

RULES

FOR THE CLASSIFICATION AND CONSTRUCTION OF HIGH-SPEED CRAFT

PART XVIII NAVIGATIONAL EQUIPMENT

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RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF HIGH-SPEED CRAFT

Rules for the Classification and Construction of High-Speed Craft of Russian Maritime Register of Shipping (RS, the Register) have been approved in accordance with the established approval procedure and come into force on 1 March 2023.

The present edition of the Rules is based on the 2018 edition taking into account the amendments developed immediately before publication.

The procedural requirements, unified requirements, unified 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 Structure and Strength";

Part III "Equipment, Arrangements and Outfit";

Part IV "Stability";

Part V "Reserve of Buoyancy and 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 "Live-Saving Appliances";

Part XVII "Radio Equipment";

Part XVIII "Navigational Equipment";

Part XIX "Signal Means";

Part XX "Equipment for Pollution Prevention";

Part XXI "Craft for Personnel Transportation".

REVISION HISTORY¹

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

Amended paras/chapters/sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
Para 1.2	Recommendation on equipping HSC with navigational equipment has been specified	315-11-1899c of 17.02.2023	15.03.2023
Para 4.1	Reference to Part I "General" of the Rules for the Equipment of Sea-Going Ships has been replaced with reference to Part I "Classification" of the Rules for the Classification and Construction of Sea-Going Ships	315-11-1899c of 17.02.2023	15.03.2023
Para 4.2	Para has been deleted	315-11-1899c of 17.02.2023	15.03.2023
Table 5.1	References and definitions have been specified, requirement for equipping HSC with navigational instruments have been deleted	315-11-1899c of 17.02.2023	15.03.2023
Paras 5.2 and 5.3	Para 5.2 has been deleted. Existing para 5.3 has been renumbered 5.2	315-11-1899c of 17.02.2023	15.03.2023
Section 8	Section 8 has been deleted. Existing Sections 9 — 11 (with paras and references thereto) have been renumbered 8 — 10 accordingly	315-11-1899c of 17.02.2023	15.03.2023
Para 10.29 (renumbered 9.29)	Reference to Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships has been deleted	315-11-1899c of 17.02.2023	15.03.2023

¹ Amendments and additions introduced at re-publication or by new versions based on circular letters or editorial amendments.

Amended paras/chapters/sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
Paras 11.1 and 11.1.1	Paras 11.1 and 11.1.1 have been deleted. Existing paras 11.1.2 and 11.1.3 have been renumbered 10.1 and 10.2 accordingly	315-11-1899c of 17.02.2023	15.03.2023
Para 11.1.2 (renumbered 10.1)	Reference to Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships has been specified	315-11-1899c of 17.02.2023	15.03.2023
Para 11.1.3 (renumbered 10.2)	Reference to Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships has been replaced with reference to IMO resolution MSC.191(79)	315-11-1899c of 17.02.2023	15.03.2023
Chapters 11.2 — 11.4	Chapters have been deleted	315-11-1899c of 17.02.2023	15.03.2023

1 SCOPE OF APPLICATION

1.1 This Part of the Rules for the Classification and Construction of High-Speed Craft² shall apply to high-speed craft³ referred to in 1.1.1.1, 1.1.1.2 of Part I "Classification". The list of navigational equipment for the craft shall meet the requirements of [Table 5.1](#). Navigational equipment to be installed on board the craft shall comply with the operational requirements described in [Section 10](#) of the present Part of the Rules, and any equipment not mentioned herein shall comply with the appropriate requirements of Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships.

1.2 This Part of the Rules shall apply to HSC referred to in 1.1.1.3 of Part I "Classification", and also to Category A high-speed passenger craft, not engaged on international voyages, carrying not more than 36 passengers, below 100 gross tonnage and proceeding for a distance of not more than 20 miles from a place of refuge. The list of navigational equipment for these craft shall be as follows:

magnetic compass (for craft of less than 150 GRT, equipment with nomenclature codes 05010000MK, 02090013MK may be fitted);

remote transmitting heading device (THD) (not required, provided the craft is fitted with a gyrocompass to transmit heading information for input to the relevant navigational equipment);

radar operating in 9 GHz band (3 cm wavelength) (for craft of less than 300 GRT (including passenger craft) not engaged on international voyages, equipment with nomenclature code 05140250 may be fitted), and on craft with a maximum speed of 30 knots and above, the scan rate of the aerial shall not be less than 40 rpm;

