

RUSSIAN MARITIME REGISTER OF SHIPPING

RULES

FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS

Part I

CLASSIFICATION



Saint-Petersburg
Edition 2016

Rules for the Classification and Construction of Sea-Going Ships of Russian Maritime Register of Shipping have been approved in accordance with the established approval procedure and come into force on 1 January 2016.

The present nineteenth edition of the Rules is based on the eighteenth edition (2015) taking into account the additions and amendments developed immediately before publication.

The unified requirements, interpretations and recommendations of the International Association of Classification Societies (IACS) and the relevant resolutions of the International Maritime Organization (IMO) have been taken into consideration.

The Rules are published in the following parts:

Part I "Classification";

Part II "Hull";

Part III "Equipment, Arrangements and Outfit";

Part IV "Stability";

Part V "Subdivision";

Part VI "Fire Protection";

Part VII "Machinery Installations";

Part VIII "Systems and Piping";

Part IX "Machinery";

Part X "Boilers, Heat Exchangers and Pressure Vessels";

Part XI "Electrical Equipment";

Part XII "Refrigerating Plants";

Part XIII "Materials";

Part XIV "Welding";

Part XV "Automation";

Part XVI "Hull Structure and Strength of Glass-Reinforced Plastic Ships and Boats";

Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships";

Part XVIII "Common Structural Rules for Bulk Carriers and Oil Tankers". The text of the part is identical to that of the IACS Common Structural Rules.

Parts I to XVII are published in electronic format and hard copy in Russian and English. In case of discrepancies between the Russian and English versions, the Russian version shall prevail.

Part XVIII is published in English and in electronic format only.

As compared to the previous edition (2015), the nineteenth edition contains the following amendments.

The term "ice category" has been replaced by the term "ice class" throughout the text of the Rules.

RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS

PART I. CLASSIFICATION

1. Chapter 1.1: the definition "A vessel of dredging fleet" has been deleted.
2. Chapter 2.1: new para 2.1.7 that takes into account practice arising from the RS classification activity has been introduced; subsequent paragraphs have been renumbered accordingly.
3. Chapter 2.2: para 2.2.3 has been supplemented with the provisions on the Baltic ice class notations; here and throughout the text of the Rules the term "ice category" has been replaced by the term "ice class";
in Table 2.2.5.3 the geographical restriction for the Laptev Sea has been amended;
in para 2.2.29 the descriptive notation **Hopper** has been replaced by the descriptive notation **Hopper barge**; new descriptive notation **Hopper dredger** has been introduced; amendments to the descriptive notations of oil tankers and bulk carriers complying with the requirements of Part XVIII "Common Structural Rules for Bulk Carriers and Oil Tankers" have been introduced; the requirement for descriptive notation **Bulk carrier** has been specified;
requirement of para 2.2.30 has been specified.
4. Chapter 2.3: para 2.3.3 has been deleted, requirements contained therein have been included in para 2.2.29.
5. Chapter 3.2: in para 3.2.2.6 the review results for the list of equivalents have been specified: mark (*) has been replaced by the mark (**);
new para 3.2.3.20 has been introduced; subsequent paragraphs have been renumbered accordingly; requirements of paras 3.2.11.9, 3.2.11.12 and 3.2.11.13 have been specified.
6. Editorial amendments have been made.

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PART I. CLASSIFICATION

1 GENERAL

1.1 DEFINITIONS AND EXPLANATIONS

Definitions and explanations pertinent to the general terminology used in the normative documents of the Register are given in Part I "General Regulations for Technical Supervision" of Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

For the purpose of Rules for the Classification and Construction of Sea-Going Ships¹ the following definitions and explanations have been adopted (unless expressly provided otherwise in particular parts of the Rules).

1.1.1 Definitions.

A **barge** is a non-self propelled cargo ship designed to be towed or pushed.

A **barge carrier (lighter carrier)** is a dry cargo ship carrying cargo in shipborne barges (lighters).

A **tug** is a ship specially intended for the towage and pushing of other ships and floating facilities.

Displacement of a light ship means the displacement of a ship without cargo, fuel oil, lubricating oil, ballast, fresh and boiler feed water in its tanks, provisions, consumable stores, and also without passengers, crew and their effects.

A **cargo ship** is any ship which is not a passenger ship (dry cargo ship, tanker, refrigerating transport ship, icebreaker, tug, pusher, salvage ship, vessel of dredging fleet, cable layer, special purpose ship and other non-passenger ship).

A **hopper barge** is a self-propelled or non-self-propelled ship intended for the carriage of spoil.

Reid vapour pressure is the pressure of liquid vapour established by standard procedure in the Reid tester at the temperature of 37,8 °C and at the gas to liquid volume ratio of 4:1.

Deadweight means the difference between the displacement of a ship at the load waterline corresponding to the summer freeboard assigned for the water with a density of 1,025 t/m³ and the displacement of a light ship.

A **dredger** is a self-propelled or non-self-propelled ship intended for extraction of spoil using dredging gear (buckets, suction pipes, grabs, etc.) and having no holds for the storage or carriage of spoil.

A **combination carrier** is a ship intended for the carriage of crude oil and petroleum products in bulk, as well as bulk cargoes (by these ships are

meant ore/oil carriers, oil/bulk dry cargo carriers and similar ships).

A **container ship** is a ship intended for the carriage of goods in containers of the international standard and provided with the cellular guides in the holds.

A **crane ship** is a construction similar to the floating crane, but on a floating hull with ship lines or lines of a similar shape.

An **icebreaker** is a self-propelled ship intended for various types of icebreaking operations to maintain navigation in the freezing seas (for details refer to 2.2.3.1.1).

A **timber carrier** is a dry cargo ship intended for the carriage of deck timber cargo.

Place of refuge is any naturally or artificially sheltered aquatorium which may be used as a shelter by a ship under conditions likely to endanger the safety of the ship.

A **bulk carrier** is a one deck ship with top-side and hopper-side tanks in cargo spaces which is primarily intended for the carriage of bulk cargoes.

This ship type also includes such types as ore carriers and combination carriers. To apply the term "bulk carrier" correctly, one should be guided by the provisions of IMO resolution MSC.277(85).

A **roll-on/roll-off ship** is a ship specially designed for transportation of various wheeled vehicles (cars, rolling stock, tracked vehicles, trailers with and without cargo), in which the cargo loading operations are performed preferably in a horizontal direction – by a roll-on/roll-off.

A **docklift ship** is a dry cargo ship adapted to carry out cargo handling operations using the docking principle in ports and protected water areas.

A **tanker** is a ship intended for the carriage of liquid cargoes in bulk, including:

a **special tanker** is a ship intended for the bulk carriage of liquid cargoes other than oil and petroleum products. The precise purpose of the special tanker is stated by the descriptive notation in the class notation in accordance with 2.2.28;

a **oil tanker** is a ship intended for the carriage in bulk of crude oil and petroleum products having a flash point 60 °C and below for sea-going ships, 55 °C and below for ships of inland navigation, Reid vapour pressure being below atmospheric pressure;

a **oil tanker (> 60 °C)** is a sea-going ship intended for the carriage of petroleum products having a flash point over 60 °C in bulk;

¹Hereinafter referred to as "the Rules".

an oil tanker ($> 55^{\circ}\text{C}$) is a ship of inland navigation intended for the carriage of petroleum products having a flash point over 55°C in bulk;

an oil recovery ship is a ship intended for recovery of crude oil and petroleum products having a flash point of 60°C or below from the sea surface;

an oil recovery ship ($> 60^{\circ}\text{C}$) is a ship intended for recovery of crude oil and petroleum products having a flash point above 60°C from the sea surface;

a bilge water removing ship is a ship designed to remove the bilge water from the machinery spaces of ships.

A passenger is every person other than the master and the members of the crew or other persons employed or engaged in any capacity on board a ship (special personnel) on the business of that ship, and a child under one year of age.

A passenger ship is a ship intended for or carrying more than 12 passengers.

A roll-on/roll-off passenger ship (ro-ro passenger ship) is a passenger ship with enclosed or open cargo spaces which are loaded/unloaded in a horizontal direction, or with special category spaces as defined in 1.5.4.3 and 1.5.9, Part VI "Fire Protection".

Classed among passenger ro-ro ships are also ferries, i.e. ships loaded/unloaded in the horizontal direction which regularly carry passengers and which carry vehicles with fuel in their tanks and/or railway carriages on open and/or enclosed decks at ferry crossings.

A floating crane is a crane structure on a floating hull of pontoon or similar type, which is intended for cargo handling or other working operations (mounting, undersea, hydraulic engineering, salvage, pipe laying, etc.) and may be also used for the carriage of cargoes on deck and/or in the hold.

A lightship is a non-self-propelled ship having special equipment (light appliances, fog signaling arrangements, radar beacons, etc.) intended for bounding navigational hazards and ships orientation to ensure safety of navigation.

An ore carrier is a ship primarily designed for the carriage of ore, the structure of which includes longitudinal bulkheads separating the central double bottom ore hatches from the side ones.

A fishing vessel is a vessel used directly for catching or for catching and processing the catch (fish, whales, seals, walrus or other living resources of the sea).

A salvage ship is a self-propelled ship intended for rendering assistance to ships in distress at sea.

Special personnel means all persons who are not passengers or members of the crew or children of under one year of age and who are

carried on board in connection with the special purpose of that ship or because of special work being carried out aboard that ship. Special personnel include the following:

scientists, technicians and expeditionaries on ships engaged in research, non-commercial expeditions and survey;

personnel engaged in training and practical marine experience to develop seafaring skills suitable for a professional career at sea;

personnel who process the catch of fish, whales or other living resources of the sea on factory ships not engaged in catching;

salvage personnel on salvage ships, cable-laying personnel on cable-laying ships, seismic personnel on seismic survey ships, diving personnel on diving support ships, pipe-laying personnel on pipe layers and crane operating personnel on floating cranes and crane ships;

other personnel similar to those referred to above who, in the opinion of the Flag State Maritime Administration, may be referred to this group.

A berth-connected ship is a non-self propelled floating facility, having the pontoon-type or ship-type hull, which is in operation either when lying at anchor or bottomed or when moored at quay. These ships include floating docks, floating hotels and hostels, floating workshops, floating power plants, floating warehouses, floating oil storages, etc.

A ship of river-sea navigation is a ship intended for navigation at sea and on inland waterways.

A shipborne barge (lighter) is a non-self-propelled cargo ship unmanned and appropriated for transportation in specially equipped ships (barge and lighter carriers) and for towing (pushing) within the specified restricted area of navigation.

A supply vessel is a vessel designed basically for the carriage of supplies and cargoes to the mobile and fixed offshore units intended for the different purposes, and fitted generally with a forward superstructure and an after weather cargo deck for processing of the cargo at sea. The ship may be used for towing operations provided the appropriate requirements of the Register rules are complied with.

A special purpose ship means a mechanically self-propelled ship which by reason of its function carries on board more than 12 special personnel, including passengers (the latter shall not exceed 12 people, otherwise such ship should not be considered a special purpose ship, as it is a passenger ship). Such ships include research, expedition, hydrographic, training ships; whale and fish factory ships and other ships engaged in processing of living resources of the sea and not engaged in catching; salvage ships, cable-laying ships, seismic

survey ships, diving support ships, pipe layers, floating cranes and crane ships.

A dry cargo ship is a ship intended for the carriage of different cargoes (general cargoes, containers, timber, bulk cargoes, etc.), except for the liquid bulk cargoes.

A pontoon is a non-self-propelled unmanned ship intended for the carriage of deck cargo and having no hatches on deck, except for small manholes for access into the hull, which are closed by covers with seal gaskets.

A hopper dredger is a self-propelled or non-self-propelled ship intended for the extraction of spoil using dredging gear (buckets, suction pipes, grabs, etc.) and having holds for the storage or carriage of spoil.

Crew means all persons carried on board the ship to provide navigation and maintenance of the ship, its machinery, systems and arrangements essential for propulsion and safe navigation or to provide services for other persons on board.

Crew of a fishing vessel means persons engaged in any business on board a ship connected with its purpose.

Definitions of particular types of ships (nuclear ships and floating facilities, nuclear support vessels, high-speed craft, dynamically supported craft, WIG craft, gas carriers, chemical tankers, pleasure craft, drilling ships, mobile offshore drilling units and fixed offshore platforms, manned submersibles and diving systems) are given in relevant rules for the classification and construction of such types of ships.

The Register rules are listed in 1.3, General Regulations for the Classification and Other Activity.

1.1.2 Explanations.

For the purpose of the present Rules classification means development, publication and application of the Rules continuous compliance with which will, along with the proper maintenance of the ship by the owner or by the operator, ensure:

- structural strength and integrity of the hull and its elements including structural fire protection;

- seaworthiness (stability) of the ship under all specified loading conditions and under particular sea-and-wind conditions;

- safe and reliable operation of its propulsion plant, systems and devices for ship control, other systems, auxiliary machinery and equipment including fire-fighting equipment,

- and thereby permit safe operation of the ship in accordance with its purpose.

Date of contract for construction of a ship (series of ships):

- .1 the date of "contract for construction" of a ship is the date on which the contract to build the ship is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the ships included in the contract shall be declared to the Register by the party applying for the assignment of class to a newbuilding;

- .2 the date of "contract for construction" of a series of ships, including specified optional ships for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.

Ships built under a single contract for construction are considered a "series of ships" if they are built to the same approved plans for classification purposes. However, ships within a series may have design alterations from the original design provided:

- .2.1 such alterations do not affect matters related to classification; or

- .2.2 if the alterations are subject to classification requirements, these alterations shall comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Register for approval.

The optional ships will be considered part of the same series of ships if the option is exercised not later than 1 year after the contract to build the series was signed;

- .3 if a contract for construction is later amended to include additional ships or additional options, the date of "contract for construction" for such ships is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract shall be considered as a "new contract" to which the above explanations apply;

- .4 if a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified ship or ships is the date on which revised contract or new contract is signed between the ship-owner, or shipowners and the shipbuilder.

Notes: 1. By optional ships, ships are meant, which are included in the contract with the condition of the additional confirmation of their construction (order) by a prospective owner.

2. This explanation became effective on 1 July 2009.

Additional requirements are the requirements caused by the item features or its operational conditions, which are not provided for by the rules imposed by the Register in writing to ensure the safety of items of technical supervision.

Measurement of distances — unless explicitly stipulated otherwise in the text of the regulations in SOLAS, Load Line and MARPOL Conventions and any of their mandatory Codes, as well as in the text of the Register rules and guidelines, distances (such as tank length, height, width, ship (or subdivision or waterline) length, etc.) shall be measured by using moulded dimensions.

The Register class (class) is a combination of conventional characters and descriptive notations assigned to the ships, other floating facilities, as well as to fixed offshore platforms, which define their structural features, purpose and operational conditions stipulated by the Rules.

An operator is a physical person or legal entity operating a ship on the basis of a contract concluded with an owner or shipowner.

Rules (the Register Rules) are the set of the regulating and technical requirements for objects under technical supervision.

The Register Rules are listed in 1.3, General Regulations for the Classification and Other Activity.

An owner is a physical person or legal entity having proprietary rights to a ship irrespective of the fact whether he (she) or it operates the ship on his (her) or its own, or has placed it in the operation of another person or entity whether on the fiduciary or some other legal basis.

Dual class is a class of a ship classed with two societies entered into an agreement on a dual class.

Special consideration is the determination of the extent, to which an object under technical supervision meets the additional requirements.

Standards, as applied to the Rules, means all kinds of standards and other regulating and technical documents of all countries approved or recognized by the Register.

A ship under construction is a ship during a period from the keel laying date till the date of issuing the documents for a ship.

Keel laying date means: the date (day, month, year) on which the installation at the building berth of a base section or block (island) in section or block (island) construction respectively, or

such a stage of construction at which construction identifiable with a specific ship begins and assembly of that ship has commenced comprising at least 50 t or 1 per cent of the estimated mass of all structural materials, whichever is less.

For fibre-reinforced plastic (FRP) ships, the keel laying date shall be interpreted as the date that the first structural reinforcement of the complete thickness of the approved laminate schedule is laid either in or on the mould.

A ship in service is a ship which is not under construction.

A shipowner is a physical person or legal entity operating a ship on his (her) or its own behalf irrespective of the fact whether he (she) or it is the owner or is operating the ship on some other legal basis.

1.2 APPLICATION

1.2.1 Rules for the Classification and Construction of Sea-Going Ships apply to:

.1 passenger ships, tankers, ships intended for the carriage of dangerous goods as well as tugs, irrespective of the power of main engines and gross tonnage;

.2 self-propelled ships not specified in 1.2.1.1, with the main engines of power output 55 kW and upwards;

.3 ships not specified in 1.2.1.1 and 1.2.1.2 of 80 gross tonnage and upwards or ships fitted out with machinery and equipment of total prime movers power output 100 kW and upwards;

.4 materials and equipment that shall be installed on the above ships (lists of relevant materials and equipment are given in the appropriate parts of the Rules).

