

Part VI "Systems and Piping";

Part VII "Electrical Equipment";

Part VIII "Instrumentation";

Part IX "Materials of Construction";

Part X "Personnel Protection";

Part XI "Summary of Technical Requirements";

Part XII "Special Requirements";

The Annexes to the Rules are published separately.

**REVISION HISTORY**

(purely editorial amendments are not included in the Revision History)

For this version, there are no amendments to be included in the Revision History.

## **1 GENERAL**

### **1.1 APPLICATION**

**1.1.1** The requirements of the Rules for the Classification and Construction of Chemical Tankers<sup>1</sup> are considered to be compliant with the provisions of the IBC Code with relevant amendments thereto and apply to specially constructed or converted ships, irrespective of gross tonnage and propulsion power, intended for carriage of dangerous chemicals in bulk specified in Part XI "Summary of Technical Requirements" of these Rules (refer also to Chapter 17 of the IBC Code and the agreed additions given in IMO MEPC.2/Circ.xx List 1).

The requirements of the Rules for the Equipment of Sea-Going Ships, the Rules for the Cargo-Handling Gear of Sea-Going Ships, the Load Line Rules for Sea-Going Ships fully apply to the chemical tankers.

The requirements of General Regulations for the Classification and Other Activity, as well as the Rules for the Classification and Construction of Sea-Going Ships<sup>2</sup> apply also to the chemical tankers, unless specified otherwise in the text of these Rules, and shall be appropriately met if they do not conflict with the provisions of these Rules.

**1.1.2** The requirements of Part XII "Special Requirements" are additional to the requirements set forth in these Rules and are compulsory depending on the list of cargoes permitted for carriage.

**1.1.3** The dangerous chemicals reviewed in these Rules are listed in Part XI "Summary of Technical Requirements".

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<sup>1</sup> Hereinafter referred to as "these Rules".

<sup>2</sup> Hereinafter referred to as "the Rules for the Classification".

## 1.2 DEFINITIONS AND EXPLANATIONS

### 1.2.1 Definitions.

In addition to the definitions in the Rules for the Classification the following definitions have been adopted for the purpose of these Rules.

**Accommodation spaces** — refer to 1.5.2 of Part VI "Fire Protection" of the Rules for the Classification.

**Biological hazard** is defined by irritant or toxic effect exerted by the cargo carried on the living organism when coming into contact with skin or penetrating through respiratory tract, and allowing for such properties of the cargo as water solubility, volatility, odour, taste, vapour, pressure and density.

**Boiling point** is the temperature in degrees Celsius at which a product exhibits a vapour pressure equal to the atmospheric pressure.

**Cargo area** is that part of the ship that contains cargo tanks, slop tanks, cargo pump-rooms including pump-rooms, cofferdams, ballast or void spaces adjacent to cargo tanks or slop tanks and also deck areas throughout the entire length and breadth of the part of the ship over the above-mentioned spaces. Where independent tanks are installed in hold spaces, cofferdams, ballast or void spaces at the after end of the aftermost hold space or at the forward end of the forward-most hold space are excluded from the cargo area.

**Cargo pump-room** is a space containing pumps and their accessories for the handling of the products covered by the IBC Code.

**Cargo reactivity hazard** is expressed by instability of a chemical, tendency to polymerization or tendency to come readily into reaction with water or by corrosive aggression.

**Cargo service spaces** are spaces within the cargo area used for workshops, lockers and storerooms of more than 2 m<sup>2</sup> in area, used for cargo-handling equipment.

**Chemical tanker** is a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product listed in Chapter 17 of the IBC Code.

**Corrosive aggression** is the property of a substance having a destructive effect on the materials coming into contact therewith.

**Dangerous chemicals** is any liquid chemicals designated as presenting a safety hazard, based on the safety criteria for assigning products to Chapter 17 of the IBC Code.

**Design vapour pressure  $P_0$**  is the maximum pressure at the top of the cargo tank, which has been used in the tank structure design.

**Explosive/flammability limits/range** are the conditions defining the state of fuel-oxidant mixture at which application of an adequately strong external ignition source is only just capable of producing flammability in a given test apparatus.

