

# **RULES**

## **FOR THE CLASSIFICATION AND CONSTRUCTION OF HIGH-SPEED CRAFT**

### **PART XV AUTOMATION**

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# **RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF HIGH-SPEED CRAFT**

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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 HISTORY**

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

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

## **1 GENERAL**

### **1.1 Scope of application.**

**1.1.1** This Part of the Rules for the Classification and Construction of High-Speed Craft<sup>1</sup> applies to machinery installations of high-speed craft<sup>2</sup> and to individual devices of automation systems of installations.

**1.1.2** In addition to the requirements of this Part, all the relevant requirements of Sections 1 to 3, Part XV "Automation" of the Rules for the Classification and Construction of Sea-Going Ships<sup>3</sup> are applicable to machinery installations of HSC and to individual devices of the automated equipment.

### **1.2 Definitions and explanations.**

**1.2.1** Definitions and explanations relating to general terminology are given in 1.1 of Part I "Classification" of these Rules and in Part XV "Automation" of the Rules for the Classification.

For the purpose of these Rules the following additional definitions have been adopted.

**Stabilization control system** is a system intended to stabilize the main parameters of the craft attitude: heel, trim, course and height and control the craft motions: roll, pitch, yaw and heave.

**Automatic stabilization system** is a system providing automatic stabilization of the craft according to parameters mentioned above.

**Self-stabilization of the craft** is stabilization ensured solely by the craft inherent characteristics (hull, foils, etc.).

**Forced stabilization** is stabilization achieved by an automatic control system or a manually assisted control system.

**Combined stabilization** is stabilization which is achieved by both automatic and manually assisted control systems.

**Remote control systems** are systems providing control of machinery installation from the craft control station.

**Back-up control systems** are systems necessary to maintain control of essential functions required for the craft safe operation when the main control systems have failed or malfunctioned.

### **1.3 Scope of technical supervision.**

**1.3.1** The following equipment, systems and devices are subject to technical supervision during manufacture:

- .1** automatic stabilization systems;
- .2** control, monitoring and protection systems of arrangements, machinery and systems subject to technical supervision by the Register and listed in the relevant parts of these Rules;
- .3** other systems, equipment and devices on the Register requirement.

**1.3.2** Automation systems, devices and equipment referred to in other parts of the Rules for the Classification are also subject to technical supervision on board.

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

<sup>2</sup> Hereinafter referred to as "HSC".

<sup>3</sup> Hereinafter referred to as "the Rules for the Classification".

## **2 TECHNICAL DOCUMENTATION**

**2.1** The requirements for technical documentation to be submitted to the Register for consideration and approval are described in 1.5 of Part I "Classification" of these Rules.

**2.2** Before manufacture of automation and essential devices to be installed on board, the documentation referred to in 1.4.1, Part XV "Automation" of the Rules for the Classification shall be submitted to the Register for consideration and approval.

### **3 STABILIZATION SYSTEM**

**3.1** The stabilization system shall be designed so that, in case of failure or malfunctioning of any one of stabilization devices or equipment (rudders, flaps, foils, skirts, water-jet arrangements), its power drive or automation equipment of the stabilization system (transducers, logic units) it would be possible either to ensure maintaining of the main parameters of craft motion within the safe limits with the aid of working stabilization devices or to put the craft into the displacement or other safe mode.

**3.2** In case of failure of the automatic stabilization system on craft not fitted with self-stabilization, an automatic safety system shall be provided to put the craft into a displacement or other safe mode. An automatic safety system may not be fitted where the redundancy in the stabilization system provides safety. Where the above-mentioned safety system is fitted, provision shall be made to override it and to cancel an override from the main control station.

Alarms on overriding the automatic safety system, on a failure in its circuit, and on transfer to the stand-by component, system or device shall be provided.

**3.3** In case the safe values of the controlled parameters are exceeded, the automatic safety system shall decrease the craft speed and put the craft safely into the displacement or other safe mode. Account shall be taken of the safe values of heel, trim, yaw and combination of trim and draught appropriate to the particular craft and service. Consequences of power failure for propulsion, lift or stabilization devices shall also be taken into consideration.

**3.4** The automatic stabilization system shall be supplied from two independent sources of power. The transfer from one source to the other shall not impair stabilization of the craft.

**3.5** The designer of the craft shall establish hazardous values of heel, trim and changes in clearance, and a calculation (or the results of model tests) shall be submitted to prove that the selected parameters and degree of stabilization of the craft preclude the hazardous values.