1.2.2 The present Rules also apply to the following types of ships and floating facilities to the extent specified in the relevant rules for their classification and construction:

.1 nuclear ships and floating facilities (refer to Rules for the Classification and Construction of Nuclear Ships and Floating Facilities);

.2 nuclear support vessels (refer to Rules for the Classification and Construction of Nuclear Support Vessels);

.3 gas carriers (refer to Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk and Rules for the Classification and Construction of Ships Carrying Compressed Natural Gas);

.4 chemical tankers (refer to Rules for the Classification and Construction of Chemical Tankers);

.5 mobile offshore drilling units and fixed offshore platforms (refer to Rules for the Classification, Construction and Equipment of Mobile Offshore Drilling Units and Fixed Offshore Platforms);

.6 high-speed craft (refer to Rules for the Classification and Construction of High-Speed Craft);

.7 type A WIG craft (refer to Rules for the Classification and Construction of Type A WIG Craft);

.8 manned submersibles, ship's diving systems and passenger submersibles (refer to Rules for the Classification and Construction of Manned Submersibles, Ship's Diving Systems and Passenger Submersibles);

.9 pleasure craft (refer to Rules for the Classification and Construction of Pleasure Craft);

.10 small sea fishing vessels (refer to Rules for the Classification and Construction of Small Sea Fishing Vessels);

.11 floating offshore oil-and-gas production units (refer to Rules for the Classification, Construction and Equipment of Floating Offshore Oil-and-Gas Production Units).

1.2.3 With the Register consent, the Rules may be applied for the classification of ships not specified in 1.2.1 and 1.2.2.

1.2.4 For special purpose ships of less than 500 gross tonnage, the applicable scope of the present Rules requirements is determined by the Register on the case-to-case basis.

1.2.5 The Rules set down the requirements regulating the assignment of class to a ship or a shipboard refrigerating plant.

1.2.6 Confirmation of compliance with the requirements of the Register rules is the Register prerogative and is carried out in accordance with the procedure established by it.

Any statements to the effect a supervised item complies with the rules requirements, which are made or documentally supported by a body other than the Register and which are not confirmed by the latter in accordance with the established procedure, cannot be considered as evidence of such a compliance.

1.3 COMPLIANCE WITH STATUTORY REQUIREMENTS

1.3.1 As far as practicable, the Rules consider the requirements of international conventions and codes coming within the Register terms of reference (refer to 2.5, General Regulations for the Classification and Other Activity). Some of them are directly incorporated in the text of the Rules, while others are referred to in the text of the Rules.

2 CLASS OF A SHIP

2.1 GENERAL

2.1.1 Assignment of the Register class to a ship means confirmation by the Register that the ship construction complies with the applicable requirements of the Register rules and its technical condition complies with the conditions of the ship operation; the ship is registered with the Register for a specified period with performing the surveys stipulated by Rules for the Classification Surveys of Ships for this period.

2.1.2 The Register may assign a class to a ship proceeding from the results of survey during its construction, as well as assign or renew a class to a ship in service.

2.1.3 Renewal of a ship's class means confirmation by the Register that the construction and technical condition of the ship comply with the provisions based on which a class has been assigned as well as extension of validity of the Register documents for a definite period as required by the Rules.

2.1.4 Class of a ship is, generally, assigned or renewed by the Register for 5 years, however, in sound cases the Register may assign or renew a class for a lesser period.

2.1.5 If a ship has the valid Register class this means that the ship's technical condition in full measure or to a degree considered adequate by the Register complies with the requirements of the Rules which apply to it according to its purpose, service conditions and class notation. If a class of a ship is valid it is certified by the valid Classification Certificate on board.

2.1.6 Classification Certificate becomes invalid and classification is automatically suspended in the following cases:

if the ship as whole or her separate elements have not been subjected to scheduled periodical or occasional surveys in specified terms (if the special survey has not been completed or the ship is not under attendance for completion prior to resuming trading, by the due date; if the annual survey has not been completed within three (3) months of the due date of the annual survey; if the intermediate survey has not been completed within three (3) months of the due date of the third annual survey in each periodic survey cycle);

unless the ship is under attendance for completion of the relevant survey or if in RS Rules it is not required otherwise;

after an accident (the ship shall be submitted for occasional survey at port where the accident took place or at the first port of call, if the accident took place at sea);

if alterations not agreed with the Register have taken place in the construction and/or if any change has been made in the equipment which may result in reducing the standards required by the Rules;

when repair of ship's items has been performed without the agreement and/or survey by the Register;

when a ship navigates with a draught exceeding that specified by the Register for specific conditions as well as in case of operation of a ship in conditions which do not comply with the requirements for assigned class of a ship or the restrictions specified by the Register;

if the prescribed specific requirements which during previous survey of the ship were the conditions for assignment or retainment of the Register class have not been fulfilled within the specified period;

if the process of surveying the ship by the Register has been suspended on the shipowner's initiative or through his fault;

when the ship has been taken out of service for a long period (more than 3 months) for fulfillment of the Register requirements (except the case when a ship is under repair for these purposes);

in case of the ship's seizure by pirates.

The Register shall specially notify the shipowner of suspension of a ship's class and Classification Certificate.

2.1.7 Ship class and Classification Certificate may be suspended following a decision made by the Register when the commitments to the Register (including those on payment for its services) fail to be performed or are improperly performed as well as in other cases specified in the RS rules.

2.1.8 Suspended (as stated in 2.1.6) class of a ship may be reinstated on the basis of satisfactory results of the appropriate periodical or occasional survey carried out by the Register in the case of ship to be submitted for survey. In so doing when the ship is taken out of service for a long period (more than 3 months), the scope of survey for reinstatement of a ship's class shall be specially established by the Register taking into account the age and condition of the ship as well as the period for which she is taken out of service.

During the period from suspension of a class to its reinstatement or renewal the ship is considered to have been lost the Register class.

The class may be suspended for a period of no more than six months unless expressly provided otherwise by the RS rules and normative documents.

2.1.9 The class of a ship is withdrawn by the Register in the following cases:

.1 upon expiration of the maximum term of class suspension;

.2 when the Register and/or shipowner consider reinstatement of the class suspended as stated in 2.1.6 to be impossible;

.3 upon transfer of the ship to the class of another classification body;

.4 at the request of the shipowner.

Withdrawal of the ship's class means cessation of the Classification Certificate validity.

2.1.10 The class of a ship shall be cancelled due to her loss or scrapping.

2.1.11 After assigning the class the Register introduces the sea-going self-propelled ships and self-propelled mobile offshore drilling units of 100 gross tonnage and upwards into the Register of Ships and excludes them in case of withdrawal or cancellation of a class.

2.2 CLASS NOTATION OF A SHIP

Ships and floating facilities, complying fully or to a degree considered adequate by the Register with the relevant requirements of the Rules, are assigned the RS class with the class notation as specified below. The class notation assigned by the Register to a ship or floating facility consists of the character of classification and distinguishing marks and descriptive notations defining structure and purpose of a ship or floating facility.

The sequence of distinguishing marks and descriptive notations (if any) being added to the character of classification of a ship is set down by the provisions of this Chapter as well as by relevant provisions concerning the class notation included in rules for the classification and construction of ships of special types, as listed under 1.2.2.

2.2.1 The character of classification assigned by the Register to a ship or floating facility consists of distinguishing marks:

KM⊕, KM★, (KM)★ — for self-propelled ships and floating facilities;

KE⊕, KE★, (KE)★ — for non-self-propelled ships and floating facilities with total power output of prime movers 100 kW and upwards;

K⊕, K★, (K)★ — for other non-self-propelled ships and floating facilities.

2.2.2 Depending on the Rules on the basis of which a ship or a floating facility was surveyed, and the classification body which carried out the survey, the character of classification is established as follows:

.1 ships and floating facilities built according to the Rules of and surveyed by the Register are assigned a class notation with the character of classification: **KM⊕** or **KE⊕** or **K⊕** (refer to 2.2.1);

.2 ships and floating facilities which were as a whole (or their hull or machinery installation, machinery and equipment) built and/or manufactured according to the Rules of another classification body recognized by the Register and surveyed by that body during their construction and manufacture, when classed with the Register are assigned a class notation with the character of classification: **KM★**, **KE★** or **K★** (refer to 2.2.1);

.3 ships and floating facilities which were as a whole (or their hull or machinery installation, machinery and equipment) built and/or manufactured without being surveyed by a classification body recognized by the Register or without any survey of a classification body at all, when classed with the Register, are assigned a class notation with the character of classification: **(KM)★** or **(KE)★** or **(K)★** (refer to 2.2.1);

.4 ships and floating facilities for which their design does not permit the character of classification out of those listed in 2.2.2.2 to be assigned a class notation with the character of classification: **KM★** or **KE★** or **K★**.

This also applies when a ship or floating facility changes a class to the Register from one of the IACS Member Societies. The possibility of such a change is considered in each case by the Register Head Office.

.5 for ships and floating facilities classed with the Register (with the character of classification assigned in compliance with 2.2.2.1) along with another classification society (dual class), the distinguishing mark ⊕ is used instead of ★ in the RS class notation.

In this case, classification societies carrying out classification surveys of ships (floating facilities) act under dual class agreement.

2.2.3 The Register ice class marks, the IACS polar class notations and the Baltic ice class notations.

2.2.3.1 Ice class marks are assigned to icebreakers and ice class ships in compliance with the requirements of 2.2.3.2 to 2.2.3.6 of the present Part.

The IACS polar class notations are assigned to polar class ships in accordance with the requirements of Section 1, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships".

The Baltic ice class notations are assigned to the Baltic ice class ships in compliance with the requirements of Section 10, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships".

The IACS polar class notations and the Baltic ice class notations are assigned at the shipowner's discretion. At the same time, for the Register-classed ships intended for operation in Russian arctic seas as well as for icebreakers, the Register ice class marks are assigned in compliance with the requirements of 2.2.3.2 and 2.2.3.3.3 of the present Part.

At the shipowner's discretion the IACS polar class notations and the Baltic ice class notations may be applied simultaneously with the Register ice class marks (double or triple ice class), provided such ships comply with the requirements for the IACS polar class ships and/or the Baltic ice class ships, and the Register ice class ships.

2.2.3.1.1 Icebreakers are specialized ships intended for all kinds of icebreaking operations: escort of ships in ice, surmount of ice ridges, breaking of a navigable channel, towing, breaking of ice and rescue operations. There are two main regimes of ice navigation while performing icebreaking operations: continuous motion and ramming.

2.2.3.1.2 Ice class ships are ships intended for independent ice navigation including motion in fractures between floes, surmounting of ice isthmuses and portions of relatively thin compact ice, or navigation in ice with icebreaker escort.

2.2.3.1.3 The following definitions are used for the description of ice navigation conditions:

ice concentration is a measure of ice continuity, which is characterized by the ratio of the area covered by ice to the total water area using 10 number scale;

open floating ice is ice of concentration 4 to 6, where most of the floes do not touch each other;

close floating ice is ice of concentration 7 to 8 where most of the floes touch each other forming ice isthmuses;

very close floating ice is ice of concentration 9 or over, but less than 10;

compact ice is ice of concentration 10.

2.2.3.2 If an icebreaker complies with the requirements of the Rules, one of the following ice class marks is added to the character of classification: **Icebreaker6; Icebreaker7; Icebreaker8; Icebreaker9**.

Icebreakers of the above ice classes have the following tentative service characteristics:

Icebreaker6 — intended for ice breaking operations in harbour and roadstead water areas as well as in non-arctic freezing seas where the ice is up to 1,5 m thick. Continuous motion capability in unbroken ice up to 1 m thick;

Icebreaker7 — intended for ice breaking operations in the arctic seas on coastal routes during winter/spring navigation in ice up to 2,0 m thick and summer/autumn navigation in ice up to 2,5 m thick; in non-arctic freezing seas and mouths of rivers flowing into arctic seas in ice up to 2,0 m thick. Continuous motion capability in unbroken ice up to 1,5 m thick. The total shaft power not less than 11 MW;

Icebreaker8 — intended for ice breaking operations in the arctic seas on coastal routes during winter/spring navigation in ice up to 3,0 m thick and summer/autumn navigation without restrictions. Continuous motion

capability in unbroken ice up to 2,0 m thick. The total shaft power not less than 22 MW;

Icebreaker9 — intended for ice breaking operations on coastal routes in arctic seas during winter/spring navigation in ice up to 4,0 m thick and summer/autumn navigation without restrictions. Continuous motion capability in unbroken ice over 2,0 m thick. The total shaft power not less than 48 MW.

2.2.3.3 Register ice classes.

2.2.3.3.1 If a self-propelled ice class ship complies with the relevant requirements of the Rules, one of the following ice class marks shall be added to its character of classification: **Ice1, Ice2, Ice3, Arc4, Arc5, Arc6, Arc7, Arc8, Arc9**. Ice class marks need not be added to the character of classification of non-self-propelled ships.

2.2.3.3.2 Ice classes **Ice1, Ice2, Ice3** which form the group of non-arctic ice classes refer to ships intended for navigation in freezing non-arctic seas (non-arctic ships).

2.2.3.3.3 Ice classes **Arc4, Arc5, Arc6, Arc7, Arc8, Arc9** which form the group of arctic ice classes refer to ships intended for navigation in arctic seas (arctic ships). At the shipowner's discretion if an arctic ship performs icebreaking operations periodically and complies with the relevant requirements of the Rules, one of the following ice class marks may be added to the character of classification: **Icebreaker6** or **Icebreaker7**.

2.2.3.3.4 For tugs, depending on the compliance with the appropriate ice class requirements, one of the following ice class marks is added to the character of classification: **Ice2, Ice3, Arc4, Arc5**.

2.2.3.4 Averaged quantitative data on permitted service areas and ice service conditions presented in Tables 2.2.3.4-1 to 2.2.3.4-3 shall be used when choosing the ice class of arctic ships, while when choosing the ice class of non-arctic ships, data on permitted ice navigation conditions given in Table 2.2.3.4-4. It is not permitted to use these data for regulating the allowable navigation conditions of ships in service. It is assumed that during service the shipowner will follow the recommendations of the Ice Navigation Ship Certificate issued by the Register upon shipowner's request and specifying the conditions of safe operation of the ship in ice depending on the ice class mark, the ship's specific features, ice conditions and icebreaker support.

Table 2.2.3.4-1 shows service areas for ships in the Russian arctic seas (the Barents Sea, the Kara Sea, the Laptev Sea, the East-Siberian Sea, the Chukchee Sea) in relation to the season, tactics of ice navigation and type of navigation.

Table 2.2.3.4-2 shows, for arctic ice class ships, limiting type and thickness of ice enabling a ship to navigate in a channel following an icebreaker at a low

Table 2.2.3.4-1

Service areas and conditions for ships of arctic ice classes

Ice class	Type of ice navigation	Winter/spring navigation					Summer/autumn navigation				
		The Barents Sea	The Kara Sea ¹	The Laptev Sea	The East Siberian Sea	The Chuckchee Sea	The Barents Sea	The Kara Sea	The Laptev Sea	The East Siberian Sea	The Chuckchee Sea
		ENHME	ENHME	ENHME	ENHME	ENHME	ENHME	ENHME	ENHME	ENHME	ENHME
Arc4	IN	— — — +	— — — —	— — — —	— — — —	— — — —	++ ++	— — ++	— — — +	— — — +	— — ++
	IEN	— * ++	— — — +	— — — —	— — — —	— — — *	++ ++	* ++ +	— — ++	— — ++	— * ++
Arc5	IN	— — ++	— — — +	— — — —	— — — —	— — — —	++ ++	— ++ +	— — ++	— — ++	— — ++
	IEN	* ++ +	— — * +	— — — +	— — — +	— — * +	++ ++	* ++ +	* ++ +	* ++ +	* ++ +
Arc6	IN	* ++ +	— — — +	— — — +	— — — +	— — — +	++ ++	++ ++	— ++ +	— ++ +	— ++ +
	IEN	++ ++	* ++ +	— ** +	— ** +	— * ++	++ ++	++ ++	++ ++	++ ++	++ ++
Arc7	IN	++ ++	— — ++	— — — +	— — — +	— — ++	++ ++	++ ++	++ ++	++ ++	++ ++
	IEN	++ ++	++ ++	* ++ +	* ++ +	* ++ +	++ ++	++ ++	++ ++	++ ++	++ ++
Arc8	IN	++ ++	++ ++	— * ++	— * ++	* ++ +	++ ++	++ ++	++ ++	++ ++	++ ++
	IEN	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++
Arc9	IN	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++
	IEN	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++	++ ++
Symbols: IN — independent navigation IEN — icebreaker escorted navigation + — operation allowed — — operation not allowed * — operation connected with the increased risk of damage EN — extreme navigation (average periodicity once in ten years) H, M, E — hard, medium, easy navigation (average periodicity once in three years)											
¹ For ships with ice class mark Arc7 an independent (IN) year-round navigation in the southwestern part of the Kara Sea, at EN, H, M and E types of navigation.											