radionavigation system receiver;

night vision equipment (night vision equipment not intended for HSC is allowed, with the exception of passenger ships and HSC within the requirements of the International Code of Safety for High-Speed Craft, HSC, not fitted with night vision equipment, capable of operating in the night-time at a limited maximum speed not exceeding the rate calculated in meters per second (m/s), according to the formula $3.7 \times \nabla^{0.1667}$; where ∇ is the displacement equal to the design waterline, m³);

sound reception system (not required where conning station is equipped with opening windows or exit to open deck);

electronic chart display and information system (ECDIS) (not required provided corrected paper nautical charts are available on board for route planning and route monitoring throughout the intended voyage).

Besides, in view of high speed of such craft it is recommended to install a heading control system, ship automatic universal identification system, echo-sounder which shall comply with the relevant requirements of [Section 10](#) in the present Part of the Rules.

1.3 This Part sets forth technical requirements to be met by the navigational equipment and specifies its composition and arrangement.

1.4 Navigational equipment not dealt with in this Part or dealt with only partially is covered by the requirements of Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships, unless they are contradictory to the requirements of this Part.

² Hereinafter referred to as "these Rules".

³ Hereinafter referred to as "HSC".

2 DEFINITIONS AND EXPLANATIONS

2.1 Definitions and explanations relating to general terminology are given in 1.1 of Part I "Classification" of these Rules and in Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships.

3 SCOPE OF TECHNICAL SUPERVISION

3.1 All types of navigational equipment required by this Part, all associated arrangements, independent sources of electrical power, switchgear and cable lines as well as spaces and areas where the equipment is arranged are subject to technical supervision by the Register during the craft construction and service.

3.2 Design and production of all navigational equipment intended for installation on HSC are subject to technical supervision by the Register at the manufacturer.

3.3 The procedure of the technical supervision is given in the General Regulations for the Classification and Other Activity and in Part I "General" of the Rules for the Equipment of Sea-Going Ships.

4 TECHNICAL DOCUMENTATION

4.1 The requirements for technical documentation on navigational equipment of high-speed craft to be submitted for consideration together with plan approval documentation are set forth in 3.3.4, 3.3.5 of Part I "Classification" of the Rules for the Classification and Construction of Sea-Going Ships.

5 LIST OF NAVIGATIONAL EQUIPMENT

- 5.1** Navigational equipment of HSC shall meet the requirements of [Table 5.1](#).
- 5.2** In addition to the requirements of [5.1](#), it is recommended that high-speed craft be equipped with unified timing system and integrated navigation system.

Rules for the Classification and Construction of High-Speed Craft (Part XVIII)

Table 5.1

No	Craft's navigational equipment	Quantity			Remarks
		Passenger craft (100 passengers and less)	Passenger craft (450 passengers and less)	Cargo craft of 500 gross tonnage and more or passenger craft (more than 450 passengers)	
1	Magnetic compass	1	1	1	
2	Remote device to transfer information on magnetic course to other navigational equipment	1	–	–	Not required if gyrocompass is installed
3	Gyrocompass for high-speed craft	–	1	1	
4	Log (dynamic pressure, induction, Doppler, etc.)	1	1	1	Where interlace with auto tracking aid (ATA) or automatic radar plotting aid (ARPA) is required, the log shall be capable to measure craft's speed through the water
5	Echo sounder	1	1	1	Only for non-amphibian craft for sounding depths in the displacement mode
6	Radar for high-speed craft ¹	1	1	2 ^{2,3}	Radar shall operate at 9 GHz (3 cm range scale)
7	Radionavigational system receiver ⁴	1	1	1	
8	Rudder angle indicator and/or propeller thrust direction indicator	1	1	1	
9	Rate-of-turn indicator	1 ⁵	1 ⁵	1 ⁵	Mandatorily required for craft of more than 500 gross tonnage
10	Night vision equipment	1 ⁶	1 ⁶	1 ⁶	
11	Craft's heading control system of high-speed craft	1	1	1	
12	Sound reception system	1	1	1	Required on craft with enclosed control station
13	Automatic identification system (AIS)	1	1	1	
14	Voyage data recorder ⁷	1	1	1	
15	Radar reflector	1 ⁸	1 ⁸	1 ⁸	Radar reflectors shall operate both at 3 and 9 GHz
16	Electronic chart display and information system (ECDIS)	1	1	1	Provision shall be made for back-up arrangements: a second ECDIS or a set of up-to-date paper nautical charts