**Fire and explosion hazard** is defined by flashpoint, boiling point, explosive/flammability limits/range and autoignition temperature of the chemical.

**Flashpoint** is the temperature in degrees Celsius at which a product will give off enough flammable vapour to be ignited. Values given in the Rules are those for a "closed-cup test" determined by an approved flashpoint apparatus.

**Gas dangerous spaces** are such spaces within the cargo area, which are not provided with instruments and equipment to ensure safe state of the atmosphere in these spaces as well as enclosed spaces outside the cargo area, which contain cargo piping.

The gas-dangerous spaces include:

integral cargo tanks;

hold spaces with independent cargo tanks; spaces adjacent to integral cargo tanks; cargo pump- and cargo compressor rooms;

spaces containing pipelines or vessels and equipment used in connection with the cargo, including rooms for contaminated cargo hoses or any other equipment used for loading/unloading or transferring cargo;

cargo sample store rooms;

enclosed or semi-enclosed spaces having a direct opening into any gas-dangerous space or zone.

Gas-dangerous zones are areas on the open deck or semi-enclosed spaces on the deck, which are situated within a distance of:

3 m from any cargo tank opening; the cargo pipe flanges; cargo valves; or openings to the gas-dangerous spaces which contain potential gas sources, e.g. cargo pipe flanges. Cargo valves or cargo pumps;

4,5 m from ventilation outlets from cargo pump-rooms;

5 m from cargo pressure/vacuum valves;

10 m from gas outlets from cargo tanks during loading (measured horizontally);

open deck 3 m aft and forward of the cargo area up to a height of 2,4 m above the deck.

For ships of less than 100 m in length lesser distances may be allowable upon review of results of the substantiation submitted to the Register.

Gas-freeing is the process where a portable or fixed ventilation system is used to introduce fresh air into a tank in order to reduce the concentration of hazardous gases or vapours to a level safe for tank entry.

Hold space is the space enclosed by the ship's structure in which an independent cargo tank is situated. Incompatible cargoes are substances that when being interacted come into a dangerous reaction or form new dangerous substances.

Lining is an acid-resistant material that is applied to the tank or piping system in a solid state with a defined elasticity property.

Marine pollution hazard is defined by:

bioaccumulation with attendant risk to aquatic life or human health or causing tainting to edible mollusks;

damage to living resources;

hazard to human health;

reduction of amenities.

Noxious Liquid Substance is any substance indicated in the Pollution Category column of chapters 17 or 18 of the IBC Code, or the current MEPC.2/Circular or provisionally assessed under the provisions of regulation 6.3 of MARPOL Annex II as falling into categories X, Y or Z.

Products is the collective term used to cover both Noxious Liquid Substances and Dangerous Chemicals.

Purging is the introduction of inert gas into a tank, which is already in an inert condition, with the object of further reducing the oxygen content; and reducing the existing hydrocarbon or other flammable vapours content to a level below which combustion cannot be supported if air is subsequently introduced into the tank.

The maximum quantity of cargo allowed for carriage in any cargo tank shall be equal to:

1250 m<sup>3</sup> for chemical tanker type 1;

3000 m<sup>3</sup> for chemical tanker type 2;

unlimited for chemical tanker type 3.

Vapour density is the ratio of a vapour or gas (with no air present) density to the density of an equal volume of air at the same pressure and temperature.

Void space is an enclosed space in the cargo area external to a cargo tank, other than a hold space, ballast space, oil fuel tank, cargo pump-room, pump-room, or any space in normal use by personnel.

### 1.2.2 Explanations.

Biological hazard specific for each ship has been taken into account in these Rules when assigning class of structural protection, type of the tank, vapour detection system, special requirements (refer to Part XI "Summary of Technical Requirements"), etc.

Various degrees of the cargo reactivity and corrosive aggression are taken into account when prescribing differentiated requirements for each kind of cargo (refer to Part XI "Summary of Technical Requirements").