Table 2.2.3.4-2

Ice class	Permitted type and thickness of ice	
	Winter/spring navigation	Summer/autumn navigation
Arc4	Thin first-year	Medium first-year up to 0,9 m
Arc5	Medium first-year up to 0,8 m thick	Medium first-year
Arc6	Medium first-year	Thick first-year up to 1,5 m
Arc7	Thick first-year up to 1,8 m	Second-year
Arc8	Multi-year up to 3,4 m	Multi-year
Arc9	Multi-year	Multi-year
Note. The classification of ice adopted according to the "Sea Ice Nomenclature" of the World Meteorological Organization (WMO):		
Ice type	Ice thickness	
Multi-year	> 3,0 m	
Second-year	> 2,0 m	
Thick first-year	> 1,2 m	
Medium first-year	0,7 — 1,2 m	
Thin first-year	< 0,7 m	

speed (3 to 5 knots) without running a heightened risk of damage through contact of hull with ice.

Table 2.2.3.4-3 shows, for arctic ice class ships operating independently, permissible speeds which a

ship under the ice conditions set out in the table may reach when navigating in fractures between floes or surmounting ice isthmuses without running a heightened risk of damage through contact of hull with ice.

Table 2.2.3.4-3

Ice class	Permitted speed, in knots	Ice concentration and type	Ice thickness, in m		Methods of surmounting ice ridges
			Winter/spring navigation	Summer/autumn navigation	
Arc4	6 — 8	open floating first-year ice	0,6	0,8	Continuous motion
Arc5		open floating first-year ice	0,8	1,0	
Arc6		open floating first-year ice	1,1	1,3	
Arc7		close floating first-year ice	1,4	1,7	Episodic ramming
Arc8	10	close floating second-year ice	2,1	3,0	Regular ramming
Arc9	12	very close floating and compact multi-year ice	3,5	4,0	Surmount of ice ridges and episodic ramming of compact ice fields

Table 2.2.3.4-4

Ice class	Permitted thickness of ice, in m		Type of operation
	Independent navigation in open pack ice at a speed of 5 knots	Navigation in channel following an icebreaker in compact ice at a speed of 3 knots	
Ice1	0,40	0,35	Episodically
Ice2	0,55	0,50	Regularly
Ice3	0,70	0,65	Regularly

2.2.3.5 Arctic ice class ships may navigate in non-arctic freezing seas in ice conditions corresponding to those stated in Tables 2.2.3.4-2 and 2.2.3.4-3.

2.2.3.6 In Table 2.2.3.6 an attempt has been made to correspond the ice class marks of the present Rules to those of the Rules, edition 1995. The provisions of 2.2.3.4 and 2.2.3.5 do not apply to the ships built according to the Rules, edition 1995 and earlier.

In accordance with the requirements of the present Rules, ice class marks may only be applied to such ships at the shipowner's discretion and after their hull examination for compliance with the requirements of 3.10, Part II "Hull".

Table 2.2.3.6

Present Rules	Rules, edition 1995	Present Rules	Rules, edition 1995
Ice class		Icebreakers	
Ice1	Л14 (L4)	Icebreaker6	ЛЛ14 (LL4)
Ice2	Л13 (L3)	Icebreaker7	ЛЛ13 (LL3)
Ice3	Л12 (L2)	Icebreaker8	ЛЛ12 (LL2)
Arc4	Л11 (L1)	Icebreaker9	ЛЛ11 (LL1)
Arc5	УЛ1 (UL)		
Arc6			
Arc7	УЛ1А (ULA)		
Arc8			
Arc9			

2.2.4 Subdivision distinguishing marks.

Ships complying with the applicable requirements of Part V "Subdivision" and fully complying with the requirements of Section 3 of the above Part in the case of flooding of any one compartment or any two or three adjacent compartments over complete length of the ship in the case of design side damage specified in 3.2 are assigned subdivision distinguishing mark **1**, **2** or **3** added to the character of classification, respectively.

2.2.5 Distinguishing marks for restricted areas of navigation.

2.2.5.1 Ships complying with the Rules requirements provided for ships operating only in restricted areas of navigation are assigned one of the following distinguishing marks: **R1**, **R2**, **R2-RSN**, **R2-RSN(4,5)**, **R3-RSN** or **R3** added to the character of classification to clarify restrictions of the ship navigation as follows:

.1 R1 — navigation in sea areas at seas with a wave height of 8,5 m with 3 per cent probability of exceeding level and with the ships proceeding not more than 200 miles away from the place of refuge and with an allowable distance between the places of refuge not more than 400 miles;

.2 R2 — navigation in sea areas at seas with a wave height of 7,0 m with 3 per cent probability of exceeding level with ships proceeding not more than 100 miles away from the place of refuge and with an allowable distance between the places of refuge not more than 200 miles;

.3 R2-RSN — river-sea navigation at seas with a wave height of 6,0 m with 3 per cent probability of exceeding level with ships proceeding from the place of refuge:

in open seas up to 50 miles and with an allowable distance between the places of refuge not more than 100 miles;

in enclosed seas up to 100 miles and with an allowable distance between the places of refuge not more than 200 miles;

.4 R2-RSN(4,5) — river-sea navigation at seas with a wave height of 4,5 m with 3 per cent probability with ships proceeding from the place of refuge:

in open seas up to 50 miles and with an allowable distance between the places of refuge not more than 100 miles;

in enclosed seas up to 100 miles and with an allowable distance between the places of refuge not more than 200 miles;

.5 R3-RSN — river-sea navigation at seas with a wave height of 3,5 m with 3 per cent probability of exceeding level with due regard for particular restrictions on the area and conditions of navigation resulting from the wind and wave conditions of the basins with determination of a maximum allowable distance from the place of refuge which in no case shall be more than 50 miles;

.6 R3 — harbour, roadstead and coastal navigation within limits established by the Register in each case.

Restrictions for particular floating crane operations (cargo-handling operations or navigation with eventual carriage of cargoes on deck and/or in the hold) shall be imposed by the Register in each particular case;

.7 Berth-connected ship (with indication of the positions of stay and geographical service area according to Fig. 4.3.3.6, Part IV "Stability").

2.2.5.2 The restrictions provided for by 2.2.5.1 define the allowable conditions of ship's navigation resulting from ship's stability and strength which are indicated in the Seaworthiness Certificate and in the Classification Certificate.

2.2.5.3 Particular restrictions on the area and conditions of navigation for ships of river-sea navigation **R3-RSN** are determined as the geographical place names of basins or their parts with the indication, where necessary, of the geographical boundary of the navigation area within the basin, the restrictions on proceeding from the place of refuge and the restrictions of ship navigation by calendar periods, or an indication of voyage between the terminal ports. In this case, the restrictions with due regard to the wind and wave conditions of the basins shall be determined by using the data of Table 2.2.5.3 or the data from the submitted to the Register justifications of possibility of ship's navigation in the

certain area or passage, made in accordance with the procedure approved by the Register.

2.2.5.4 Whatever the area of navigation of ships whose stability does not comply with the requirements of Part IV "Stability" of the Rules imposed upon the ships navigating in winter seasonal zones to the North of parallel 66°30' N and to the South of parallel 66°00' S as well as in winter in the Bering Sea, the Sea of Okhotsk and in the Tatar Strait, the Register specifies the appropriate restrictions by introducing the entry into the Classification Certificate that the ship is not allowed to navigate in the above winter seasonal zones and areas.

2.2.6 Distinguishing automation marks.

Ships and floating facilities fitted with automation equipment complying with the requirements of Part XV "Automation" are assigned one of the following distinguishing marks added to the character of classification, namely:

.1 AUT1 — where the automation extent is sufficient for the machinery installation operation with unattended machinery spaces and the main machinery control room;

.2 AUT2 — where the automation extent is sufficient for the machinery installation operation by one operator at the main machinery control room with unattended machinery spaces;

.3 AUT3 — where the automation extent is sufficient for the machinery installation operation of a ship with the main machinery power output not more than 2250 kW with unattended machinery spaces and the main machinery control room;

.4 AUT1-C, AUT2-C or AUT3-C — where automation is based on computers or programmable logic controllers meeting the requirements of Section 7, Part XV "Automation";

.5 AUT1-ICS, AUT2-ICS or AUT3-ICS — where automation is made with the use of a computerized integrated monitoring and control system meeting the requirements of Section 7, Part XV "Automation".

2.2.7 Distinguishing mark of one man bridge operated ship.

If the navigational equipment of self-propelled ship installed on the navigation bridge complies with the requirements for self-propelled one man bridge operated ships specified in Part V "Navigational Equipment" of Rules for the Equipment of Sea-Going Ships, a distinguishing mark **OMBO** is added to the character of classification.

2.2.8 Distinguishing mark for a ship carrying equipment for fire fighting aboard other ships.

If a ship carries supplementary systems, equipment and outfit for fire fighting aboard other ships, offshore drilling units, floating and shore facilities and if the ship is in full compliance with the relevant requirements of the Rules in respect to those appliances, distinguishing

Table 2.2.5.3

Basin	Geographical restrictions	Season
The Sea of Azov	No restrictions	Throughout the year
The Adriatic Sea	South of 42°N, 20-mile coastal area along the East and West coast, crossing the sea in Otranto Strait in the area of p. Brindizi (p. Bari) — p. Bar and in the area of the Cape Franchesco — the Lastovo Island. North of 42°N, 40-mile coastal area with calling at ports of the West coast	Throughout the year
The Baltic Sea	No restrictions, including the Gulfs of Bothnia, Finland, Riga, the Zund, Great and Small Belt, Kattegat Straits to the South of 57°45'N.	Throughout the year
The Baltic Sea and the North Sea	Exit to the Skagerrak Straits in the waters to the East of the line the Cape Skagen — Oslo- Fjord and South of 59°N and also along the coast of Sweden in Sekken and Single-Fjord Straits	March to September
The White Sea	The Onezhsky, Dvinsky and Kandalakshsky Gulfs, as well as 20-mile coastal area to the South of 66°45'N	May to October
The Ionian Sea	20-mile coastal area along the East coast from Kathira to Otronto Straits 20-mile coastal area along the East coast from the Gulf of Patraikos to the Strait of Otranto	March to November Throughout the year
The Kara Sea	20-mile coastal area from p. Dikson to r. Pyasing 20-mile coastal area along the North and West coast of the Yamal Peninsula from Obskaya Guba to p. Kharasavey via the Malygin Straits	July to September August to 15 October
The Caspian Sea	To the North of 44°30'N as well as to the South of 44°30'N within 20-mile coastal area along the East coast up to p. Turkmenbashi (port of Bekdash), along the West coast up to p. Makhachkala and from p. Baku up to p. Anzali, and within the area from Shakhovaya Spit at 39°50'N and 50°20'E up to Kurinskaya Spit at 39°00'N and 49°44'E ships are allowed to proceed up to 25 miles away from the shore; passage from the East coast in the area of p. Turkmenbashi (port of Bekdash) — southern extremity of Krasnovodskaya Spit to the West coast in the area of Shakhovaya Spit ¹ .	March to November
The Laptev Sea and the East-Siberian Sea	20-mile coastal area from the Cape Bykov to the mouth of r. Kolyma including Guba Buor-Khaya Coastal area within 6 to 15 m isobath from the mouth of r. Kolyma to p. Pevek	20 July to September August to September during years of low to medium ice formation determined by the position of the Ayon ice mass
The Sea of Marmora	No restrictions from Bosporus to Dardanelles Straits	Throughout the year
The Persian Gulf (the Arabian Sea)	East part — from Ormus Strait to 54°E; central part — coastal area along the West coast in the area restricted by 54°E, parallel 28°59'N and line connecting islands Abu-Musa, Khalul, Al-Kharkus, Failaka; north part — from parallel 28°59'N	Throughout the year
The North Sea	Helgoland Bay to the South of 54°02'N and to the East of 7°58'E Coastal area in the zone of traffic separation along the East-Frisian Islands and farther on with possible calls at the ports of South coast to p. Antwerp inclusive	Throughout the year March to October
The Mediterranean Sea	From Rhodes Strait in 20-mile coastal area to the ports of Israel inclusive with calls at the port of Cyprus Island	March to November
The Black Sea	20-mile coastal area along the North, West and East coast from p. Batumi to Straits of Bosporus	Throughout the year
The Aegean Sea	From the Dardanelles to Karpathos and Kithira Straits to the North of 36°N Passage to the Ionian Sea through the Gulf of Saronikos, Corinth Canal, Gulf of Corinth, Gulf of Patraikos	Throughout the year Throughout the year
The Sea of Japan and the Sea of Okhotsk	20-mile coastal area along the West coast from p. Vladivostok to the Preobrazhenia Bay The Tatar Strait and the Amur Firth from the line of p. Sovetskaya Gavan — p. Ugleorsk to the line of the Cape Menshikov — the Cape Tambov	Throughout the year June to October

¹ For ships having the Register-approved area of navigation to the South of p. Turkmenbashi (port of Bekdash) within 20-mile coastal area along the East coast up to ports of Iran, from Cheleken Peninsula at 39°26'N and 52°40'E up to the southern extremity of Ogurchinsky Island at 38°40'N and 53°00'E the 20-mile coastal area shall be counted from the coast of Ogurchinsky Island.

marks **FF1WS**, **FF1**, **FF2WS**, **FF2** or **FF3WS** are added to the character of classification proceeding from the degree of the ship equipment with these appliances.

The degree of the ship equipment for fire fighting in other structures is determined on the basis of the list of fire fighting equipment and systems prescribed by 6.6, Part VI "Fire Protection".

2.2.9 Distinguishing mark for ships fitted with a dynamic positioning system.

If a ship is fitted with a dynamic positioning system complying with the requirements of Section 8, Part XV "Automation", one of the following distinguishing marks: **DYNPOS-1**, **DYNPOS-2** or **DYNPOS-3** is added to the ship's character of classification, depending on the redundancy of the dynamic positioning system.

2.2.10 Distinguishing mark for ships fitted with position mooring systems.

If a ship is fitted with the position mooring system, one of the following distinguishing marks is added to the character of classification:

.1 POSIMOOR — if the position mooring system meets the requirements of 9.1 to 9.3, Part XV "Automation";

.2 POSIMOOR-TA — if the position mooring system meets the requirements of 9.1 to 9.4, Part XV "Automation" when applying thrusters complying with the applicable requirements of Section 8, Part XV "Automation".

2.2.11 Distinguishing mark for a ship intended for carriage of refrigerated cargo.

Ships intended for carriage or storage of refrigerated cargo or catch in ship's cargo spaces and/or in thermal containers with the use of a refrigerating plant available on board and classed in compliance with Section 4 of the present Part of the Rules and meeting the requirements of Part XII "Refrigerating Plants" are assigned the distinguishing mark **REF** added to the character of classification.

Ships intended for carriage or storage of refrigerated cargo or catch in ship's cargo spaces and/or in thermal containers and using non-classed refrigerating plant for maintaining the required temperature, complying with the relevant requirements of Part XII "Refrigerating Plants", are assigned the distinguishing mark (**REF**) added to the character of classification.

2.2.12 Distinguishing mark for ships fitted with the main electric propulsion plant.

If a ship is fitted with the main electric propulsion plant complying with the requirements of Section 17, Part XI "Electrical Equipment", the distinguishing mark **EPP** is added to the character of classification.

2.2.13 Distinguishing mark for ships fitted with equipment for icing protection.

If a ship or FOP is fitted with equipment providing effective icing protection in compliance

with the requirements of Section 4, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships", the distinguishing mark **ANTI-ICE** is added to the character of classification.

2.2.14 Distinguishing mark for a ship intended for carriage of packaged irradiated nuclear fuel, plutonium and high-level radioactive wastes (INF cargo).

Ships intended for carriage of packaged irradiated nuclear fuel, plutonium and high-level radioactive wastes, which comply with the requirements of 7.3, Part VI "Fire Protection", are assigned one of the following distinguishing marks added to the character of classification:

INF1 for Class **INF1** ships;

INF2 for Class **INF2** ships;

INF3 for Class **INF3** ships.

2.2.15 Distinguishing mark for ships fitted with a loading instrument.

If a ship is fitted with a loading instrument complying with the requirements of 1.4.9.4 and Appendix 2, Part II "Hull", the distinguishing mark **LI** is added to the character of classification.

2.2.16 Distinguishing mark for ships fitted with a cargo vapour discharge system.

If a ship is fitted with a cargo vapour discharge system complying with the requirements of 9.9, Part VIII "Systems and Piping", the distinguishing mark **VCS** is added to the character of classification.

2.2.17 Distinguishing mark for ships fitted with an inert gas system.

If a ship is fitted with an inert gas system complying with the requirements of 9.16, Part VIII "Systems and Piping", one of the following distinguishing marks is added to the character of classification:

.1 IGS-IG if a system uses an oil-burning inert gas generator as the inert gas source and the requirements of 9.16.9, Part VIII "Systems and Piping" are complied with;

.2 IGS-NG if a system uses a nitrogen generator as the inert gas source and the requirements of 9.16.12, Part VIII "Systems and Piping" are complied with;

.3 IGS-Pad if an inert gas system is only intended for forming an insulating pad in cargo tanks and the requirements of 9.16.11, Part VIII "Systems and Piping" are complied with. This distinguishing mark may be used where systems with inert gas supplied from cylinders are installed as well as for systems using inert gas and nitrogen generators whose capacity is insufficient for assigning the distinguishing marks **IGS-IG** or **IGS-NG**.

