

# RULES

## FOR THE CLASSIFICATION AND CONSTRUCTION OF FIXED OFFSHORE PLATFORMS

### PART X ELECTRICAL EQUIPMENT

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**St. Petersburg  
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# **RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF FIXED OFFSHORE PLATFORMS**

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Rules for the Classification and Construction of Fixed Offshore Platforms (the FOP Rules) 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 September 2023.

The present Rules are based on the latest version of the Rules for the Classification, Construction and Equipment of Mobile Offshore Drilling Units and Fixed Offshore Platforms, 2022, taking into account the amendments and additions developed immediately before publication.

The Rules set down specific requirements for FOP and supplement the Rules for the Classification and Construction of Sea-Going Ships and the Rules for the Equipment of Sea-Going Ships.

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 and Machinery";

Part VIII "Systems and Piping";

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

Part X "Electrical Equipment";

Part XI "Refrigerating Plants";

Part XII "Materials";

Part XIII "Welding";

Part XIV "Automation";

Part XV "Safety Assessment";

Part XVI "Signal Means";

Part XVII "Life-Saving Appliances";

Part XVIII "Radio Equipment";

Part XIX "Navigational Equipment";

Part XX "Equipment for Prevention of Pollution".

**REVISION HISTORY**

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

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

## **1 GENERAL**

### **1.1 APPLICATION**

**1.1.1** The requirements of this Part of the Rules for the Classification and Construction of Fixed Offshore Platforms<sup>1</sup> apply to the electrical equipment of machinery installations (powerplants) as well as to systems and appliances of FOP being subject to the technical supervision of the Register, and also to individual types of the electrical equipment according to [1.3](#).

**1.1.2** The applicable requirements of this Part shall be also applied to the fixed electrical equipment and automation equipment not mentioned in [1.3](#), but potentially affecting the operation of essential machinery and appliances in case of their malfunctions or accidents.

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

## **1.2 DEFINITIONS AND EXPLANATIONS**

**1.2.1** Definitions and explanations are given in the General Regulations for the Classification and Other Activity, Part I "Classification" and Part XI "Electrical Equipment" of the Rules for the Classification and Construction of Sea-Going Ships<sup>1</sup>, in Part I "Classification" and Part X "Electrical Equipment" of the Rules for the Classification and Construction of Mobile Offshore Drilling Units<sup>2</sup>.

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<sup>1</sup> Hereinafter referred to as "the RS Rules/C".

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

### **1.3 SCOPE OF TECHNICAL SUPERVISION**

**1.3.1** Applicable types of essential electrical equipment specified in 1.3.2 and 1.3.3, Part X "Electrical Equipment" of the MODU Rules shall be subject to technical supervision.

## **1.4 TECHNICAL DOCUMENTATION**

**1.4.1** Prior to the technical supervision of electrical equipment manufacture, the documentation specified in 1.4.2, Part X "Electrical Equipment" of the MODU Rules, on each kind of equipment shall be submitted to the Register for consideration.

## **2 GENERAL REQUIREMENTS**

The electrical installations and electrical equipment of a FOP shall be covered by the applicable requirements of Section 2, Part X "Electrical Equipment" of the MODU Rules taking into account the requirements specified below.



## **2.1 OPERATING CONDITIONS**

**2.1.1** Climatic operating conditions of the electrical equipment shall meet the requirements stipulated in 2.1.1, Part X "Electrical Equipment" of the MODU Rules.

**2.1.2 Mechanical effects.**

**2.1.2.1** Electrical equipment shall be capable of reliable performance at vibrations with frequency of 2 to 80 Hz, i.e. with an amplitude of displacements of  $\pm 1$  mm for frequency range of 2 to 13,2 Hz and an acceleration of  $\pm 0,7g$  for frequency range of 13,2 to 80 Hz.