Rules for the Classification and Construction of High-Speed Craft (Part XVIII)

No	Craft's navigational equipment	Quantity			Remarks
		Passenger craft (100 passengers and less)	Passenger craft (450 passengers and less)	Cargo craft of 500 gross tonnage and more or passenger craft (more than 450 passengers)	
17	Long-range identification and tracking (LRIT) system equipment	1	1	1	Not required for craft not making international voyages
¹ At least one radar shall be equipped with automatic radar plotting or auto tracking aid suitable for craft's speed. ² The second radar shall operate at 3 GHz (10 cm range scale). ³ Where two radars are required, they shall be independent of each other. ⁴ The radionavigational system used shall be accessible at all times during the intended voyage. ⁵ The rate-of-turn indicator is required for craft of less than 500 gross tonnage if the test according to Annexes 3 and 9, Chapter 19 of 2000 HSC Code, shows that the turn rate can exceed safety level 1. ⁶ According to the requirements of 8.1 . ⁷ Voyage data recorders shall be installed on cargo craft of more than 3000 gross tonnage. ⁸ To be installed on any craft of 150 gross tonnage and less.					

6 ARRANGEMENT OF NAVIGATIONAL EQUIPMENT

6.1 All navigational equipment required by this Part shall be arranged at the stations from where the craft is navigated.

Where some sets of navigational equipment cannot be arranged at such stations, their indicators and controls shall be positioned in all cases in accordance with this requirement.

6.2 Indicators and controls of the navigational equipment shall be readily accessible and arranged so that the craft operating crew can steer the craft and obtain all the necessary information without leaving their seats.

6.3 The compass card or repeater shall be capable of being easily read from the position at which the craft is normally controlled.

6.4 The radar display unit shall be installed in a compartment from where the craft is navigated. The display unit shall be positioned so that in case of course orientation mark "course" on the display shall be oriented in relation to the fore-and-aft line of the craft.

6.5 The radar shall be so arranged that the operator could work when seated.

6.6 Each radar shall be mounted so as to be as free as practicable from vibration.

6.7 Controls and monitors for information display of the night vision equipment shall be readily accessible and positioned at the navigating workstation, the distance between the observer's eyes and the information display shall not be greater than the screen diagonal more than 2,3 times.

6.8 The sensor of the night vision equipment shall be arranged so that:

.1 in the required horizontal field of view there are no shadow sectors forward of the bow on either side to 30°;

.2 in the required vertical field of view, sea surface shown on the screen shall not reduce by more than two lengths of the ship following changes of the shadow zone of the ship due to vertical inclinations of the sensor.

7 SOURCES OF POWER

7.1 Navigational equipment required by this Part shall be supplied from the main and emergency sources of electrical power in compliance with the requirements of Part XI "Electrical Equipment".

7.2 Each navigational instrument indicated in [Table 5.1](#) and requiring electrical power shall be supplied from the navigational equipment switchboard by separate feeders. Power supply to switchboard busbars shall be provided from the main switchboard and from the emergency switchboard by two separate feeders.

7.3 Magnetic compasses shall be illuminated from the main and emergency sources of electrical power.

8 NIGHT VISION EQUIPMENT

8.1 For navigation of high-speed craft in dark time, they shall be fitted with night vision equipment.

9 CRAFT CONTROL STATIONS

9.1 All control functions of the craft when under way in any mode shall be exercised from the craft control station at the navigating bridge.

9.2 The craft control station shall be positioned in the upper part of the superstructure or be raised above the upper deck. The operating compartment shall be fitted with windows around the periphery to provide view all-round the horizon when at sea and in manoeuvring the craft to a berth. Where all-round view is not provided, two control stations shall be arranged.

At least one exit to the craft's side or stern shall be provided at the craft's operating compartment. Besides, the operating compartment shall communicate with interior spaces. Arrangements shall be made to prevent passengers from entering the operating compartment.

9.3 Blind sectors shall be as few as possible. The total arc of blind sectors from right ahead to 22,5° abaft the beam on either side shall not exceed 20°. Each individual blind sector shall not exceed 5° and the clear sector between two blind sectors shall not be less than 10°. The view of the sea surface from the control station, when the navigators are seated, shall not be obscured by more than one craft length forward of the bow to 90° on either side, irrespective of the craft draught, trim and deck cargo.