2.2.18 Distinguishing mark for ships fitted with a crude oil washing system.

If a ship is fitted with a crude oil washing system complying with the requirements of 9.12, Part VIII

"Systems and Piping", the distinguishing mark **COW** is added to the character of classification.

2.2.19 Distinguishing mark for ships fitted with a centralized cargo control system.

If a ship is fitted with a cargo control room complying with the requirements of 3.2.11, Part VII "Machinery Installations", the distinguishing mark **CCO** is added to the character of classification.

2.2.20 Distinguishing marks for ships of high ecological safety.

Ships complying with the requirements of Section 3, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships" are assigned with one of the following distinguishing marks added to the character of classification:

.1 ECO — if a ship meets the requirements for controlling and limiting operational emissions and discharges, as well as requirements for prevention of environmental pollution in case of emergency, as specified in 3.5, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships";

.2 ECO-S — if a ship meets more stringent requirements than those for assignment of the distinguishing mark **ECO** in the class notation, as specified in 3.5, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships".

2.2.21 Distinguishing mark for a ship complying with ballast water management requirements.

If a ship performs ballast water management through ballast water exchange at sea and, as appropriate, carries Ballast Water Management Plan approved by the Register (refer to 1.4.13, Part IV "Stability"), and the ship ballast systems comply with the requirements of 8.7, Part VIII "Systems and Piping", one of the following distinguishing marks is added to the character of classification: **BWM(E – S)**, **BWM(E – F)**, **BWM(E – D)**, **BWM(E – SF)**, **BWM(E – SD)**, **BWM(E – FD)** or **BWM(E – SFD)**. **BWM** means that the ship performs ballast water management; **E** means that ballast water management is performed through ballast water exchange at sea; **S** means that sequential method is used; **F** means that flow-through method is used; **D** means that dilution method is used; **SF**, **SD**, **FD** and **SFD** mean that combined ballast water exchange method is used being a combination of the above methods.

2.2.22 Distinguishing marks for a ship fitted with a diving system permanently installed on the ship.

If a ship is fitted with a diving system permanently installed on the ship, which comply with the relevant requirements of Rules for the Classification and Construction of Manned Submersibles, Ship's

Diving Systems and Passenger Submersibles, one of the following distinguishing marks is added to the character of classification:

.1 SDS < 12 for ships fitted with a diving system designed for diving operations at depths less than 12 m;

.2 SDS < 60 for ships fitted with a diving system designed for diving operations at depths less than 60 m;

.3 SDS ≥ 60 for ships fitted with a diving system designed for diving operations at depths of 60 m and over.

2.2.23 Distinguishing mark for a ship fitted with a manned submersible.

If a ship is fitted with a manned submersible complying with the relevant requirements of Rules for the Classification and Construction of Manned Submersibles, Ship's Diving Systems and Passenger Submersibles, the distinguishing mark **MS** is added to the character of classification.

2.2.24 Distinguishing mark for a ship to carry out cargo operations at offshore terminals.

Oil tankers to carry out cargo operations at offshore terminals in compliance with the requirements of Section 5, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships" are assigned one of the following distinguishing marks added to the character of classification:

.1 BLS-SPM — if a ship is fitted with the bow loading system and fully complies with the requirements for equipment of oil tankers to carry out cargo operations at offshore terminals;

.2 BLS — if a ship is fitted with the bow loading system and complies with the requirements for equipment of oil tankers to carry out cargo operations at offshore terminals, except for 5.6.2 to 5.6.9 and 5.6.12 to 5.6.14, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships";

.3 SPM — if a ship is not fitted with the bow loading system, though complies with the requirements of 5.6.2 to 5.6.9 and 5.6.12 to 5.6.14, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships".

This distinguishing mark may also be added to the character of classification of ships carrying liquefied gases in bulk.

2.2.25 Distinguishing mark for a ship fitted with helicopter facilities.

If ships and FOP are fitted with helicopter facilities in compliance with the requirements of Section 6, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships", one of the following distinguishing marks is added to the character of classification:

.1 HELIDECK — if a ship (FOP) is fitted with a helideck and complies with the requirements of 6.2, 6.3, 6.4.1, 6.6 and 6.7, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships";

.2 HELIDECK-F — if a ship (FOP) is fitted with helicopter refuelling facilities and, in addition to 2.2.25.1, complies with the requirements of 6.4.2 (as far as applicable), 6.5.1 and 6.5.2 (as far as applicable), Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships";

.3 HELIDECK-H — if a ship (FOP) is fitted with hangar facilities and fully complies with the requirements of Section 6, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships".

2.2.26 Distinguishing mark for a ship equipped to ensure long-term operation at low temperatures.

If ships and FOP are equipped to ensure long-term operation at low temperatures in compliance with the requirements of Section 7, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships", at the shipowner's discretion the distinguishing mark **WINTERIZATION(DAT)** is added to the character of classification, where design ambient temperature is indicated in brackets, in Celsius degrees, e.g. **WINTERIZATION(–40)**.

2.2.27 Distinguishing mark for propulsion plant redundancy.

Where provision is made for the redundancy of propulsion plant components complying with the requirements of Section 8, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of the Ship", one of the following distinguishing marks is added to the character of classification: **RP-1**, **RP-1A**, **RP-1AS**, **RP-2** or **RP-2S**, depending on the redundancy arrangement.

2.2.28 Distinguishing mark for a ship equipped to use gas fuel.

If ships are equipped for using gas fuel in compliance with Section 9 of Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships", the distinguishing mark **GFS** (gas fuelled ships) is added to the character of classification.

2.2.29 Descriptive notation in the class notation.

Ships complying with a definite scope of requirements of the Rules taking account of their structural particulars and service conditions are assigned the appropriate descriptive notation added to the character of classification of a ship.

The current Register rules cover certain requirements the fulfilment of which makes possible

introducing of the following descriptive notations in the class notation:

Bilge water removing ship
Bulk carrier
Catamaran
Container ship
Crane vessel
Docklift ship
Dredger
Escort tug
Fishing vessel
Floating crane
Floating dock
Hopper barge
Hopper dredger
Oil recovery ship
Oil tanker
Oil/bulk carrier
Oil/bulk/ore carrier
Ore carrier
Passenger ship
Pontoon
Pontoon for technological services
Pontoon for transportation services
Ro-ro passenger ship
Ro-ro ship
Salvage ship
Shipborne barge
Special purpose ship
Supply vessel
Tanker
Tanker (water)
Tanker (wine)
Timber carrier
Tug, etc.

Note. Descriptive notation in the class notation is written in English. At the discretion of the shipowner it may be written in two languages, English and Russian, for example: **Oil tanker** (нефтеналивное) (ESP).

To the class notations of nuclear ships and floating facilities, nuclear support vessels, gas carriers, chemical tankers, high-speed craft, type A WIG craft, mobile offshore drilling units, manned submersibles and diving systems, sea-going pleasure craft, the distinguishing marks and descriptive notations shall be inserted in conformity with the provisions of rules for the classification and construction of the relevant types of ships (refer to 1.2.2).

The descriptive notation **Tanker** shall be accompanied by a cargo carried specification in brackets such as **Tanker (water)**, **Tanker (wine)**.

For ships of restricted area of navigation with the descriptive notation **Berth-connected ship** (refer to 2.2.5.1.6), the descriptive notation shall be supplemented by the statement of ship purpose out of those

listed in the definition of the berth-connected ship (refer to 1.1.1).

If the scope of the Rules requirements which a ship complies with allows, two and more descriptive notations may be stated in the class notation of a ship (e.g. **Supply vessel**, **Salvage ships Tug**) or the descriptive notation may be written as compounds (e.g. **Oil/bulk carrier**, **Oil/bulk/ore carrier**).

If an oil tanker or oil recovery ship complies with the requirements for the ships, which carry petroleum products or recover them from the sea surface and carry them having flash point above 60 °C, this temperature shall be indicated in the descriptive notation. For example: **Oil tanker (> 60 °C)**, **Oil/ore carrier (> 60 °C)**, **Oil recovery ship (> 60 °C)**.

For oil tankers and bulk carriers fully complying with the requirements of Part XVIII "Common Structural Rules for Bulk Carriers and Oil Tankers", the distinguishing mark **CSR** shall be mandatory added after descriptive notation.

When adding the descriptive notation **Bulk carrier** to the character of classification, for bulk carriers of 150 m in length and upwards provided the appropriate requirements of 3.3, Part II "Hull" and those of Part XVIII "Common Structural Rules for Bulk Carriers and Oil Tankers" (as applicable) are complied with, one of the following distinguishing marks shall be added after the descriptive notation:

.1 BC-A — for ships designed to carry the bulk cargoes having a density of 1,0 t/m³ and above with specified holds empty at the maximum draught;

.2 BC-B — for ships designed to carry the bulk cargoes having a density of 1,0 t/m³ and above with all holds loaded;

.3 BC-C — for ships designed to carry the bulk cargoes having a density less than 1,0 t/m³.

For bulk carriers having one of the distinguishing marks **BC-A** or **BC-B** in the class notation, the detailed description of limitations to be observed during operation as a consequence of the design loading condition applied during the design (refer to 3.3, Part II "Hull" or 3.2.1, Section 1, Chapter 1, Part 1 of the Common Structural Rules for Bulk Carriers and Oil Tankers¹ (Part XVIII of these Rules), as applicable) shall be provided in the following cases:

for distinguishing marks **BC-A** and **BC-B**, an entry (**maximum cargo density t/m³**) shall be made if the maximum cargo density is less than 3,0 t/m³;

for the distinguishing mark **BC-A**, the allowed combination of specified empty cargo holds shall be additionally entered, for example: (**cargo holds Nos. 2, 4, ... may be empty**);

for the distinguishing mark **BC-A**, when the ship is intended to operate in alternate block load condition, an entry (**block loading**) shall be made.

When the ship has not been designed for loading and unloading in multiple ports, an entry (**no MP**) shall be added after all the above distinguishing marks.

For bulk carriers having one of the distinguishing marks **BC-A** or **BC-B** in the class notation, and with cargo holds designed for loading/unloading by grabs in compliance with the requirements of Section 6, Chapter 1, Part 2 of the IACS Common Structural Rules (Part XVIII "Common Structural Rules for Bulk Carriers and Oil Tankers" of these Rules), the distinguishing mark **GRAB(X)** shall be mandatory added after the above distinguishing marks, where instead of **X** an unladen grab weight shall be indicated, taken not less than:

35 t for ships with $L \geq 250$ m,

30 t for ships with $200 \text{ m} \leq L < 250$ m,

20 t otherwise.

For all other bulk carriers, the addition of the distinguishing mark **GRAB(X)** is voluntary.

When adding descriptive notation to the character of classification of self-propelled ships such as **Chemical tanker**, **Oil tanker**, **Bulk carrier**, **Ore carrier** or the word combinations: **Oil/bulk carrier**, **Oil/ore carrier** etc., after the descriptive notation it shall be added (**ESP**). This means the necessity to survey these ships based on the Enhanced Survey Programme.

For example: **Oil/ore carrier (> 60 °C) (ESP)**.

The descriptive notation **Escort tug** is added to the character of classification of tugs complying with the requirements of Section 2, Part XVII "Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships".

2.2.30 Limitations on validity of some distinguishing marks.

When the particular scope of requirements of the Rules, on the basis of which the appropriate distinguishing marks are introduced in the class notation, are met only under limitations specified by the Register, the limitations, on exceeding of which these distinguishing marks become invalid, are added (in parentheses after such distinguishing marks) to the class notation, e.g.: **KM⊕Arc7 (at $d \leq 8,4$ m) ⊗ (at $d \leq 8,4$ m) AUT2 Ro-ro ship**.

¹Herein after referred to as "The IACS Common Structural Rules".

2.3 ADDITIONAL CHARACTERISTICS

2.3.1 When complying with definite requirements of the Rules stipulated by the structural features or operational characteristics of the ship the fulfilment of which is not reflected by distinguishing marks and descriptive notation in the class notation, the confirmation of compliance of the ship with such requirements is certified by the entry in column "Other characteristics" of the Classification Certificate stating for example that the ship is fit for the carriage of dangerous goods as it is indicated in the Certificate...; the ship is equipped for the carriage of cargo in international standard containers on deck and/or in appropriate holds, that the ship is suitable for operation in waters covered with oil, etc. (refer also to 1.1.4.8, 1.1.5.1, 1.1.5.2 and 3.3.1.5, Part II "Hull").

2.3.2 The column "Other characteristics" of the Classification Certificate of supply vessels and other ships serving offshore oil and gas fields (except for

mobile offshore drilling units, floating cranes, pipe-laying barges and floating hotels), which comply with the requirements of Guidelines for the Transport and Handling of Limited Amounts of Hazardous and Noxious Liquid Substances in Bulk on Offshore Support Vessels (IMO resolution A.673(16), as amended by IMO resolution MSC.236(82) and IMO resolution MEPC.158(55)), shall have an entry reading as follows: "The ship is fit to carry a limited amount of hazardous and noxious liquid substances in bulk, as stated in Certificate of Fitness of Offshore Support Vessel (Form 2.1.47)".

2.4 ALTERATION OF MARKS IN CLASS NOTATION

2.4.1 The Register may delete or alter any mark in the class notation in the case of any alteration of, or non-compliance with the requirements defining the insertion of this mark in the class notation.

3 TECHNICAL DOCUMENTATION

3.1 GENERAL

3.1.1 General provisions pertinent to the review and approval (agreement) of technical documentation on ships, materials and products are given in Part II "Technical Documentation" of Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

3.1.2 The present Part of the Rules contains lists of the plan approval documentation to be submitted to the Register for review and approval.

3.1.3 Requirements for the scope of technical documentation of a ship under conversion, repair or renovation, transfer of class, as well as during the initial survey of ship not built under the technical supervision of the Register or any other classification body, are given in Part I "General Provisions" of Rules for the Classification Surveys of Ships in Service.

At the same time, technical documentation for conversion of single-hull tankers to double-hull tankers or bulk carriers shall meet the relevant requirements of the Rules taking in to account IACS UI SC226 (Rev.1 Dec 2012) set out in the Supplement to rules of Russian Maritime Register of Shipping "IACS Unified Interpretations and Recommendations" (published in electronic form as a separate edition).

3.1.4 Requirements for the scope of technical documentation of materials and products for ships are given in the relevant Parts of the Rules.

3.1.5 When alternative design and arrangements being applied on board deviate from statutory requirements, an engineering analysis shall be submitted for the Register approval with a technical justification demonstrating that the alternative design and arrangements provide an equivalent level of safety to that stipulated by the relevant statutory requirements (refer to IMO resolution MSC.216(82)).

The engineering analysis shall be performed in accordance with the provisions of Guidelines on Alternative Design and Arrangements (refer to IMO circular MSC.1/Circ. 1212).

For fire safety alternative design and arrangements — refer to 1.7, Part VI "Fire Protection".

3.2 PLAN APPROVAL DOCUMENTATION

3.2.1 General provisions.

3.2.1.1 Prior to commencement of a ship construction, the plan approval documentation proving that all requirements of the Register rules applicable to the ship concerned are complied with shall be submitted to the

Register for review. The documentation for review shall be submitted to the Register, as a rule in electronic form in PDF format by mutually agreed way, or as a hard copy in triplicate, completed in accordance with the lists given in 3.2.2 to 3.2.11, taking into account the peculiarities and type of a ship.

Documentation marked with (*) is the documentation, which review results are documented by stamping as per to 8.3.1, Part II "Technical Documentation" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

Documentation marked with (**) is the documentation, which review results are documented by stamping as per to 8.3.2, Part II "Technical Documentation" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

3.2.2 General:

- .1** ship specification (**);
- .2** general arrangement plans with indication of escape routes (*);
- .3** list of components and materials with indication of the Register approval (**);
- .4** drawing of dangerous zones and spaces (*);
- .5** plan showing the position of the IMO number on board a ship in compliance with the requirements of regulation XI-1/3 of SOLAS-74/2004 (for all passenger ships of 100 gross tonnage and above and for all cargo ships of 300 gross tonnage and above) (*);
- .6** list of equivalents of structures, materials and products with justification of their application (refer to 1.3.4.1, General Regulations for the Classification and Other Activity), if any (**);
- .7** engineering analysis of alternative design and arrangements (refer to 3.1.5), if any (**);
- .8** report on qualitative failure analysis for propulsion and steering in compliance with Section 12, Part VII "Machinery Installations" (for passenger ships) (**);
- .9** engineering analysis of the capability of a ship to return to port in case of an accident in compliance with 2.2.6 and 2.2.7, Part VI "Fire Protection", considering interpretations of IMO circular MSC.1/Circ.1369 (for passenger ships having length of 120 m and above or having three or more main vertical zones) (**);
- .10** list of structural measures and engineering solutions ensuring electrostatic and galvanic intrinsic safety (**).