### **1.3 ABBREVIATIONS**

**1.3.1** The following abbreviations have been adopted in these Rules:

- CPR — cargo pump-rooms;
- the IBC Code — International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk;
- MA — Maritime Administration;
- MARPOL 73/78 — International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto;
- PTFE — polytetrafluoroethylene;
- CCR — cargo control room;
- MCS — main control station.

## **2 DEVIATIONS, EQUIVALENCES**

**2.1** The Register may allow, in accordance with the RS established procedure, the use of any materials, structures of a ship, arrangements and articles intended to be fitted on board the ship, which are other than stipulated in these Rules, and in case of positive review such decision shall be documented as a deviation from these Rules with account taken of the General Regulations for the Classification and Other Activity.

If deviations from these Rules also pertain to complying with the applicable provisions of the IBC Code, such deviations may be allowed by the Register and documented as equivalences only in cases provided by the IBC Code and upon agreement with the Flag State MA.



### **3 DOCUMENTS**

**3.1** Ships complying with the requirements of these Rules and the IBC Code and in addition to the documents stipulated in 1.4 of the General Regulations for the Classification and Other Activity (e.g. Classification Certificate (form 3.1.2), international certificates of compliance with the applicable provisions of SOLAS, MARPOL, International Load Line Convention, etc.), subject to satisfactory results of surveys, detailed in the RS records based on results of surveys, shall receive from the Register an International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk as per form prescribed by the IBC Code (form 2.4.10 in RS, hereinafter referred to as "the Certificate of Fitness for the Chemical Tanker") if the Flag State MA authorization is available.

The period of validity of the Certificate of Fitness for the Chemical Tanker shall not exceed 5 years.

**3.2** The Certificate of Fitness for the Chemical Tanker shall be available on board for inspection at all times.

## **4 CLASS NOTATION AND CLASSIFICATION SURVEYS**

### **4.1 CLASS NOTATION OF THE SHIP**

**4.1.1** The character of classification and additional distinguishing marks shall be assigned in conformity with the provisions of 2.2 of Part I "Classification" of the Rules for the Classification.

## 4.2 DESCRIPTIVE NOTATION

**4.2.1** Ships complying with the requirements of these Rules are assigned the descriptive notation **Chemical tanker**.

The descriptive notation **Chemical tanker** and the distinguishing mark (**ESP**) shall be assigned to sea-going self-propelled ships, which are constructed generally with integral tanks (tanks forming part of main hull) and intended primarily to carry chemicals in bulk. This type notation shall be assigned to tankers of both single and double skin construction, as well as tankers with alternative structural arrangements. Typical midship sections are given in [Fig. 4.2.1](#).

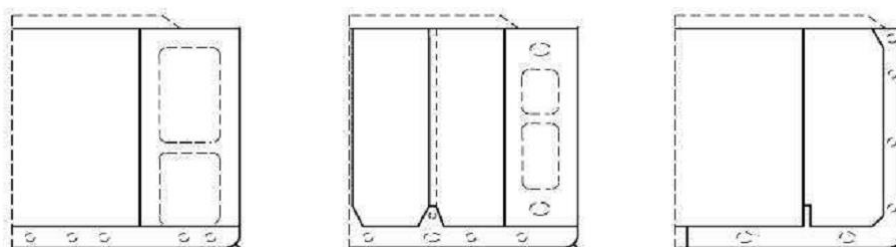


Fig. 4.2.1  
Typical midship sections of a chemical tanker

**4.2.2** Depending on the extent to which the ship meets the requirements of Part IV "Stability, Subdivision and Freeboard" as well as on the arrangement of cargo tanks in relation to the shell plating and on maximum quantity of cargo allowed for carriage in any one tank to the descriptive notation **Chemical tanker** the words **type 1** or **type 2** or **type 3** are added.

**4.2.3** If the chemical tanker is intended for carriage of only one particular cargo, the name of such cargo shall be added to the class notation, e.g. **Chemical tanker type 3 (sulphuric acid)**. In this case, the requirements imposed upon the ship shall take account of the hazards associated with the carriage of such cargo.