It shall be demonstrated during the trials of the first craft of the series that the stabilization system provides safe operation of the craft in the operational mode under the worst intended conditions and the consequences shall also be demonstrated by simulation of the most dangerous failures.

#### **4 CRAFT CONTROL STATION**

**4.1** Any failure of craft remote or automatic control systems shall initiate alarms and shall not prevent normal manual control.

**4.2** Control stations shall be provided with workstations equipped with controls for the following emergency services:

- .1** fixed fire-extinguishing systems;
- .2** emergency stopping of fans and dampers in the spaces protected by the fire-extinguishing system;
- .3** emergency stopping of oil fuel booster pumps for main and auxiliary machinery;
- .4** emergency stopping of all sources of electrical power (a control shall be protected against accidental or inadvertent operation);
- .5** emergency stopping of main and auxiliary machinery.

Controls shall be located so as to be within the reach of the officer on watch.

## **5 AUTOMATION EQUIPMENT OF MACHINERY INSTALLATIONS**

**5.1** Where remote automated control of machinery installation (reversing and change of rotational speed) is used, all control and manoeuvring functions shall be performed from the craft control station. In case of failure of the remote automated system, reversing and change of rotational speed shall be controlled from the engine control station.

**5.2** In addition to the remote control, provision shall be made at the craft control station for an emergency arrangement to quickly transfer the craft into the displacement mode and, where necessary, to eliminate the thrust. Such arrangement shall be totally independent of the remote control.

**5.3** Where the engine control station is beyond the operating compartment of the craft, communication shall be provided between the two control stations. Transfer of control from one station to the other shall be possible only from the craft control station.

On category B craft, the controls for craft's movement or manoeuvring, as well as for arrangements and systems specified in [4.2](#) shall be provided in one or more control stations beyond the operating compartment of the craft. Such control stations shall have direct communications with the operating compartment of the craft where continuous watch is kept.

**5.4** The safety system shall stop automatically the part of the controlled machinery installation, the failures in which may result in the emergency condition of the installation.

Propulsion and lift of the craft shall be ceased only if a danger arises which requires immediate stopping of the craft.

Any failure in the safety system circuit shall not cause a stop of the controlled item of machinery.

Provision shall be made for an arrangement for overriding (and re-activating) the safety system from the craft control station; the arrangement shall be protected against inadvertent operation.

**5.5** For passenger and cargo craft the remote control systems for propulsion machinery and steering gear shall be equipped with back-up control systems. For cargo craft, the back-up system controllable from machinery space is acceptable.



## 6 ALARM SYSTEM

**6.1** Alarms giving indications of conditions requiring immediate action shall be distinctive and in full view of the crew members at control stations.

**6.2** The alarm system at the craft control station shall give the alarms indicated in [Table 6.2](#):

**6.3** The alarm on activation of an emergency arrangement for transfer of the craft into the displacement mode as required by [5.2](#) shall be provided at all control stations from where craft control functions may be effected.

**6.4** The following alarms shall be provided at the craft control station:

- .1 "Water in the machinery space";
- .2 "Fire in the machinery space";
- .3 "Failure of the alarm system".

Table 6.2

Nos.	Controlled parameter	Colour of visual alarm
1	Activation of fire alarm and detection system	Red
2	Loss of power supply from main source of electrical power	Red
3	Overspeed	Red
4	Thermal runaway of storage battery <sup>1</sup>	Red
5	Exceeding the limiting value of any craft machinery or system parameter (other than engine overspeed)	Yellow
6	Failure of normal power supply to powered directional and trim devices	Yellow
7	Operation of any automatic bilge pump	Yellow
8	Failure of compass system	Yellow
9	Upper and lower level contents in fuel tank and in any Quid reservoir the contents of which are essential for craft normal operation	Yellow
10	Failure of power supply to side, masthead and stern navigational lights	Yellow
11	Failure of any connected electrical power source	Yellow
12	Failure of any ventilation fan installed for ventilating spaces in which inflammable vapours, gases and dust-and-air mixtures may accumulate	Yellow
13	Failure of main or essential auxiliary diesel engine high-pressure fuel line	Yellow
14	High level of bilge water in each watertight compartment shall be located below the design load waterline	Yellow
<sup>1</sup> For cadmium-nickel alkaline batteries only.		

## **7 SAFETY SYSTEM**

**7.1** The arrangements for overriding safety system shall be such as to preclude inadvertent operation.

When the arrangements are activated, a visual alarm shall be given.

Russian Maritime Register of Shipping

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Part XV  
Automation**

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