3.2.3 Hull documentation:

- .1** hull members scantlings determination, as well as analysis of the overall longitudinal strength and buckling stability of members for all specified loading

conditions of a ship, including the loading and carriage of bulk cargoes other than grain (**);

.2 midship section plan and the typical transverse sections with indication of spacing between the main longitudinal and transverse members, main particulars of the ship and their ratios, class notation of a ship and values of design still water bending moments¹ (*);

.3 constructional profile with indication of frame spacing, boundaries of the portions of a ship length, position of the watertight bulkheads, pillars, arrangement of superstructures and deckhouses¹ (*);

.4 deck and platform plans with indication of design loads (including the loads induced by lift trucks and containers), positions and dimensions of openings, their strengthening, end structures of the side coamings¹ (*);

.5 double bottom (single bottom) plan. The plan shall contain:

sea chest sections with indication of pressure in the blowing system;

table of pressure heads;

boundaries of watertight compartments;

dimensions and position of manholes and other openings.

For bulk carriers and ore carriers an allowable load on the inner bottom plating shall be indicated¹ (*);

.6 shell expansion with indication of the ship hull boundaries, positions and dimensions of openings in shell plating, and for ships strengthened for navigation in ice also the upper and lower edges of the ice belt and corresponding forward and aft draughts (with due regard to trim), arrangement of intermediate frames. Shell expansion for glass reinforced ships shall be submitted if the outer shell plating has different thickness¹ (*);

.7 drawings of longitudinal and transverse bulkheads, including tank wash bulkheads (for tanks the heights of overflow and air pipes shall be indicated)¹ (*);

.8 drawing of the after end framing and sternframe¹ (*);

.9 drawing of the fore end framing and stem¹ (*);

.10 drawings of propeller brackets and bossings, as well as fixed nozzles¹ (*);

.11 drawings of seatings for the main machinery, boilers and shaft bearings, including bottom construction with indication of type and power of the machinery, as well as with indication that seatings comply with the requirements of the supplier's technical documentation on the main machinery and boilers or that no special requirements are placed by the supplier on the seatings¹ (*);

.12 drawings of seatings for auxiliary machinery, equipment and gears according to 2.11, Part II «Hull»¹ (*);

.13 drawings of engine and boiler casings, coamings, companions and other guards of openings in the ship's hull¹ (*);

.14 drawing of superstructures and deckhouses¹ (*);

.15 bulwark drawings¹ (*);

.16 strength calculations of seatings for mooring and towing appliances (**);

.17 drawings of seatings for mooring and towing appliances¹ (*);

.18 plan of weld control and table of hull welding (*), containing the following information:

.18.1 name and thickness of structural components to be joined;

.18.2 shape or symbol of edge preparation;

.18.3 brands and grades of base metal;

.18.4 brands and grades of welding consumables;

.18.5 method of welding and position of joint in space²;

.19 plan of testing the hull for watertightness³ (*);

.20 hull structural details (*);

.21 drawings of penetrations of piping, ventilation ducts, cable ducts, etc. through the bulkheads, decks, inner bottom, watertight floors and web members (*);

.22 specifications of protective coatings according to 6.5, Part XIII "Materials" (*);

.23 basic parameters of the hull protection by damping from damages when mooring (for ships to be moored at sea to other ships) (**);

.24 detailed description of the hull constructing process, containing the information on the materials, methods of forming the structural items, necessary conditions required during hull construction, as well as analysis of the structural strength both local and general (only for ships constructed of glass-reinforced plastic) (**);

.25 loading manual for ships of 65 m and over in length (refer to 1.4.9, Part II "Hull") (*).

3.2.4 Documentation on arrangements, equipment and outfit:

.1 arrangement plans, drawings of essential assemblies and parts of closing appliances of openings in hull, superstructures, deckhouses and subdivision bulkheads, including data on coamings height and type of closing appliances (*);

.2 calculations of bow, side and stern closing appliances in a ship's hull (**);

.3 arrangement plans of machinery and actuators of rudder and steering gear with indication of essential parts and assemblies (*);

¹All constructional drawings mentioned here shall indicate the scantlings of the hull members, their material (with indication of grades according to Part XIII "Materials"), as well as typical sections and details, types and dimensions of fillet welds.

²If the information indicated in 3.2.3.18.1 to 3.2.3.18.5 is stated to the full in the drawings of a ship's hull, then submission of the table of welding is not required.

³It can be merged with plan of subdivision according to 3.2.6.3.

.4 strength calculation of essential parts and assemblies of rudder and steering gear (**);

.5 calculation of efficiency of rudder and steering gear (**);

.6 arrangement plan with essential parts and assemblies of hatchways of dry cargo holds (*);

.7 strength calculations of hatchways of dry cargo holds (**);

.8 calculations of anchor, mooring and towing arrangements (**);

.9 arrangement plans with essential parts and assemblies of anchor, mooring and towing arrangements (*);

.10 calculations of signal masts and rigging (**);

.11 drawings of signal masts and rigging (*);

.12 arrangement plans with essential parts and assemblies of guard rails (*);

.13 calculations of essential parts and assemblies of guide members for containers in cargo holds (**);

.14 arrangement plans of essential parts and assemblies of guide members for containers in cargo holds (*);

.15 plans of arrangement and fastening of ladders with essential parts and assemblies (including accommodation and pilot ladders, and gangways) (*);

.16 arrangement plan with essential parts and assemblies of catwalk on oil tankers (*);

.17 plan of escape routes¹ (*);

.18 arrangement plans with essential parts and assemblies of means of access for inspections of spaces in cargo area and other spaces on oil tankers and bulk carriers (*);

.19 means of access manual (for oil tankers and bulk carriers) (*);

.20 calculation of hoisting gear of shipborne barges (**);

.21 general view of hoisting gear of shipborne barges (*);

.22 list of emergency outfit (**).

3.2.5 Documentation on stability and manoeuvrability:

.1 lines drawing, coordinate tables of lines (**);

.2 hydrostatic curves (**);

.3 curves of areas and static moments of hull cross sections (**);

.4 calculations and curves of arms of form stability (cross-curves) with schemes of the relevant hull volumes (**);

.5 summary table of displacements, positions of centre of gravity, trim and initial stability for various loading conditions (**);

.6 calculations relating to verification of a ship's stability according to the Rules; mass tables for

various loading conditions with indication of distribution of cargoes, fuel oil, fresh water and liquid ballast in tanks; calculations of roll amplitude and weather criterion; diagrams of windage area of a ship and calculations of heeling moments;

calculations of heel caused by crowding of passengers and by turning; calculations of icing, angles of flooding, corrections for free surface effect of liquid cargoes and stores, etc. (**);

.7 summary table of the results of stability verification according to the Rules and curves of static or dynamic stability (**);

.8 stability calculations for the case of loading and stowage of bulk cargoes other than grain (**);

.9 freeboard plan (**), containing:

information about maximum draught of the ship; general arrangement plan of openings and closing appliances, which contribute to the watertight integrity of the ship external boundaries (external doors, cargo hatches, service hatches; bow, stern and side doors and ramps; scuttles and windows, freeing ports and scuppers, bottom and side valves of sea water systems, sewage system etc.; air pipes and ventilation heads, closures of ventilation ducts, engine room skylights, etc.);

arrangement plan of means for protection of the crew (bulwark, guard rails, gangways, passageways, etc.).

3.2.6 Documentation on subdivision:

.1 calculations on probability estimation of subdivision (if required) (**);

.2 calculations of damage trim and stability, including static stability curves (**);

.3 plan of subdivision showing all watertight structures and openings with indication of types of closing appliances, as well as arrangements used for equalizing heel and trim of a damaged ship (**);

.4 cross-curves of stability (for a damaged ship) if necessary for the adopted method of damage stability calculation (**);

.5 calculations of sectional areas of cross-flooding fittings and of uprighting time of a ship (**);

.6 corner point coordinate table for compartments and tanks (**);

.7 arrangement plan of the flooding detection sensors of water ingress into compartments of passenger ships, bulk carriers or single-hold cargo ships below 100 m in length, as specified in Part V "Subdivision". The arrangement plan, as a minimum, shall include the following:

technical description of the flooding detection system equipment (**);

Type Approval Certificate for the flooding detection system (*);

¹If all necessary information concerning escape routes is stated in the general arrangement plan, plan of escape routes is not required.

single-line diagrams of the flooding detection system with indication of equipment location in the ship general arrangement plan (*);

documents with indication of location, fastening, protection and test procedures for the flooding detection system equipment (*);

description of procedures necessary to be performed in case of the flooding detection system failure (**);

requirements for the flooding detection system equipment maintenance (**).

3.2.7 Documentation on fire protection:

.1 documents on structural fire protection:

.1.1 arrangement plan of fire-protective divisions, including doors and penetrations (cutouts) in these structures with indication of categories of these spaces in compliance with 2.2.1.3, 2.2.1.5, 2.3.3 or 2.4.2, Part VI "Fire Protection" (*);

.1.2 schemes or description of insulation, lining, finishing, deck covering and other finishing materials (*);

.1.3 calculations required by 2.1.1.4 and 2.1.1.10, Part VI "Fire Protection" (**);

.2 diagrams of fire extinguishing systems and smoke detection system by air sampling with associated calculations and other data, which confirm the fulfillment of the requirements of Part VI "Fire Protection" (*);

.3 list of fire-fighting outfit (**);

.4 structural drawings of assemblies and parts of fire-protective divisions (*);

.5 structural drawings of insulation, lining and deck covering (*);

.6 arrangement plan of fire-fighting outfit (*);

.7 list of spare parts and tools (**);

.8 preliminary fire plan (**);

.9 calculations of fire extinguishing systems (**);

.10 structural drawings of assemblies and equipment of fire extinguishing systems (*);

.11 diagrams and operational manuals for fire extinguishing systems, which shall be available on board the ship in compliance with the requirements of Part VI "Fire Protection" (**).

Note. When equipment of carbon dioxide smothering systems, aerosol fire extinguishing systems, fixed local application fire extinguishing systems are supplied as complete delivery, appropriate diagrams and calculations as required by 3.2.7.2, 3.2.7.9 and 3.2.7.10 for the mentioned systems may be submitted together with the documentation required by Section 4, Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships;

.12 electrochemical protection scheme in oil tankers (*).

3.2.8 Documentation on machinery and boiler installations:

.1 general arrangement plans of machinery and equipment in the machinery spaces of category A, as well as in the emergency diesel generator spaces (refer to 1.2, Part VII "Machinery Installations") with indication of escape routes (*);

.2 drawings of seating and attachment fittings of the main machinery, shafting bearings and boilers (*);

.3 diagram (*) and description (**) of the remote control for the main machinery complete with information on equipment of remote control stations with control devices, indication and alarm devices, means of communication and other arrangements.

Note. When remote control for the main machinery is supplied as complete delivery with the main engines and/or with steerable propellers, the mentioned diagram and description may be submitted together with the documentation required by Section 12, Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships;

.4 drawings of arrangement and outfitting in fuel oil and lubricating oil tanks (*);

.5 documentation on shafting¹:

.5.1 general view of shafting (**);

.5.2 drawing of sterntube and parts of sterntube arrangement, drawing of casing protecting the area between the sterntube and propeller boss (*);

.5.3 sterntube bearing and sterntube seal lubrication and cooling diagrams (*);

.5.4 drawings of shafts (propeller, intermediate and thrust) (*);

.5.5 drawings of shaft connections and couplings (*);

.5.6 drawings of journal and thrust bearings of shafting and their fastening to the seatings (*);

.5.7 strength calculation of shafts and their fastening parts (**);

.5.8 calculation of the number of shaft bearings, their position and experienced loads (**);

.5.9 calculation of parameters of shafting alignment (**);

.5.10 calculation of fitting of propeller and shafting couplings (**);

.5.11 torsional vibration calculations in conformity with Section 8, Part VII "Machinery Installations". In some cases, calculation of axial and bending vibration of shafting may be required (**).

Note. When controllable pitch propeller is supplied as complete delivery with the propulsion plant, the documentation listed in 3.2.8.5.2 to 3.2.8.5.11 may be submitted together with the documentation required by Section 6, Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships;

¹The documentation shall contain information on treatment and geometry of working surfaces, heat treatment, tolerances on mating parts, hydraulic tests, non-destructive testing, etc.

.5.12 calculation of power of the main machinery for **Ice2** to **Arc9** ice class ships in compliance with the requirements of 2.1, Part VII "Machinery Installations" to the minimum value of power delivered to the propeller shafts of the ships (**);

.6 documentation on propeller^{1,2}:

.6.1 general view of propeller (**);

.6.2 strength calculation of propeller blade, and for detachable blade propellers and controllable pitch propellers (CP-propellers), also calculation of fastening of blades to the boss (**).

Note. The mentioned calculations may be submitted together with the documentation required by Section 7, Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships;

.6.3 drawings of blade, boss and cone, as well as items for their securing (for detachable blade propeller and CP-propeller) (*);

.6.4 drawing of propeller attachment to propeller shaft (*);

.6.5 description of pitch actuating mechanism (PAM) and its control system (**);

.6.6 diagrams of pitch actuating mechanism (PAM) (*);

.6.7 assembly drawing of pitch actuating mechanism (PAM) complete (**);

.6.8 drawings of the PAM main parts, including shaft, hydraulic cylinders, push-pull rods, pistons, slides, oil distribution boxes, lubricating oil supply tube to hydraulic cylinder in hub (*).

Note. The documentation listed in 3.2.8.6.3 to 3.2.8.6.8 may be submitted together with the documentation required by Section 7, Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships;

.7 documentation on active means of the ship's steering (AMSS)^{1,2}:

.7.1 drawings of installation and attachment of AMSS (*);

.7.2 data to confirm compliance of the AMSS construction with operational conditions (**);

.7.3 general view with necessary sections and sealing details (**);

.7.4 calculations of propeller (or impeller of water-jet), shafts, couplings, pinions, gear wheels of steerable propellers, water-jets and thrusters (when CP-propeller is used, refer to 3.2.8.6) (*);

.7.5 drawings of propeller (or impeller of water-jet), shafts, couplings, pinions, gear wheels of steerable propellers, water-jets and thrusters (when CP-propeller is used, refer to 3.2.8.6) (*);

.7.6 strength calculations of the driving shaft of rotor, blade, gearing of vertical-axis propellers (**);

.7.7 drawings of shafts, gearing, rotors, blades and blade turning mechanism of vertical-axis propellers (*);

.7.8 drawings of bearings and seals (*);

.7.9 calculation of connections, drawings of propeller nozzles and tunnel, including information on acceptable clearance between ready-fitted propeller and tunnel (nozzle) (**);

.7.10 hull member drawings and drawings of reversible-steering gear of water-jets (*);

.7.11 diagrams of cooling, lubricating and hydraulic turning systems for steerable propellers (blades of CP-propellers), as well as particulars of piping of the above mentioned systems (*);

.7.12 calculations of electric drives for electrically driven AMSS (**);

.7.13 diagrams of electric drives for electrically driven AMSS (*);

.7.14 documentation on monitoring, control, and protection systems (*);

.7.15 torsional vibration calculations (for main AMSS and dynamic positioning systems) and service life calculation of rolling bearings (**).

Moreover, the Register may require presentation of rotational and calculations of pendular vibration for steerable propellers if used as main AMSS (**);

.7.16 AMSS specification, containing its principal characteristics, as well as material specifications for principal parts and assemblies (**);

.7.17 prototype and pilot specimen test programme (*);

.7.18 description, service and maintenance manual (**).

Note. The documentation listed in 3.2.8.7.3 to 3.2.8.7.18 may be submitted together with the documentation required by Section 7, Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships;

.8 documentation on refrigerating plants (refer to 4.3).

3.2.9 Documentation on automation equipment:

.1 technical description of automation systems and devices with indication of their purpose and principle of operation (**);

.2 functional diagrams of alarm and monitoring systems (AMS), centralized monitoring systems, computer-based and integrated control systems and AMS, including diagrams of power supply (*);

.3 list of controlled parameters with indication of types of devices (*);

.4 technical documentation on remote automated control for main engines and CP-propellers: func-

¹The documentation shall contain information on treatment and geometry of working surfaces, heat treatment, tolerances on mating parts, hydraulic tests, non-destructive testing, etc.