9.4 The control station of the craft shall be, as far as possible, such as to ensure visual observation for the navigators and utilization of leading marks astern of the craft.

9.5 The number of workstations for personnel on watch in the craft control station shall be sufficient to normally maintain the watch and steer the craft. The required vision of the surroundings from each workstation sufficient for the operating personnel to perform their duties shall be provided.

9.6 The number of workstations and their arrangement depend on a possibility of all-round view, procedure of maintaining the watch by a navigator, helmsman, craft engineer and radio operator as well as on the extent of craft automation.

9.7 Where a docking station is provided for docking the craft, the field of vision from the docking workstation shall permit one navigator to safely manoeuvre the craft to a berth.

9.8 If separate workstations for supervision of engine performance and use of the radio equipment are placed in the operating compartment, the location and use of these workstations shall not interfere with primary functions in the operating compartment.

9.9 Each workstation shall be equipped with a seat, control panels with all necessary controls for the officer in charge to perform all the prescribed functions.

9.10 Seats shall be comfortable and so positioned that in the operational mode each operating crew member could be seated facing right ahead. The height of the seat shall be adjustable so that, in addition to the view referred to in [9.3](#), all indicators, controls and alarms referred to [9.15](#) could be easily used.

9.11 Seats shall be provided with safety belts and permanently attached in the most convenient position for the personnel in charge which shall not be changed during the craft operation. The operating crew members, with the seats suitably adjusted and safety belts correctly worn, shall be able to perform the operations referred to in [9.10](#). Subsequent change of seat position to operate any control shall not be acceptable. Exception may be made only in respect of controls which are required on very rare occasions and which are not associated with the need for safety restraint.

9.12 A table suitable for chart work and record keeping in a logbook at the workstation shall be of a size sufficient for keeping nautical charts and publications thereon. The table shall be so placed that the navigator could work with charts and publications not leaving the seat. No table is necessary where an electronic chart display system is available on board.

9.13 The dimensions of the table at the workstation shall be not less than:

- .1** 760 mm in width;

.2 660 mm in depth.

9.14 Where an automatic steering aid is provided, a chart table may be positioned beyond the workstation but close thereto. In such case the officer in charge may temporarily leave the seat.

9.15 The following devices and instruments shall be located at each workstation in the control station:

.1 levers to control main engines direction and speed of rotation or engine telegraph hand levers;

.2 hand levers, buttons or wheels of directional control systems, i.e. steering engines, foils, flaps, steerable propellers, jets, yaw control ports, side thrusters, differential propulsive thrust, variable geometry of the craft or its lifting-system components, aerial or water rudders, lift fans, etc.;

.3 main engine rotational speed and direction indicators, course indicators, rudder angle indicators, position indicators of foils, flaps, steerable propellers, jets, yaw control ports, side thrusters, differential propulsive thrust, variable geometry of the craft or its lifting-system components, aerial or water rudders, lift fans, etc.;

.4 alarms on failures in engines, control devices and systems referred to in [9.15.1](#), [9.15.2](#) and [9.15.5](#);

.5 craft's automatic stabilization system control station and automatic safety control station;

.6 hand controls of safety device of automatic stabilization system of craft modes;

.7 illuminated indicator panels and sound alarms of the warning and alarm systems of craft automated machinery, systems and arrangements;

.8 illuminated indicator panels and sound alarms of fire detection systems;

.9 a device for remote starting of fire-extinguishing systems;

.10 navigation light boards and associated signalling systems;

.11 navigational equipment required by this Part;

.12 radio equipment required by Part XVII "Radio Equipment";

.13 light and sound signalling devices on failures in ventilation system for special-category spaces;

.14 switches for remote stopping of fans in accommodation, service, machinery spaces and in special-category spaces;

.15 instruments for measuring temperature, pressure, level of liquid, voltage, load and other essential parameters of craft propulsion machinery and arrangements;

.16 remote arrangements for stopping flammable liquid transfer pumps and fire-extinguishing systems control;

.17 alarms on high water level in drained spaces;

.18 any other instruments, arrangements, controls, including those for emergency purposes, which may be required depending on the craft structure.

9.16 The equipment referred to in [9.15](#) shall be arranged on consoles, bulkheads, desks, etc. It shall have such design and size of light and digital indicator scales, signal lamps, controls, and be so mounted and illuminated that operating personnel can easily view the instruments and operate the controls without leaving their seats in all possible service conditions.