**4.2.4** If the chemical tanker is intended for carriage of several particular cargoes, the requirements shall be prescribed, reasoning from the whole complex of properties of the most dangerous cargoes being carried.

### **4.3 SURVEYS**

#### **4.3.1 Classification surveys.**

Initial surveys of the chemical tankers when the ships are under construction and after completion of ship construction shall be carried out in conformity with applicable provisions of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships, Guidelines on Technical Supervision of Ships under Construction.

Initial and/or periodical surveys of the chemical tankers to assign, retain and/or confirm a class of ship in service shall be carried out in conformity with applicable provisions of the Rules for the Classification Surveys of Ships in Service (including Section 4 of Part III "Additional Surveys of Ships Depending on Their Purpose and Hull Material").

#### **4.3.2 Statutory surveys.**

Survey of the ship to issue/confirm/renew the certificates required by the applicable international conventions, codes, including International Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk (form 2.4.10) shall be carried out during initial/annual or intermediate/renewal survey of the ship in compliance with the applicable provisions of international conventions, codes, including the IBC Code, taking into account applicable provisions of IMO resolution A.1140(31).

## 5 TECHNICAL DOCUMENTATION OF A SHIP

**5.1** In addition to the technical documentation listed in Section 3 of Part I "Classification" of the Rules for the Classification the following technical data and documents confirming fulfillment of the requirements of these Rules shall be submitted to the Register<sup>1</sup>:

**.1** list of cargoes intended for carriage on board the ship.

The list shall include the following:

name and chemical formula for each cargo;

basic physical properties: density, flashpoint, boiling point, autoignition temperature, melting point, vapour density and pressure;

basic chemical properties: corrosive aggression, reactivity with air, water and other substances, tendency to polymerization;

basic hazards associated with carriage and storage of cargo: toxicity, maximum permissible vapour concentration, explosive/flammability limits/range;

marine pollution hazard as per the classification in Appendix 1 to Annex II of MARPOL 73/78;

*Note.* For additional requirements, refer to Annex 1 to these Rules.

**.2** cargo tank arrangement and capacity plans with indication of distance from the side and bottom shell to the tanks, including information on the materials used and coverings (\*);

**.3** tank strength drawings and calculations (\*);

**.4** drawings of support and staying of independent cargo tanks or tanks installed on deck (\*);

**.5** damage stability calculations (\*);

**.6** stability instrument (software for stability calculations) with User Manual (\*);

*Note.* Documentation and software specified in [5.1.6](#) may be submitted to the RS Branch Office carrying out technical supervision under construction prior to completion of initial survey after the ship construction has been finished.

**.7** drawings of the cargo piping system including details such as expansion elements, flange connections, shut-off and regulating fittings (\*);

**.8** drawings of cargo pumps including driving machinery (\*);

**.9** drawings and calculations of bilge and ballast systems in the cargo area, pump-rooms, cofferdams, pipe tunnels and hold spaces (\*);

**.10** diagrams and equipment for drainage of cargo pumps and pipelines in the pump-room (\*);

**.11** diagrams and equipment for cargo tank stripping and drainage/stripping of cargo pipelines (\*);

*Note.* For vacuum stripping systems, details shall include termination of air pipes and openings from drain tanks and other tanks. For ships with cargo pump-rooms, specification of temperature monitoring equipment for cargo pumps and shaft penetrations shall be included in addition to arrangement of drainage of cargo pumps and piping on the pump.

The list of materials with yard's declarations of materials in contact with cargo shall be submitted to the RS Branch Office supervising construction of the ship.

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<sup>1</sup> Review results of documentation marked with (\*) and (\*\*) are documented by stamping according to 3.1.5 of Part I "Classification" of the Rules for the Classification.