²For propellers not covered by the requirements of the Rules, the drawing list shall be agreed with the Register in each particular case.

tional diagrams, front panels of the remote automated control deck with indication of all devices, diagram of power supply to remote automated control, diagrams of protection, alarm and indication of parameters of the main engines and CP-propellers (*);

.5 functional diagrams of automation systems for main engines (cooling, lubricating oil, fuel oil preparation systems, etc.) (*);

.6 technical documentation on automation of auxiliary engines and electric generating plant: functional diagrams, front panels of control desks for electric generating plant with indication of all devices, diagram of power supply, protection, alarm and indication of parameters of auxiliary engines and electric generators (*);

.7 technical documentation on automation of boiler installation: functional diagrams, front panels of control desks with indication of all devices, diagrams of power supply, protection, alarm and indication of parameters (*);

.8 functional diagrams of automation of starting air compressors, including diagrams of protection, alarm and indication (*);

.9 functional diagrams of automation and remote control of bilge and ballast systems, diagrams of power supply, alarm and indication (*);

.10 functional diagrams of remote level sounding in tanks (*);

.11 diagrams of electric connections (for systems and equipment specified in 3.2.9.2, 3.2.9.4 to 3.2.9.10) with indication of cable types and places of installation of all elements of the diagrams (*);

.12 drawings of front panels of desks and boards of control and alarm systems at the ship's control station and on the navigation bridge with indication of all devices (*);

.13 general arrangement plans of automation equipment at the ship's control station and on the navigation bridge (*);

.14 failure mode and effects analysis (FMEA) for dynamic positioning systems on the ships having distinguishing marks **DYNPOS-2**, **DYNPOS-3** in the class notation (**);

.15 mounting and structural drawings of automation systems and devices, sensors, alarm devices, instruments, as well as of switchboards and desks of control and monitoring (*);

.16 technical background for justification containing substantiation of distinguishing automation mark in class notation of the ship (**).

Note. The documentation listed in 3.2.9.4 to 3.2.9.8, 3.2.9.14 and 3.2.9.15 may be submitted together with the documentation required by Section 12, Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

3.2.10 Documentation on systems and piping:

.1 documentation on ship's systems:

.1.1 bilge system diagram (*);

.1.2 ballast system diagram (*);

.1.3 heeling and trimming system diagrams, as well as diagrams of devices (automatic and manually controlled) for ship trimming by cross-flooding (*);

.1.4 air, overflow and sounding pipes diagrams (*);

.1.5 diagrams of ventilation and air conditioning systems of accommodation, service, cargo, machinery and production spaces with indication of watertight bulkheads and fire-proof divisions, arrangement of fire dampers, as well as indication of closures of ventilation ducts and openings (*);

.1.6 diagrams of sewage and waste water systems, as well as scuppers with indication of watertight bulkheads, freeboard deck and distances from waterline or freeboard deck to the relevant openings, as stated in 4.3.2.4 and 4.3.2.6, Part VIII "Systems and Piping" (*);

.1.7 diagrams of heating and blowing systems of sea chests, heating system of side fittings, heating system for liquids in tanks, steaming system for tanks (*);

.1.8 diagram of the compressed air system for typhoons, for blowing the sea chests (*);

.1.9 diagrams of hydraulic systems for drives of mechanisms and arrangements (*);

.1.10 diagrams of special systems for oil tankers and combination carriers (*);

.1.11 calculations of the systems: bilge, ballast, vapour emission control; ventilation of battery rooms, cargo pump rooms, enclosed spaces and holds intended for the carriage of motor vehicles (**);

.1.12 diagram of thermal liquid system (*);

.2 documentation on machinery installation systems:

.2.1 diagrams of live and exhaust steam systems (*);

.2.2 diagrams of blowing-off systems for boilers, machinery and steam piping (*);

.2.3 diagram of condensate and feed water system (*);

.2.4 diagram of fuel oil system (*);

.2.5 diagram of lubricating oil system (*);

.2.6 diagrams of fresh and sea water cooling systems (*);

.2.7 diagram of starting air system (*);

.2.8 diagram of exhaust gas pipes and uptakes (*);

.2.9 drawing of sea chests and ice chests equipment (*);

.2.10 calculation of starting air system (**);

.2.11 calculation of fuel oil service tank capacity of emergency diesel-generator (**);

.2.12 drawings of silencers and spark arresters of exhaust gas pipes and uptakes (*) (may be submitted together with the documentation required by Section 8,

Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships;

.2.13 drawings of position and details of attachment of bottom and side valves and valves at the collision bulkhead (*);

.2.14 drawings of air pipes and ventilators on open deck spaces (*);

.2.15 drawings of leading the pipes and vent ducts through the watertight bulkheads, fire proof divisions, decks and platforms (may be combined with drawings required by 3.2.3.18) (*);

.3 data on pipe dimensions (diameter and wall thickness), on piping construction (materials, insulation, manufacturing methods, installation, arrangement, hydraulic tests, etc.) as well as data on material of applicable pipes, material of gaskets and types of pipe connections shall be contained in documentation listed in 3.2.10.1 and 3.2.10.2.

3.2.11 Documentation on electrical equipment:

.1 diagrams of power generation and distribution from the main and emergency sources of electrical power: ship's mains, lighting (up to section switchboards) and navigation lights (*);

.2 diagrams and general view of the main and emergency switchboards, control desks and other switchboards of non-standard design (*);

.3 calculation results of necessary output of the ship's electric power plant providing for the operating conditions specified in 3.1.5, Part XI "Electrical Equipment", substantiation of the choice of the number and power output of generators, as well as calculation of capacity of emergency sources of electrical power (**);

.4 calculation results of cross-sections of cables with indication of their types, currents and protection (**);

.5 detailed diagrams of the main current, excitation, control, pilot, signalling, protection and interlocking of the electric propulsion plant (*);

.6 calculation results of necessary power output of the propulsion generators to ensure normal operation under all operating conditions (**);

.7 calculation results of short-circuit currents and analysis of selective properties of protection equipment for total rated current of generators working in parallel in excess of 1000 A (**);

.8 calculation results of illumination intensity for areas and spaces (**);

.9 diagrams of internal communication and signaling according to Section 7, Part XI "Electrical Equipment" (*);

.10 diagrams of essential electric drives (according to 1.3.2.1 and 1.3.2.2, Part XI "Electrical Equipment"). (*);

.11 diagrams of lubrication systems for electric machines and air cooling systems for the main electric machines (*);

.12 diagrams of the protective and lightning protection earthing (*);

.13 diagram of cable runs with indication of spaces which they pierce, including information on power supply cables for services required for operation under fire conditions in case of their transit routing through high fire risk spaces (refer to 16.8.1.9 and 16.8.1.11, Part XI "Electrical Equipment") (*);

.14 capacity calculation results for accumulator batteries of emergency lighting, navigation lights, general alarm system, fire alarm system and fire smothering appliances starting devices of the emergency diesel-generator set (**);

.15 results of preliminary calculations of factors accounting for voltage anharmonicity in different parts of the ship's mains when using power semiconductor units (**);

.16 calculation of expected efficiency of overload protection of generator sets by means of disconnection of the part of consumers with explanations of the number of disconnection steps and the list of disconnected consumers in every step (**);

.17 diagram and drawing of disconnection and blocking system of electrical equipment, which is not used in the oil recovery ship operations on elimination of oil spillage (*);

.18 instruction on preparation and application of electrical equipment of oil recovery ship for elimination by it of oil spillage determining procedure of compulsory disconnection and blocking of electrical consumers without Certificates on Safe Type Electrical Equipment (**);

.19 list of electrical equipment installed in dangerous zones, containing information on spaces and areas where it is installed with indication of zones according to 19.2.3.1, Part XI "Electrical Equipment", and information on this equipment with indication of type of protection (**);

.20 documentation on fixed and portable devices for measuring and signalling of explosive concentrations of gases (*);

.21 calculation of voltage drop when a consumer with the maximum starting power is switched on (**);

.22 list of measures to be taken to ensure the electromagnetic compatibility of a ship equipment (**);

.23 failure mode and effects analysis (FMEA) for all electric and hydraulic components of the podded drive used as the rudder and steering gear (may be submitted together with the documentation required by Section 7, Part IV "Technical Supervision during Manufacture of Products" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships) (**);

.24 diagrams of electric connections (for systems and equipment specified in 3.2.11.1, 3.2.11.2, 3.2.11.5, 3.2.11.9, 3.2.11.10, 4.3.1.1.12) with indication of cable types and places of installation of all elements of the diagrams (*);

.25 drawings of cable runs and their penetrations through watertight, gastight and fire-proof divisions with indication of measures taken to suppress radio interferences (*);

.26 diagrams of the main and emergency lighting in the spaces and places of arrangement of essential appliances, escape routes, survival craft embarkation stations on the deck and outboard (supplying from section switchboards) (*);

.27 drawings of arrangement and installation of essential electrical equipment (*);

.28 assembly drawings (only for non-standard products) of the main and emergency switchboards, electric propulsion plant boards, control stations and desks, special boards, power and lighting switchboards (*);

.29 diagrams and installation drawings of devices for measuring non-electric values (level, pressure, temperature indicators, etc.) (*);

.30 technical background containing substantiation of distinguishing mark **EPP** (if applicable) in class notation (**);

.31 shipyard/industry standards on wiring works confirming compliance with the requirements of the Register rules (**);

.32 where refrigerating plants shall be classified, documentation stated in 3.2.11.1 to 3.2.11.31 shall contain the data concerning electrical equipment of refrigerating plant.

3.3 PROGRAMMES OF MOORING AND SEA TRIALS (*)

3.3.1 Programmes of mooring and sea trials shall be approved by the Register prior to commencement of the relevant trials.

3.3.2 The scope of mooring and sea trials shall comply with the relevant requirements of Part V "Technical Supervision during Construction of Ships" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

4 CLASSIFICATION OF REFRIGERATING PLANTS

4.1 GENERAL

4.1.1 For ensuring safety of a ship and preventing ozone-destructive effect of refrigerants on environment the refrigerating plants installed in ships classed with the Register are subject to surveys in the following cases:

.1 refrigerating plants working with Group II refrigerants in accordance with Table 2.2.1, Part XII "Refrigerating Plants";

.2 refrigerating plants working with Group I refrigerants and comprising the compressors with theoretical suction capacity 125 m³/h and above;

.3 refrigerating plant ensures the functioning of systems affecting the ship safety.

4.1.2 From the number of the refrigerating plants stated in 4.1.1 the Register assigns a class to:

.1 refrigerating plants intended for developing and maintaining the required temperatures in refrigerated cargo spaces of transport ships, as well as in thermal containers to provide proper carriage of goods;

.2 refrigerating plants intended for developing and maintaining the required temperatures in refrigerated cargo spaces, for cold-treatment of sea products (cooling, freezing) and supplying the cold necessary for operation of process plants in fishing ships and other ships used for processing of the biological resources of sea;

.3 refrigerating plants intended to maintain the required conditions for transportation of liquefied gas in bulk in gas carriers.

Other refrigerating plants from the number of those stated in 4.1.1 subject to the Register supervision are considered unclassified.

4.2 CLASS OF A REFRIGERATING PLANT

4.2.1 General.

4.2.1.1 The Register may assign a class to a refrigerating plant after the ship's construction, as well as assign, or renew a class of a refrigerating plant installed in a ship in service.

4.2.1.2 Assignment or renewal of a class means that the refrigerating plant fully or to a degree considered acceptable by the Register complies with the requirements of the relevant Rules. The fact of a class being assigned or renewed indicates that the refrigerating plant complies either fully or to a degree deemed acceptable by the Register, with the require-

ments of the relevant Rules and is taken under the Register supervision, and that the technical condition of the plant is in accordance with the provisions of design specifications included in the Classification Certificate for Refrigerating Plant.

4.2.1.3 Assignment or renewal of a class shall be confirmed by the issue of a Classification Certificate for Refrigerating Plant after the appropriate survey carried out.

4.2.2 Class notation of a refrigerating plant.

4.2.2.1 The character of classification of a refrigerating plant consists of the following marks:

REF⊗ — for a refrigerating plant built according to the Rules and surveyed by the Register;

REF★ — for a refrigerating plant built according to the Rules of a classification body recognized by the Register, surveyed by that classification body and then classed by the Register;

(REF)★ — for a refrigerating plant built without being surveyed by a classification body recognized by the Register or without being surveyed by a classification body at all, but subsequently classed with the Register;

REF★ — for a refrigerating plant built according to the Rules of an IACS Member Society, surveyed by that Society during construction and subsequently classed by the Register, if the refrigerating plant does not fully comply with the requirements of Part XII "Refrigerating Plants".

4.2.2.2 Mark of a capability to cargo refrigeration.

If the refrigerating plant has a capacity sufficient to refrigeration of a non-precooled cargo on shipboard during a period of time that provides preservation of that cargo, a distinguishing mark **PRECOOLING** shall be added to the character of classification.

In such a case a note specifying the conditions of cargo cooling on shipboard shall be entered into the Classification Certificate for Refrigerating Plant and in the Register of Ships.

4.2.2.3 Mark of capability for cooling or freezing sea products.

The distinguishing mark **QUICK FREEZING** is added to the character of classification if the plant is intended for cooling or freezing sea products and is in accordance with the relevant requirements specified in Part XII "Refrigerating Plants".

4.2.2.4 Distinguishing marks of refrigerating plants.

4.2.2.4.1 If a refrigerating plant is intended for cooling of cargo transported in thermal containers and complies with applicable requirements of

Part XII "Refrigerating Plants" the distinguishing mark **CONTAINERS** is added to the character of classification of the plant.

4.2.2.4.2 If, in addition to a refrigerating plant, a ship is equipped with atmosphere control system in refrigerated spaces and/or thermal containers which complies with applicable requirements of Part XII "Refrigerating Plants" the distinguishing mark **CA** is added to the character of classification of the plant.

4.2.2.4.3 If a refrigerating plant is intended to maintain the required conditions for transportation of liquefied gas in bulk in a gas carrier and complies with applicable requirements of Part XII "Refrigerating Plants" the distinguishing mark **LG** is added to the character of classification of the plant.

4.2.3 Additional characteristics.

4.2.3.1 Additional details of conditions for cooling cargoes on board, specified temperature conditions for transportation of cargoes and other details are indicated in the Classification Certificate for Refrigerating Plant and in the Register of Ships if it is found necessary by the Register to specify the purpose or structural features of the refrigerating plant.

4.2.3.2 Number of thermal containers served by the refrigerating plant is indicated in the Classification Certificate for Refrigerating Plant and in the Register of Ships.

4.2.4 Alteration of marks in class notation.

The Register may delete or alter a mark shown in the class notation in case of any modification or non-compliance with the requirements which served as the basis for the insertion of that mark into the class notation.

4.3 TECHNICAL DOCUMENTATION OF A REFRIGERATING PLANT

4.3.1 Plan approval documentation of a classed refrigerating plant.

4.3.1.1 Prior to commencement of a ship's construction, plan approval documentation with a sufficient scope of information to prove that the requirements of the Register Rules for a refrigerating plant are complied with, shall be submitted to the Register for review:

.1 technical description of a refrigerating plant (**);

.2 cooling capacity calculations with indication of thermal load from each refrigerated cargo space and cold consumer (**);

.3 general arrangement plans of a refrigerating plant on board the ship (*);

.4 circuit diagrams of working and emergency ventilation systems in the refrigerating machinery spaces with indication of the watertight bulkheads

and fire-proof divisions, as well as the number of air changes per hour (*);

.5 circuit diagrams of refrigerant, cooling medium, cooling water systems with indication of places for installation of instruments and automatic devices (*);

.6 air cooling diagram with indication of watertight bulkheads and fire-proof divisions (*);

.7 arrangement plans of equipment in refrigerating machinery spaces with indication of escape routes (*);

.8 arrangement plans of equipment in refrigerated spaces with indication of places for installation of temperature control devices (*);

.9 construction plans of insulation of refrigerated spaces with specification of insulating materials (*);

.10 diagram of water screen system in refrigerating machinery space (for refrigerant of Group II) (*);

.11 general arrangement plans of freezing and cooling arrangements and other refrigerating processing equipment (*);

.12 circuit diagrams of automatic control, protection and alarm systems (*);

.13 list of machinery, vessels and apparatus of refrigerating plant with indication of technical characteristics (**);

.14 list of control devices and measuring instruments, protection and alarm systems with indication of technical characteristics (**);

.15 tables of the values of the bounding surface areas of the refrigerated cargo spaces and holds with data on calculated heat transfer coefficient for each surface (**);

.16 drawings of cargo cooling air ducts in thermoinsulated containers with an indication of the layout on board (*);

.17 drawings of air duct insulation with technical data of insulation materials (*);

.18 drawings of sealing and flexible joints with indication of details on materials (*);

.19 general arrangement plans of atmosphere control installation (*);

.20 list of equipment of the atmosphere control system, including control and automatic devices (**);

.21 drawings of installation and fastening of machinery, vessels and apparatus (*);

.22 arrangement plans of piping of refrigerant, cooling medium and cooling water system with indication of places of their penetration through the bulkheads, decks and platforms (*);

.23 arrangement plan of emergency discharge system of refrigerant outboard (*).

4.3.2 Test program (*).

4.3.2.1 Test program with indication of the method of design thermal load generation (including a calculation of the power of additional heaters to be used) and the method of determining the actual

averaged heat-transfer coefficient for the insulating structure of refrigerated cargo spaces shall be approved by the Register prior to commencement of the relevant tests.

