



RUSSIAN MARITIME REGISTER OF SHIPPING

CIRCULAR LETTER

No. 315-05-1362c

dated 20.03.2020

Re:

amendments to the Rules for the Classification and Construction of Sea-Going Ships, 2020, ND No. 2-020101-124-E

Item(s) of supervision:

electrical equipment

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Appendices:

Appendix 1: information on amendments introduced by the Circular Letter

Appendix 2: text of amendments to the Part XI "Electrical Equipment"

Director General

Konstantin G. Palnikov

Text of CL:

We hereby inform that the Rules for the Classification and Construction of Sea-Going Ships shall be amended as specified in Appendices to the Circular Letter.

It is necessary to do the following:

1. Bring the content of the Circular Letter to the notice of the RS surveyors, as well as interested organizations and persons in the area of the RS Branch Offices' activity.
 2. Apply the provisions of the Circular Letter during review and approval of the technical documentation of ships and during survey of ships as well as during technical supervision during manufacture of equipment intended for use on ships contracted for construction or conversion on or after 01.07.2020.
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List of the amended and/or introduced paras/chapters/sections:

Part XI: Section 24

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**Information on amendments introduced by the Circular Letter
(for inclusion in the Revision History to the RS Publication)**

Nos.	Amended paras/chapters/sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
1	Section 24	A new Section with the special requirements for composite (hybrid) propulsive systems has been introduced	315-05-1362c of 20.03.2020	01.07.2020

RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS, 2020

ND No. 2-020101-124-E

PART XI. ELECTRICAL EQUIPMENT

The Part is supplemented with a **new Section 24** reading as follows:

"24 SPECIAL REQUIREMENTS FOR COMPOSITE (HYBRID) PROPULSIVE SYSTEMS

24.1 DEFINITIONS AND EXPLANATIONS

24.1.1 For the purpose of this Part, the following definitions and explanations have been adopted.

Composite (hybrid) propulsive system (CPS) means a propulsive system where the power for ship's motion is generated in two or more different ship's engines (heat and electric) mechanically linked and driving a common propeller.

24.2 GENERAL

24.2.1 The requirements of this Section apply to composite (hybrid) propulsive systems that comprise main heat engine and electric propulsion motor mechanically linked and driving a common propeller.

24.2.2 Unless otherwise specified in this Section, heat main engines shall comply with the requirements of Part IX "Machinery", electric machines – with the requirements of this Part, control systems – with the requirements of Part XV "Automation" and CPS as a whole – with the requirements of Part VII "Machinery installations".

24.2.3 Requirements of Section 17 do not apply to electric propulsion plants driven by CPS if heat main engine is capable of ensuring ship's motion without overload with the speed sufficient for manoeuvrability and safety of navigation. In other cases, electric propulsion plants driven by CPS shall comply with all applicable requirements specified in Section 17.

24.2.4 If electric propulsion plant comprises a semiconductor converter, it shall comply with the requirements of Section 12.

24.2.5 If electric propulsion plant comprises semiconductor converter and propulsion motor capable of operating in generator operation mode, this electric propulsion plant shall additionally comply with the requirements specified in Section 23.

24.2.6 Firm (manufacturer) or firm responsible for overall operation of CPS shall take into account the nature of physical processes in the equipment being part of CPS and shall ensure its compatibility and system integration.

24.3 STRUCTURE

24.3.1 The configuration and structure of CPS and electric propulsion plant are determined by provided functions and operation modes taking into account the requirements of 24.2.3.

24.3.2 The electric propulsion plant shall have electromagnetic compatibility with ship's power plant system and consumers. This may be provided by installing an impedance matching transformer or a noise filter.

24.4 ELECTRIC PROPULSION MOTORS

24.4.1 Electric propulsion motor design is determined by provided functions and operation modes taking into account the requirements of 24.2.3.

24.4.2 The electric propulsion motor shall be capable to withstand overload in torque without damage that occurs when the heat main engine is being suddenly disconnected in joint operation mode of heat main engine and propulsion motor driving a common propeller.

24.4.3 For electric propulsion d.c. motors provision shall be made for an independent overspeed (runaway) protection device as required in 2.11, Part IX "Machinery". The electric propulsion motor shall be capable to withstand overspeed up to the trip setting value of overspeed protection device.

24.4.4 The electric propulsion motor shall be capable to withstand a sudden short-circuit currents at its terminals under nominal load without damage.

24.4.5 Propulsion motor capable of running in generator mode shall additionally:
be designed for currents and speeds of motor and generator operation modes considering possible overloads and overspeed;
comply with the requirements of 3.2.3.

24.5 SEMICONDUCTOR CONVERTERS

24.5.1 If the electric propulsion plant comprises semiconductor converters, they shall be capable to withstand over-current without damage that occur when the heat main engine is suddenly disconnected in joint mode of heat main engine and propulsion motor driving the propeller.