- .12 diagrams of tank washing (\*);
- .13 arrangement plans and equipment of underwater outlets for discharge of noxious liquid chemical wastes, including necessary dimensions related calculations (\*);
- .14 drawings of quick-closing devices of the cargo containment system (\*);
- .15 diagrams of cargo heating or cooling systems and heat transfer calculation (\*);
- .16 diagrams of thermal insulation (if used) and justification of suitability of the insulation materials for use in the cargo area (\*);
- .17 arrangement and location plans of decontamination showers and eyewashes including water supply and equipment used to prevent freezing (\*);
- .18 drawings and specification of inert gas system (\*);
- .19 justification of suitability of the fire extinguishing media, fire detection and extinction equipment for the cargoes being carried as well as documents confirming assumed time of fire extinction, rate of supply of fire extinguishing media and adequate supply of fire extinguishing media on board the ship, which have been taken in the design (\*\*);
- .20 arrangement plans and specification of fixed fire smothering systems in gas-dangerous spaces and zones (\*);
- .21 arrangement plans and specifications of ventilation system in cargo area and other spaces access to which shall be provided to carry out cargo handling operations. The plans shall include information on suitability of materials used for manufacture of air ducts and impellers and casings of fans (\*);
- .22 drawings of portable ventilators and diagrams showing where and how these are to be fitted (\*);
- .23 specification and diagrams of gas-freeing of cargo tanks and pipelines as well as equipment for tank ventilation (\*\*);
- .24 diagrams and calculations of cargo tank venting system (\*);
- .25 diagrams and specifications of gastight bulkhead stuffing boxes (\*);
- .26 drawings and specification of all monitoring systems and devices for liquid level and characteristics and gas detection (\*);
- .27 drawings of pressure- and vacuum-relief valves of cargo tanks (\*);
- .28 diagrams of cargo pressure and temperature control systems (\*);
- .29 circuit diagrams of electric measuring and alarm systems (\*);
- .30 circuit diagrams of automatic and remote switch-off of electric equipment, remote valve control, and hull structures heating (\*);
- .31 arrangement plans of electric equipment in gas-dangerous zones (\*);
- .32 drawings of cable run in explosion-hazardous spaces (\*);
- .33 diagrams of earthing of electric equipment, cables, pipelines installed in gas-dangerous spaces and zones (\*);
- .34 list of safe-type equipment with reference to drawings and certificates of a competent body confirming explosion-proofness (\*\*);
- .35 ship structure access manual: the plan shall include details enabling verification of compliance with the requirements for safe access to cargo tanks, ballast tanks, cofferdams and other spaces within the cargo area as required by the IBC Code — 3.4 (\*);
- .36 specification and stowage of the equipment for personnel protection;
- .37 documentation related to the pollution prevention arrangements and equipment:  
Procedures and Arrangements Manual, developed in accordance with Appendix 4 to Annex II of MARPOL 73/78 (\*) — refer to Annex 1 to these Rules;  
for ships of gross tonnage 150 and above — Shipboard Marine Pollution Emergency Plan for Noxious Liquid Substances (\*) or Shipboard Marine Pollution Emergency Plan (\*) (combined);

stripping test procedure (\*).

**Note.** Documents specified in [5.1.35 — 5.1.37](#) may be submitted to RS after construction has been finished, but prior to completion of initial survey after the ship construction has been finished.

**5.2** A general arrangement plan of the ship or individual drawings shall give location of the following:

- cargo hatches, tank cleaning hatches and any other openings for the cargo tanks;
- doors, hatches and any other openings to pump-rooms and other gas-dangerous spaces;
- venting pipes, ventilating pipes and openings for cargo tanks, pump-rooms and other gas-dangerous spaces;

- doors, sidescuttles, air locks, ventilating pipe outlets and other openings to superstructure spaces and spaces adjacent to cargo area including spaces in and below the forecastle;

- cargo pipelines and gas return pipes over the deck with shore connections including stern pipes for cargo discharge;

- deckplan showing location of all monitoring equipment for cargo handling (specifying its type) such as, level gauging, overflow control, temperature measuring, etc.

**5.3** Additional plans, specifications or information may be required depending on the structure and equipment used in the design.

Russian Maritime Register of Shipping

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Part I  
Classification**

FAI "Russian Maritime Register of Shipping"  
8, Dvortsovaya Naberezhnaya,  
191186, St. Petersburg,  
Russian Federation  
[www.rs-class.org/en/](http://www.rs-class.org/en/)