4.3.2.2 The scope of tests shall comply with the relevant requirements of Section 11, Part V "Technical Supervision during Construction of Ships" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

4.3.3 Plan approval documentation of an unclassified refrigerating plant.

4.3.3.1 Prior to commencement of a ship's construction, Plan Approval Documentation listed in 4.3.1.1.3 4.3.1.1.5 (for refrigerant only), 4.3.1.1.7, 4.3.1.1.10, 4.3.1.1.11 (for devices operating under the refrigerant pressure only), 4.3.1.1.12 (for protection and alarm system only), 4.3.1.1.13, 4.3.1.1.14 (for gauges in refrigerant system and protection and alarm devices only), 4.3.1.1.21, 4.3.1.1.22 (for refrigerant only), 4.3.1.1.23.

LIST OF CIRCULAR LETTERS AMENDING/SUPPLEMENTING NORMATIVE DOCUMENT

(Normative document No. and title)

Item No.	Circular letter No., date of approval	List of amended and supplemented paras



RUSSIAN MARITIME REGISTER OF SHIPPING

CIRCULAR LETTER

No. 312-11-926c

dated 08.08.2016

Re:

Introducing the requirements for bunkering ships of liquefied natural gas (LNG) to the Rules for the Classification and Construction of Sea-Going Ships, 2016, ND No. 2-020101-087-E

Item of supervision:

LNG bunkering ships

Implementation from the date of publication

Valid: till -

Validity period extended till -

Cancels / amends / adds circular letter № - dated -

Number of pages: 11

Appendices: Text of the RS requirements for LNG bunkering ships

Director General  Konstantin Palnikov

Amends Rules for the Classification and Construction of Sea-Going Ships, 2016, ND No. 2-020101-087-E

We hereby inform that new RS requirements for gas carriers engaged in transportation of liquefied natural gas (LNG) and intended to ensure the transfer of LNG to ships using LNG as fuel shall be introduced to the Rules for the Classification and Construction of Sea-Going Ships, 2016, ND No. 2-020101-087-E

Text of the requirements is specified in the Appendix.

It is necessary to do the following:

1. Familiarize surveyors of the RS Branch Offices and interested organizations in the area of the RS Branch Offices' activity with the content of the Circular Letter.
2. Apply the above RS requirements in practical activity.

Person in charge: V.F. Piskorsky

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DMS THESIS № 16-187508

RULES OF THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS, 2016, ND NO. 2-020101-087

PART I. CLASSIFICATION

2.2 CLASS NOTATION OF A SHIP

Para 2.2.29 shall be amended to read:

“In compliance with the requirements of Section 11, Part XVII “Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships”, for Gas carriers engaged in transportation of liquefied natural gas (LNG) and intended to ensure the transfer of LNG to ships using LNG as fuel may be assigned an additional descriptive notation **LNG bunkering ship** after the descriptive notation **Gas carrier** to be added to the class notation.

When additional functions related to servicing of ships using LNG as a fuel are available on board the ship and when the ship meets the requirements stated in 11.13 of the abovementioned Part of the Rules, the distinguishing marks: **RE, IG-Supply, BOG** shall be added to the class notation of the ship.”.

PART XVII. DISTINGUISHING MARKS AND DESCRIPTIVE NOTATIONS IN THE CLASS NOTATION SPECIFYING STRUCTURAL AND OPERATIONAL PARTICULARS OF SHIPS

New Section 11 shall be introduced as follows:

«11 REQUIREMENTS TO LNG BUNKERING SHIPS

11.1 GENERAL PROVISIONS AND SCOPE OF APPLICATION

11.1.1 These requirements apply to the gas carriers engaged in transportation of liquefied natural gas (LNG) and intended to ensure the transfer of LNG on board the ships using LNG as a fuel (hereinafter – LNG bunkering ships).

An additional descriptive notation and marks stated in 2.2.29, Part I “Classification” may be added to LNG bunkering ships complying with these requirements.

11.1.2 Descriptive notation and marks in class of notation of LNG bunkering ships.

For gas carrier complying the requirements of this Section, except Chapter 11.13, after the descriptive notation **Gas carrier** the descriptive notation **LNG bunkering ship** may be added to the class notation.

When additional functions related to servicing of ships using LNG as a fuel are available on board the ship and when the ship meets the requirements stated in 11.13, the following distinguishing marks may be added to the descriptive notation:

RE – where the ship is designed to receive LNG from a gas fuelled ship for which the LNG fuel tanks shall be emptied;

IG-Supply – where the ship is designed to supply inert gas and dry air, to ensure gas freeing and aeration in compliance with 6.10.4 of the International Code of Safety for Ships Using Gases or Other Low Flashpoint Fuels (IGF Code)

BOG – where the ship is designed to recover and manage the boil-off gas generated during the bunkering operation.

11.1.3 Definitions.

LNG bunkering station means room or space fitted with the following equipment:
hoses and piping connections used for liquid and vapour return lines, including the isolating valves and the emergency shut-down valves;
automation and alarms systems;
the drip tray with its draining arrangement and other arrangements intended for the ship structure protection;
the gas and LNG leak detection systems;
the associated firefighting installations.

LNG bunkering control room means a safe location with regards to bunkering operations and may be from the cargo control room. At this location, overfilling alarm, automatic and manual shutdown shall be indicated.

Emergency shutdown system (ESD) means a system that safely and effectively stops the transfer of LNG (and vapour as applicable) between the receiving ship and the bunkering ship in the event of an emergency during the bunkering operation, and puts the system in a safe condition.

Bunkering connections mean liquid and vapour connections between ships used for liquid product transfer to receiving ship and product vapour return to the bunker ship (i.e. manifold for a system with flexible hose and before the swivel for a system with transfer arm).

Emergency release coupling (ERC) means a coupling located on the receiving ship bunkering manifold or on the LNG transfer system, which separates at a predetermined section, when required, each separated section containing a self-closing shut-off valve, which seals automatically.

An emergency release coupling can be activated:
by maximal allowable forces applied to the predetermined section
by manual or automatic control, in case of emergency.

Quick connect/disconnect coupler (QCDC) means a manual or hydraulic mechanical device used to connect the LNG transfer system to the receiving ship manifold.

Sloshing means liquid oscillations effect at significant free surface in cargo and fuel tanks.

11.2 TECHNICAL DOCUMENTATION

11.2.1 In addition to technical documentation specified in 3.2, Part I “Classification” of these Rules and 6.1, Part I “Classification” of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk, the following technical documentation shall be submitted:

.1 general arrangement of the ship showing the location of LNG bunkering station and bunkering control station and escape routes;

.2 diagram and description of the cargo system/ Drawings of hose lines, swivels and transfer arms (where applicable);

- .3 diagram and description of LNG vapour return transfer system. Documentation for the reliquefaction system (where applicable). Calculation of maximum bunkering flow and maximum pressure;
- .4 technical documentation for ESD bunkering system;
- .5 single line diagrams for all intrinsically safe circuits;
- .6 electrical equipment in hazardous areas for electrical circuits related to bunker operations;
- .7 technical documentation for fire and gas detection and alarm systems of the bunkering installation, including location of gas detectors, lines, valves and sampling points on board;
- .8 technical documentation for measuring, alarm and pressure monitoring in the cargo spaces and piping;
- .9 technical documentation for control and warning alarm system of cargo pumps.

11.2.2 The following operating documentation shall be submitted:

- .1 risk analysis of LNG bunkering operations, including inerting and gas freeing as per IACS Recommendation No. 142 given in the Supplement to rules and guidelines of Russian Maritime Register of Shipping "IACS Procedural Requirements, Unified Interpretations and Recommendations" (published in electronic format as a separate edition). The analysis shall cover risks of hull members damage and failure of equipment due to the accident related to gas fuel freeing. The results of risk analysis shall be included in the ship's Operating manual;
- .2 operating instructions containing the procedures of bunkering, inerting, vapour return control as per IACS Recommendation No. 142.

11.3 ARRANGEMENT OF LNG BUNKERING SHIP

11.3.1 LNG bunkering ship shall comply with the requirements of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk and the International Code of Safety for Ships Using Gases or Other Low Flashpoint Fuels (IGF Code).

11.3.2 The LNG bunkering station shall be located on the open deck in the area with sufficient natural ventilation. Closed or semi-enclosed bunkering stations will be subject to special consideration. The LNG bunkering station shall be physically separated or structurally shielded from accommodation and control stations.

11.3.3 Bunker manifold area and escape routes shall have safe access for crew engaged in operation. It shall have unrestricted natural ventilation and be sufficiently illuminated.

11.3.4 The bunker connections shall be clearly visible from the navigation bridge and bunker operation control position where continuous watch is kept during the transfer. CCTV can be accepted as substitute for the direct view when it provides unobstructed view of the bunker connections.

11.3.5 Arrangement of work platforms in areas where liquid spill may occur shall exclude liquid spill accumulation at the platform surface. Gratings used in this location shall be suitable for low temperatures and correspond to boiling point of gas bunker. Area under the gratings shall be equipped with spill collecting trays with drainage arrangements suitable for draining the accumulated spill overboard. The drain shall be fitted with a valve.

11.3.6 Drip trays shall be fitted below the liquid bunkering connections and where leakage may occur which can cause damage to the ship structure. Thermal sensors shall be positioned in way of bunkering connections in the drip tray. The drip trays shall be made of stainless steel, and capable of being remotely drained over the ship's side without risk of damage to the ship structure and to the receiving ship.

11.3.7 When bunker boiling point is lower than design temperature of the hull steel, the hull in the manifold area shall be effectively protected from low temperature in case of a major bunker spill. Where water curtain is used for hull protection, the pumps shall be arranged with redundancy.

11.4 HULL AND STABILITY

11.4.1 The hull structure and stability of the LNG bunkering ship shall meet the requirements of Parts II “Gas Carrier Design” and III “Stability, Subdivision, Freeboard” of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk and the following additional requirements:

- .1** Bunkering ship shall be able to abort bunkering operation at any stage in case of emergency. Cargo tanks on bunker ship therefore shall not have restrictions on intermediate filling;
- .2** However, internal transfer between cargo tanks within short period of time to leave dangerous sloshing zone may be accepted upon special considerations.

11.5 FIRE PROTECTION

11.5.1 Structural fire protection of LNG bunkering ship shall meet the requirements of Part V “Fire Protection” of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk and the following additional requirements:

When applicable, the bunkering station shall be separated by class A-60 insulation towards other spaces, except for spaces such as tanks, voids, auxiliary machinery spaces of no fire risk, sanitary and similar spaces where insulation standard may be reduced to class A-0.

11.5.2 Fire extinguishing systems of LNG bunkering ship shall meet the requirements of Part V “Fire Protection” of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases and the following additional requirements:

- .1** The water spray system shall be fitted to protect the bunkering manifold, associated piping installations and the transfer area. The system capacity shall not be less than those stated in 3.3.2 of Part V “Fire Protection” of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk;
- .2** In the bunkering station area a permanently installed dry chemical powder extinguishing system shall cover all possible leak points. The capacity shall be at least 3,5 kg/s for a maximum of 45 s discharges. The system shall be arranged for easy manual release from a safe location outside of the protected area;
- .3** one portable dry powder extinguisher of at least 5 kg capacity shall be located near the bunkering station.

11.5.3 Exhaust gas system shall meet the requirements of Part VI “Systems and Piping” of these Rules, therewith, the outlets of the exhaust gas system of the internal combustion engines and boilers shall be provided with spark arresters.

11.5.4 Use of equipment for cargo vapor thermal oxidation not complying with the requirements of 4.3, Part VI “Systems and Piping” shall be prohibited during the bunkering operations.

11.6 CARGO SYSTEM

11.6.1 The following components shall be obligatory included in the cargo system:

bunkering hoses and/or loading arms;
quick release connection;

emergency release coupling;
electrical insulating joint.

11.6.2 Cargo system and the bunkering fuel transfer procedure shall be so designed .to avoid the release of gas or liquid to the atmosphere both from bunkering and receiving ships during bunkering.

11.6.3 Bunker transfer piping system for products with boiling point below -55°C shall be thermally insulated to minimise heat leaks to transferred gas bunker and protect personnel from direct contact with cold surfaces.

11.6.4 Bunkering hoses.

11.6.4.1 Bunkering hoses shall meet the requirements of 5.11.7 of the IGC Code, applicable requirements of 6.2, Part VI “Systems and Piping” and shall have Type Approval Certificate (CTO). In addition to the above requirements, the requirements given in 11.6.4.2 – 11.6.4.10 shall be complied with during the type testing.

11.6.4.2 All the applicable materials shall be compatible with each other and transported medium (LNG and LNG vapors). The end fittings shall be made of stainless steel and comply with the IGC Code requirements.

11.6.4.3 The following characteristics shall be defined by the designer and submitted to the Society:

- Extreme service temperature
- Maximum working load
- Maximum design pressure
- Minimum bend radius (MBR)
- Maximum allowable applied twist (MAAT).

11.6.4.4 Each hose type shall be subjected to a pressure cycle test at ambient temperature to demonstrate that the hose is capable of withstanding 2 000 pressure cycle test from zero to at least twice the specified maximum working pressure. The hose assembly is also to be subjected to a cryogenic temperature and pressure cycle test with a minimum of 200 combined test cycles. After the cycling test, the crushing test shall be carried out at the pressure at least 5 times exceeding the maximum working pressure at the minimum working pressure.

11.6.4.5 The hose assembly shall be subjected to a bending cycle fatigue test, at ambient and cryogenic temperature, with 400 000 cycles without failure. The fatigue bend radius shall be in accordance with manufacturer’s recommendation.

11.6.4.6 The hose assembly shall be subjected to a crushing test at ambient temperature and cryogenic temperature without damage. The hose assembly shall be held between two rigid plates (an area equivalent to the diameter of the hose) and a force of 1000N shall be applied ten times at the same location in the middle of each flexible hose.

11.6.4.7 The hose assembly shall be subjected to a tensile test at ambient and cryogenic temperature to ensure that the hose is capable of withstanding the maximum working load.

11.6.4.8 Each hose type shall be subjected to a bending test at ambient and cryogenic temperature to ensure that the hose is capable of withstanding the maximum working pressure at minimum working bend radius (MBR). Hose should be gradually bent to the MBR and then pressurized to the maximum working pressure. Hose shall be examined for leaks whilst being held for 15 min at MBR and no damage should be evident on return pre-test conditions.

11.6.4.9 Each hose type shall be subjected to a tensile test at ambient and cryogenic temperature to ensure that the hose is capable of withstanding the maximum working load. The hose assembly shall be subjected to a ambient and cryogenic twist test to ensure that the hose is capable of withstanding its maximum working load whilst at MAAT. The hose assembly shall

be gradually twisted to the MAAT and then pressurized to the maximum working pressure. The hose shall be examined for leaks whilst being held for 15 min at MAAT and no damage should be evident on return pre-test conditions.

11.6.4.10 The hose assembly shall be subjected to an electrical test. The hose assembly shall be drained and supported above ground by non-conductive means and the resistance measured between the two end fittings (connection face). Electrically continuous hoses shall have a resistance of less than 10 Ohm. Electrically discontinuous hoses shall have a resistance of not less than 25 kilohm.

11.6.5 Quick connect disconnect coupler (QCDC).

11.6.5.1 QCDC shall be type approved by the Society. The QCDC shall be subjected to a hydraulic pressure test, at ambient temperature, to a pressure not less than 1,5 times the design pressure, to demonstrate that the QCDC is capable of withstanding its pressure without leaking.

11.6.5.2 Controls of quick connect disconnect couplers (QCDC) shall be fitted with mechanical interlocking device to prevent unintended operation. In case of supply failure the quick connect disconnect couplers (QCDC) shall not change the position (shall remain in as-is position).

11.6.6 Emergency release coupling (ERC).

11.6.6.1 Emergency release coupling (ERC) or break-away coupling shall be provided in the bunkering line. Adequacy shall be observed regarding the compatibility with hoses and the maximum axial and shear forces likely to be exerted on the break-away or the ERC during the bunkering operations. Alternatively the manifold area may be suitably reinforced. Details of the manifold loads shall be submitted to the society for information. Emergency release coupling (ERC) or break-away coupling shall have Type Approval Certificate.

11.6.6.2 Emergency release couplings (ERC) used in bunker connection shall be of "dry-break" type and be capable to self-disconnect upon application of force at any direction of ship's relative motion which exceeds design loads and at pressure surge exceeding the coupling design pressure. ERC fitted in lines for transfer of gas fuel shall be capable to break-away through the ice accumulated on the coupling during the transfer.

11.6.7 Emergency release system.

Each emergency release system shall be air tested. In this case the resistance shall be at least 10 kiloOhm. Resistance of each insulating flange shall be at least 1000 Ohm, but shall not exceed 1000 kiloOhm.