24.6 VOLTAGE REGULATION

24.6.1 Automatic voltage regulation systems in propulsion motor generator operation mode with a semiconductor converter shall comply with the requirements of 23.7.

24.6.2 Automatic voltage regulation systems in propulsion motor generator operation mode without a semiconductor converter shall comply with the applicable requirements of 3.2.3.

24.7 VOLTAGE FREQUENCY REGULATION

24.7.1 Automatic voltage frequency regulation systems in propulsion motor generator operation mode with a semiconductor converter shall comply with the requirements of 23.9.

24.7.2 Automatic voltage frequency regulation systems in propulsion motor generator operation mode without a semiconductor converter shall comply with the applicable requirements of 3.2.3.

24.8 PROTECTION

24.8.1 Automatic limitation of power consumed by the propulsion motor from ship's electric power plant shall be provided to avoid generator overload.

24.8.2 Excitation systems and automatic control systems shall protect electric propulsion motors from overspeeding in the event of the propeller breaking down or working clear of water.

24.8.3 If power recuperation into the ship mains is provided at braking, this recuperation shall not activate overspeed and reverse power protection and disconnect ship's electric power plant generators.

24.8.4 For electric propulsion motors, at least the following protective devices shall be provided:

from overloads;

from short circuits;

from inner short circuits for motors with the power output of 1000 kW and more.

24.8.5 For semiconductor converter (if any), at least the following protective devices shall be provided:

from minimum input voltage;
from maximum input voltage;
from maximum voltage in direct current link (if present);
from power modules overheating;
from overloads;
from inner short circuits.

24.8.6 For electric propulsion plant with propulsion motor capable of running in generator operation mode and with semiconductor converter, additional protective devices as specified in 23.10 shall be provided.

24.9 CONTROL STATIONS

24.9.1 CPS control stations shall comply with the requirements of Section 3, Part VII "Machinery Installations".

24.9.2 Local control stations of heat main engine and propulsion motor shall (if possible) be positioned in close proximity to each other.

24.9.3 Operating controls of main engine and propulsion motor on the remote control stations of CPS shall be positioned in close proximity to each other and the possibility of simultaneous control by one person shall be provided.

24.9.4 Each control station shall be equipped with an engine emergency shutdown device.

24.9.5 Control stations shall be provided with necessary light alarm and indication showing currently operating engines, their applied operation modes and parameter values.

24.10 OPERATION MODES

24.10.1 Motor operation mode of propulsion motor and heat main engine.

24.10.1.1 In CPS different motor operation modes including autonomous or joint mode of main engine and propulsion motor driving a common propeller are available. The switch from one mode to another shall not result in loss of power or steering of the ship.

24.10.1.2 CPS shall provide acceleration, speed regulation, braking and reversing of the ship.

24.10.1.3 To use motor operation modes, CPS shall be provided with the relevant algorithms of automatic control and (if necessary) mechanical devices (transmission, controlled couplings, etc.).

24.10.1.4 In set modes disproportional distribution of mechanical stress between heat main engine and propulsion motor is permitted if neither of motors is overloaded and the requirements of 2.1.11, Part VII "Machinery Installations" are met.

24.10.1.5 In transient modes including acceleration and braking, distribution of mechanical stress between heat main engine and propulsion motor shall be carried out in such a way that no motor and engine overloads occur.

24.10.1.6 Reversing the ship at CPS operation shall be carried out in such a way that the requirements of 2.1.3 – 2.1.5, Part VII "Machinery Installations" are met.

24.10.2 Propulsion motor generator operation mode

24.10.2.1 When propulsion motor is in generator operation mode, the requirements of 3.2.3, Section 3 shall be met.

24.10.2.2 When propulsion motor is in generator operation mode, disconnection of propeller via controlled coupling or another similar device (if provided by the design) is permitted. In this case the heat main engine is covered by the requirements for generator prime movers including those of 2.11.3, Part IX "Machinery".

24.10.2.3 If electrical propulsion plant comprises a semiconductor converter, in propulsion motor generator operation mode, the requirements of Section 23 shall be met.

24.10.2.4 Switch of propulsion motor from motor to generator operation mode and vice versa shall not result in blackout of ship's electric power plant, loss of power and steering of the ship.

24.10.3 Electric starting of heat main engine and propulsion motor.

24.10.3.1 Electric starting of heat main engine by electric propulsion motor is permitted. To use this mode in CPS, relevant algorithms of automatic control and mechanical devices (controlled couplings, etc.) shall be provided.

24.10.3.2 Electric starting of heat main engine by propulsion motor shall not result in overload of ship's electric power plant."