9.17 All alarm, indication and monitoring instruments referred to in [9.15](#), and controls shall be logically grouped according to their function. The alarm, indication and monitoring instruments shall be clearly marked with any limitation if this information is not otherwise clearly presented to the operating crew. The instrument panels forming the emergency control for the monitoring of the fire-fighting systems and launching of liferafts, etc. shall be grouped and be separate. The instruments shall not be rationalized by sharing functions or by inter-switching.

9.18 The alarm, indication and monitoring instruments shall be so designed as to be plainly visible at any level of lighting. Glare and reflections from the instruments shall not interfere with normal work of the operating personnel at night-time.

9.19 The surfaces of the alarm, indication and monitoring instruments, and console tops shall have dark, matt, glare-free colours.

9.20 Only the most essential equipment shall be arranged in front of the operating crew members facing right ahead, provided their attention and observation of the surroundings is not prevented.

Where indications of the alarm, indication and monitoring instruments and visual information on the displays of navigational equipment shall be used by more than one person, they shall be located for easy viewing by all users concurrently. If this is not possible, the instrument or display shall be duplicated.

9.21 Where maintaining watch and radio equipment control at workstations are difficult due to arrangement of the radio equipment used, a special workstation for the radio operator, in addition to the workstations referred to in [9.5](#), shall be provided. The VHF radio installation control desk shall be positioned in all cases at the workstations referred to in [9.5](#).

9.22 Means to communicate between the operating compartment and spaces containing essential machinery, such as propulsion machinery, emergency steering positions, etc., shall be provided.

9.23 A portable microphone shall be provided in the operating compartment for making public address and safety announcements to all areas to which passengers and crew have access and through which escape paths are routed, and to all survival craft embarkation stations.

9.24 The operating compartment shall be equipped with adequate temperature and ventilation control systems.

9.25 An adequate level of lighting shall be provided in the operating compartment to enable the operating personnel to efficiently perform their tasks both at sea and in port. Red light shall be used to maintain dark adaptation whenever any items of equipment other than the chart table require local illumination in the operational mode.

9.26 Lighting in the operating compartment and noise generated by the instruments installed in the operating compartment shall not produce any interference for navigation.

9.27 Where provision is additionally made to control the craft from control stations other than the craft's operating compartment referred to in [9.2](#), the alarm, indication and monitoring instruments and controls shall be switched over to operation from other stations only from the craft's operating compartment.

9.28 Sockets supplied from the emergency source of electrical power for connection of a portable lamp which shall be permanently kept in the craft control station shall be provided in the craft.

9.29 Where the craft control station is equipped with a combined craft control panel, one shall be guided by the provisions of this Part and those of 4.5 in Part XI "Electrical Equipment" of the Rules for the Classification and Construction of Sea-Going Ships¹.

9.30 Divisions between windows shall be kept to a minimum. No division shall be installed immediately forward of the officer in charge and helmsman workstations.

9.31 The arrangement of the control station windows and the curvature of their surface shall be such that no glare, reflections or distortions are produced which might result in navigation errors. Neither polarized or tinted window glass shall be fitted. The windows shall be angled from the vertical plane top out to not less than 10° but not more than 25° to reduce unwanted reflections. Windows shall be made of a material which will not break into dangerous fragments if fractured.

¹ Hereinafter referred to as "the Rules for the Classification".

9.32 Front windows and, depending on configuration of the control station, other windows shall be provided with means for wiping, heating and air blowing of the windows. The means shall be so arranged that no reasonably probable single failure can result in a reduction of the cleared field of vision from the operating compartment.

9.33 The design and software of the equipment arranged in the operating compartment shall be such as to prevent their use for purposes other than navigation, communication and other functions essential to the safe operation of the craft.

10 OPERATIONAL REQUIREMENTS FOR NAVIGATIONAL EQUIPMENT

10.1 All navigational equipment required by this Part as well as the navigational aids to be installed on HSC in addition to those required shall comply in respect of their constructional and operational characteristics with the requirements of Appendix 1 to Part V "Navigational Equipment" of the Rules for the Equipment of Sea-Going Ships.

10.2 For presentation of navigation-related information from different detectors, display equipment (indicators) may be used which integrate data from several sources. In this case, equipment of this kind installed in a craft control station should present navigation-related information in conformity with the requirements of IMO resolution MSC.191(79).

Russian Maritime Register of Shipping

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Part XVIII
Navigational Equipment**

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