11.6.8 Cargo swivel.

11.6.8 Cargo swivel having Type Approval Certificate shall be provided in the bunkering line. Swivels shall be subject to static hydraulic pressure tests at the maximum working pressure. During the dynamic tests, at least two complete rotations in each direction shall be performed at normal conditions and minimum working temperature.

11.6.9 The bunkering line shall be suitably supported in such a way that to prevent the hose abrasion and to observe that the allowable bending radius is satisfied.

11.6.10 The QCDC shall be subjected in assembly to a hydraulic pressure test, at ambient temperature, to a pressure not less than 1,5 times the design pressure, to demonstrate that the QCDC is capable of withstanding its pressure without leaking.

11.6.11 All welds of cargo system and hose line items shall be made by full penetration welding with 100% inspection of welds by non-destructive examination.

11.6.12 The LNG velocity in the piping system shall not exceed 10m/s in order to avoid the generation of static electricity and to limit the heat transfer due to friction inside the pipes.

The maximum LNG transfer rate shall be justified, taking into consideration:

- The management of the BOG generated during bunkering operation;
- The temperature of the LNG supplied to the ship;
- Characteristics of the receiving tank;
- The maximum flow permitted by the ERC;
- The maximum flow permitted by the hose;
- The maximum flow permitted by the QCDC.

11.7 INERT GAS SYSTEM

11.7.1 Prior to the bunkering operations, the possibility shall be provided for tightness test of connections between the bunkering and receiving ships. The procedure thereof shall be specified in the ship's operating manual.

11.7.2 The relevant measures and procedures shall be provided for inerting the hose lines prior to filling them with bunkering fuel or LNG vapors, as well as inert-gas pressurization of bunkering fuel or LNG vapors upon completion of cargo operations prior to disconnection. The cargo residuals shall be leading back to the cargo tanks.

11.8 GAS DETECTION SYSTEM

11.8.1 Installed onboard gas detection system shall be capable to measure gas concentration in the manifold connections area in addition to arrangements described in Section 6, Part VIII "Instrumentation and Automation System" of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk and have arrangement to provide a remote gas detection point for receiving ship.

11.8.2 Gas detecting equipment at the manifold connection shall provide continuous monitoring and activate alarm when concentration of hydrocarbons reaches 30% of lower flammable limit (LFL).

11.8.3 Audible and visible alarm from the permanently installed gas detection equipment shall be located on the navigation bridge, in the bunkering operation control position and at the gas detector readout location.

11.9 ELECTRICAL EQUIPMENT

The requirements of this Chapter cover the electrical equipment of LNG bunkering ships and supplement the requirements of Part XI "Electrical Equipment" of these Rules and Part VII "Electrical Equipment" of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk.

11.9.1 The following systems of generation and distribution of electric energy are acceptable:

.1 direct current:

.1.1 two-wire insulated;

.2 alternating current переменного тока:

.2.1 single-phase, two-wire insulated;

.2.2 three-phase, three-wire insulated;

.2.3 three-phase, four-wire insulated.

11.9.1.3 In insulated distribution systems, no current carrying part is to be earthed, other than:

.1 through an insulation level monitoring device

.2 through components used for the suppression of interference.

11.9.2 Earthed systems with hull return.

11.9.2.1 Earthed systems with hull return are not permitted, with the following exceptions to the satisfaction of the Society:

- .1 impressed current cathodic protective systems;
- .2 limited and locally earthed systems, such as starting and ignition systems of internal combustion engines, provided that any possible resulting current does not flow directly through any hazardous area;
- .3 insulation level monitoring devices, provided that the circulation current of the device does not exceed 30 mA under the most unfavourable conditions.
- .4 earthed intrinsically safe circuits;
- .5 power supplies, control circuits and instrumentation circuits in non-hazardous areas where technical or safety reasons preclude the use of a system with no connection to earth, provided the current in the hull is limited to not more than 5 A in both normal and fault conditions;
- .6 limited and locally earthed systems, such as power distribution systems in galleys and laundries to be fed through isolating transformers with the secondary windings earthed, provided that any possible resulting hull current does not flow directly through any hazardous area.

11.9.3 Контроль сопротивления изоляции цепей во взрывоопасных зонах.

11.9.3.1 The devices intended to continuously monitor the insulation level of all distribution systems are also to monitor all circuits, other than intrinsically safe circuits, connected to apparatus in hazardous areas or passing through such areas.

11.9.3.2 An audible and visual alarm shall be given, at a manned position, in the event of an abnormally low level of insulation.

11.10 EMERGENCY SHUT-DOWN SYSTEM (ESD)

11.10.1 The requirements of Part VIII "Instrumentation and Automation System" of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk are applicable to emergency shut-down systems (ESD). Any activation of the ESD systems shall be implemented simultaneously on both bunkering facility and receiving ship.

11.10.2 Pendant with means of control for local manual activation position for the ESD system shall be provided on board the receiving ship. When a bunkering ship may connect on board ESD system to those of the receiving ship, no remote panel is required.

11.10.3 The ESD function shall be initiated in following circumstances:

- .1 automatically, if the distance of connection on receiving ship from the connection on bunker ship exceeds safe operational envelope for transfer arrangement
- .2 by activating manual ESD button on ESD pendant
- .3 automatically at ERS activation.

11.10.4 Opening of main transfer valves shall not be possible unless ERS is re-assembled.

11.11 TRANSFER CONTROL SYSTEM

11.11.1 The transfer control system shall have provisions of automatic control of flow rate and limiting pressure in the transfer system. Parameters of the control system critical for the safe transfer shall have adjustable settings.

11.11.2 Deviations from set values mentioned in 11.11.1 shall activate audible and visual alarms at the bunker operations control position and on the navigation bridge.

11.11.3 The transfer control system for liquid shall automatically reduce the liquid transfer rate when set values for pressure in the vapour return/vapour recovery system is exceeded.

11.11.4 If the transfer rate exceeds a maximum value, alarm and automatic stop of transfer shall be activated and manifold valves closed.

11.11.5 The receiving ship shall have possibility to control transfer flow rate by means of a ship-to-ship link, e.g. flexible cable and pendant with means of control.

11.11.6 Alarms and safety actions required for the transfer system are given in Table 11.11.6.

Table 11.11.6

Alarms and safety actions required for the LNG transfer system

Parameters	Alarm	Activation of the ESD systems	Automatic activation of the emergency release coupling
Low pressure in the supply tank	X	X	
Sudden pressure drop at the transfer pump discharge	X	X	
High level in the receiving tank	X	X	
High pressure in the receiving tank	X	X	
LNG leak detection or vapour detection (anywhere)	X	X	
Gas detection around the bunkering lines	X	X	
Manual activation of the emergency release coupling	X		
Safe working envelope of the loading arm exceeded	X	X	X
Disconnection of the ERC	X	X	

11.12 COMMUNICATION SYSTEMS

11.12.1 A communication system with back-up shall be provided between the bunkering ship and the receiving ship.

11.12.2 Communications shall be maintained between the bunkering ship and the receiving ship at all times during the bunkering operation. In the event that communications cannot be maintained, bunkering shall be stopped and not resumed until communications are restored.

11.12.3 The components of the communication system located in hazardous and safety zones shall be of a suitable safe type.

11.13 ADDITIONAL SERVICE FEATURES RELATED TO SHIPS USING LNG AS FUEL

11.13.1 When the additional features related to ships servicing are provided on board the LNG bunkering ship using LNG as fuel and indicated by an additional descriptive notation **RE** in the class notation, the BOG handling system of the LNG bunkering ship shall be sized to handle the extra vapours generated during this operation taking into account the fact that the level in the receiving cargo tanks is increasing.

To confirm the ship compliance with the requirements applicable to ships with the additional descriptive notation **RE** the Bunkering procedure for LNG receiving from a gas fueled ship with the required calculations shall be submitted.

11.13.2 When the additional features related to ships servicing are provided on board the LNG bunkering ship using LNG as fuel and indicated by an additional descriptive notation **IG-Supply** in the class notation, the LNG bunkering ship shall be fitted with supply of inert gas and/or dry

air to ensure gas freeing and aeration of fuel tanks in compliance with 6.10.4 of the IGF Code. The lines used for the inert gas shall be independent from the liquid and vapour lines used for normal operation. To confirm the ship compliance with the requirements applicable to ships with the additional descriptive notation **IG-Supply**, a Diagram of the gas freeing system and Procedure for gas freeing shall be submitted.

11.13.3 When the additional features related to ships servicing are provided on board the LNG bunkering ship using LNG as fuel and indicated by an additional descriptive notation **BOG** in the class notation, the boil-off-gas system (BOG) generated during bunkering shall be provided . The LNG bunkering ship shall be capable of handling all or part of the boil-off gas from receiving ship, in addition to its own boil-off, generated during the LNG bunkering operation without release to the atmosphere. The boil-off gas handling capacity of the bunkering ship shall be indicated and justified by calculations.

Different ways to dispose of the BOG or their combination may be considered:

- liquefaction
 - using gas as fuel in the ship's dual-fuel engine or boilers
 - combustion using gas flaring unit in compliance with 4.3, Part VI "Systems and Piping" of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk.
- To confirm the ship compliance with the requirements applicable to ships with the additional descriptive notation **BOG**, the following documents shall be submitted:

Bunkering procedure for boil-off gas management indicating the operations.

Calculation of the maximum LNG vapour flow rate possible to be generated during the bunkering to be less than the capacity of boil-off gas unit specified in the Bunkering procedure.



RUSSIAN MARITIME REGISTER OF SHIPPING

CIRCULAR LETTER

No. 312-11-931c

dated 05.09.2016

Re:

Introduction of new distinguishing marks and descriptive notations in class notation of a ship

Item of supervision:

Ships under construction and in service

Implementation from the date of publication

Valid: till until re-publication of the Rules for the Classification and Construction of Sea-Going Ships, 2017

Validity period extended till -

Cancels / amends / adds circular letter No - dated

Number of pages: 4

Appendices: Text of additions to the RS Rules

Director General Konstantin Palnikov

Amends Rules for the Classification and Construction of Sea-Going Ships, 2016,
ND No. 2-020101-087-E

We hereby inform that new distinguishing marks and descriptive notations shall be introduced to the Rules for the Classification and Construction of Sea-Going Ships, 2016,
ND No. 2-020101-087-E.

Text of the requirements is given in the Appendix to the Circular Letter.

It is necessary to do the following:

1. Familiarize surveyors of the RS Branch Offices and interested organizations in the area of the RS Branch Offices' activity with the content of the Circular Letter.
2. Apply the above requirements in the RS practical activity.

Person in charge: D.A. Grubov

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"Thesis" System

No.: 222648

RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS, 2016, ND No. 2-020101-087-E

Part I. CLASSIFICATION

2.2 CLASS NOTATION OF A SHIP

The Chapter shall be supplemented by **new paras 2.2.29 – 2.2.35** reading as follows:

“2.2.29 Distinguishing mark for ships fitted with a machinery technical condition monitoring system.

If a ship is fitted with a machinery technical condition monitoring system for machinery installations to comply with Section 11 of Part VII “Machinery Installations”, and on board the Planned Maintenance Scheme for Machinery (PMS) has been implemented/applied according to 2.7, Part II “Survey Schedule and Scope” of the Rules for the Classification Surveys of Ships in Service, the distinguishing mark **PMS** (Planned Maintenance Scheme for Machinery) is added to the character of classification.

2.2.30 Distinguishing mark for ships fitted for possible carriage of the international standard containers.

If a ship without a descriptive notation **Container Ship** in the class notation is fitted for carriage of cargo in international standard containers on deck and/or in appropriate holds, the distinguishing mark **CONT** is added to the character of classification and the container transportation area is specified in parenthesis **(deck) (cargo hold(s) No.)**.

2.2.31 Distinguishing mark for ships fit for the carriage of dangerous goods.

If a ship complies with Section 7 of Part VI “Fire Protection” and was duly surveyed according to 2.1.5, Part III “Survey of Ships in Compliance with International Conventions, Codes and Resolutions” of the Guidelines on Technical Supervision of Ships in Service and is recognized fit for carriage of dangerous goods, the distinguishing mark **DG** is added to the character of classification with the following specified in parenthesis depending on the type of the dangerous goods: **(bulk)** – in bulk, **(pack)** – packaged.

2.2.32 Distinguishing mark for implementation of modified survey of a propeller shaft.

The distinguishing mark for implementation of modified survey of a propeller shaft in compliance with 2.10.2.7, Part II “Survey Schedule and Scope” of the Rules for the Classification Surveys of Ships in Service, the distinguishing mark **TMS** is added to the character of classification.

2.2.33 Distinguishing mark for ships prepared for in-water survey.

For a ship built according to Section 12 of Part XVII “Distinguishing Marks and Descriptive Notations in the Class Notation Specifying Structural and Operational Particulars of Ships” the distinguishing mark **IWS** is added to the character of classification.

2.2.34 Distinguishing mark for alternative method of reducing SO_x emissions.

If on board a ship, as an alternative, the exhaust gas (SO_x) cleaning system of the fuel oil combustion unit approved by RS is fitted, considering IMO resolution MEPC.184(59), the distinguishing mark **SO_x Cleaning** is added to the character of classification.

2.2.35 Distinguishing mark for marine diesel engines fitted with NO_x-reducing devices.

If the marine diesel engines are fitted with NO_x-reducing devices and tested in compliance with IMO resolution MEPC.198(62), as amended by IMO resolution MEPC.260(68), the distinguishing mark **DE+SCR** is added to the character of classification.

Para 2.2.29 shall be renumbered 2.2.36. The list of descriptive notations given in this para shall be supplemented with the following:

Standby vessel
Supply vessel (OS)
Pipe laying vessel
Cable laying vessel
Pipe laying barge
Cable laying barge.

“Other than supply vessel (OS)” shall be added to the existing definition of a descriptive notation **Supply vessel**.

Para 2.2.30 shall be renumbered 2.2.36.

2.3 ADDITIONAL DESCRIPTIVE NOTATIONS

Para 2.3.1. The words “the ship is fit for the carriage of dangerous goods as it is indicated in the Certificate ...; the ship is equipped for the carriage of cargo in international standard containers on deck and/or in appropriate holds;” shall be replaced by the following text: “the ship is equipped for episodic roll-on/roll-off;”.

PART XVII. DISTINGUISHING MARKS AND DESCRIPTIVE NOTATIONS IN THE CLASS NOTATION SPECIFYING STRUCTURAL AND OPERATIONAL PARTICULARS OF SHIPS

New **Section 12** shall be introduced reading as follows:

"12. REQUIREMENTS TO SHIPS FOR COMPLIANCE WITH DISTINGUISHING MARK IWS IN THE CLASS NOTATION

12.1 General provisions and scope of application.

12.1.1 For the ships built in compliance with this Chapter, the distinguishing mark **IWS (in-water survey)** is added to the character of classification denoting the ship is fit for in-water survey.

12.1.3 The conditions for in-water survey are specified in 2.5 of Part II “Survey Schedule and Scope” of the Rules for the Classification Surveys of Ships in Service.

12.2 Technical documentation.

Drawing of the marking on the side and bottom plating to identify the tanks shall be submitted in the scope of plan approval documentation for a ship under construction.

12.3 Technical requirements.

The distinguishing mark **IWS** may be assigned to the ships complying with the following additional requirements.

12.3.1 A ship shall have the distinguishing mark **TMS** in the class notation or propeller and shafting arrangement shall comply with 2.10.2, Part II "Survey Schedule and Scope" of the Rules for the Classification Surveys of Ships in Service for the minimum interval between surveys of 5 years.

12.3.2 Interval between the complete survey of main AMSS (if installed on board) shall not be less than 5 years in accordance with 2.10.8, Part II "Survey Schedule and Scope" of the Rules for the Classification Surveys of Ships in Service.

12.3.3 Underwater hull is fitted with an effective corrosion protective system consisting of combination of coating systems and cathodic protection.

12.3.4 Possible underwater washing of sea chests shall be provided, where necessary. To achieve this, closures of intake gratings shall have such a structure for their safe opening and closure by a diver.

12.3.4 For the water-lubricated rudder bearings, measures shall be provided to enable the in-water measurement of clearance in the rudder stock and pintles.

12.3.5 Underwater hull shall be marked.

Transverse and longitudinal reference lines of 300 m in length and 25 mm in width shall be indicated as marking. The marks shall be permanent and made by welding or similar way, of contrasting colour to the hull.

As a rule, the marks shall be placed as follows:

at the flat bottom in the regions of tank bulkhead intersection or integrity of floors of the bottom longitudinal girders;

on board in the areas of transverse framing (marking shall not be higher than 1 m above the hopper plating);

at the double bottom intersection with watertight floor in the area of the ship sides

at all suction and exhaust side valves.

Letter and numeric codes shall be placed on the plating for identification of tanks, suction and exhaust sea inlets."

Российский морской регистр судоходства
Правила классификации и постройки морских судов
Часть I
Классификация

Russian Maritime Register of Shipping
Rules for the Classification and Construction of Sea-Going Ships
Part I
Classification

The edition is prepared
by Russian Maritime Register of Shipping
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