Electrical equipment located on the sources of vibrations (diesel engines, compressors, etc.) shall be capable of reliable performance at vibrations of 2 to 100 Hz, i.e. with an amplitude of displacement of  $\pm 1,6$  mm for frequency range of 2 to 25 Hz and an acceleration of  $\pm 4,0g$  for frequency range of 25 to 100 Hz.

**2.1.2.2** Electrical equipment shall possess the relevant mechanical strength and shall be so located as to avoid the risk of mechanical damage.

**2.1.3** Electrical equipment shall be so designed that it remains operative in all cases under steady conditions at all variations from the rated supply voltage and frequency as specified in 2.1.3, Part X "Electrical Equipment" of the MODU Rules.

## **2.2 ELECTROMAGNETIC COMPATIBILITY**

**2.2.1** Failure-free performance of the equipment shall be ensured under conditions of interference specified in 2.2 of Part XI "Electrical Equipment" of the RS Rules/C for the Classification and 2.2, Part X "Electrical Equipment" of the MODU Rules.

## **2.3 MATERIALS**

**2.3.1** The materials shall comply with the requirements of 2.3, Part X "Electrical Equipment" of the MODU Rules.

## **2.4 STRUCTURAL REQUIREMENTS AND DEGREE OF PROTECTION OF ELECTRICAL EQUIPMENT**

**2.4.1** Degree of protection of electrical equipment shall comply with the requirements of 2.4, Part X "Electrical Equipment" of the MODU Rules.

**2.5 PROTECTIVE EARTHING OF METAL PARTS OF ELECTRICAL EQUIPMENT  
WHICH DO NOT CARRY CURRENT**

**2.5.1** Earthing of metal parts of the electrical equipment shall comply with the requirements of 2.5, Part X "Electrical Equipment" of the MODU Rules.

## **2.6 LIGHTNING PROTECTION**

**2.6.1** Lighting protection shall comply with the requirements of 2.6, Part X "Electrical Equipment" of the MODU Rules.

## **2.7 ARRANGEMENT OF ELECTRICAL EQUIPMENT**

**2.7.1** Arrangement of electrical equipment shall comply with the requirements of 2.7, Part X "Electrical Equipment" of the MODU Rules.

## **2.8 SPECIAL ELECTRICAL ROOMS**

**2.8.1** Special electrical rooms shall comply with the requirements of 2.8, Part X "Electrical Equipment" of the MODU Rules.



## **2.9 HAZARDOUS AREAS**

**2.9.1** In case where FOP is fitted for drilling works, locations and spaces of the drilling rig shall comply with the requirements of 2.9, Part X "Electrical Equipment" of the MODU Rules.

FOP locations and spaces that are not part of the drilling rig as well as all FOP locations and spaces that are not fitted with a drilling rig shall be classified into hazardous and non-hazardous in accordance with the requirements of standard IEC 60079-10-1:2020.

**2.10 OPENINGS, ACCESS AND VENTILATION CONDITIONS AFFECTING THE EXTENT OF HAZARDOUS ZONES**

**2.10.1** Enclosures and ventilation of hazardous zones shall comply with the requirements of 2.10, Part X "Electrical Equipment" of the MODU Rules.

## **2.11 ELECTRICAL EQUIPMENT AND CABLES IN HAZARDOUS AREAS**

**2.11.1** Electrical equipment and cables in hazardous areas shall comply with the requirements of 2.11, Part X "Electrical Equipment" of the MODU Rules as well as applicable requirements of 20.2, Part XI "Electrical Equipment" of the RS Rules/C, in particular:

for electrical equipment refer to 20.2.4.1, 20.2.4.2, 20.2.4.4 — 20.2.4.12;

for cable routing, refer to 20.2.6;

for integrated cargo and ballast systems, refer to 20.2.7.

## **2.12 ANTISTATIC EARTHING**

**2.12.1** Antistatic earthing of the equipment shall comply with the requirements of 2.12, Part X "Electrical Equipment" of the MODU Rules.

### **3 MAIN SOURCE OF ELECTRICAL POWER**

#### **3.1 COMPOSITION AND CAPACITY OF MAIN SOURCE OF ELECTRICAL POWER**

**3.1.1** Every FOP shall be provided with a main source of electrical power whose capacity is sufficient to supply all FOP necessary electrical equipment under conditions specified in [3.1.2](#). Such a source shall consist of at least two independently-driven generators.

It is permitted to use transformers receiving power from a shore power supply network or from other platform by two separate feeders laid in different cable runs spaced as far as possible as main source of electrical power.

Where there is no need to convert the electrical energy, terminal/junction boxes or cable runs from external networks are considered as the main source.

**3.1.2** The number and capacity of electrical power supply units or feeders from external power sources shall be determined with regard to the following modes of FOP operation:

- .1** drilling and related works;
- .2** production and treatment of products;
- .3** inboard/outboard transfer of products including preparatory and completion operations;
- .4** emergency operations, e.g. fire, flooding or others affecting FOP safety emergency conditions;
- .5** other modes appropriate for the FOP design and purpose, for example:
  - living quarter operation;
  - taking-in of fuels and supply;
  - routine maintenance.

### **3.2 GENERATOR SETS**

**3.2.1** Generating sets shall comply with the requirements of 3.2, Part X "Electrical Equipment" of the MODU Rules.

### **3.3 NUMBER AND CAPACITY OF TRANSFORMERS**

**3.3.1** On FOP, where transformers powered from a shore-based network are used as the sets of the main source of electrical power, and also where lighting and other essential services are powered through transformers, at least two transformers shall be provided of such a capacity that if the largest one fails, the others can satisfy the total demand for electrical power under all operating conditions of the FOP.

Where subdivided system of busbars is used, transformers shall be connected to different sections of the main switchboard.

### **3.4 POWER SUPPLY FROM EXTERNAL SOURCE OF ELECTRICAL POWER**

**3.4.1** Power supply from external source of electrical power shall comply with the requirements of 3.4, Part X "Electrical Equipment" of the MODU Rules.



### **3.5 CONNECTION OF ELECTRICAL POWER SUPPLY UNITS**

**3.5.1** The connection of electrical power supply units shall comply with the requirements of 3.5, Part X "Electrical Equipment" of the MODU Rules.

### **3.6 UNINTERRUPTIBLE POWER SUPPLY**

**3.6.1** Uninterruptible power supplies (UPS) shall comply with the requirements of 3.6, Part X "Electrical Equipment" of the MODU Rules.

#### **4 DISTRIBUTION OF ELECTRICAL POWER**

**4.1** The distribution of electrical power shall comply with the requirements of Section 4, Part X "Electrical Equipment" of the MODU Rules.

## **5 ELECTRIC DRIVES OF MACHINERY AND ARRANGEMENTS**

**5.1** The electric drives of machinery and arrangements shall comply with the requirements of Section 5, Part X "Electrical Equipment" of the MODU Rules.

## **6 LIGHTING**

**6.1** Lighting shall comply with the requirements of Section 6, Part X "Electrical Equipment" of the MODU Rules.

## **7 INTERNAL COMMUNICATION AND ALARMS**

### **7.1 GENERAL**

**7.1.1** Internal communication and alarms shall comply with the requirements of Section 7, Part X "Electrical Equipment" of the MODU Rules with regard to the requirements of Section 2, Part XIV "Automation" Правил МСП.

## **7.2 EXPLOSIVE GAS DETECTION AND ALARM SYSTEM**

**7.2.1** Explosive gas detection and alarm system shall meet the requirements of 7.9, Part X "Electrical Equipment" of the MODU Rules, excluding the requirements of 7.9.3 and 7.9.4.

**7.2.2** The alarm system shall give a visual and audible alarm in the bridge control station when the following levels of explosive gas concentrations are detected in the protected spaces:

maximum concentration of 20 and 50 % of the lower explosive limit (LEL), as specified in Part VI "Fire Protection" of the FOP Rules;

low level alarm set at 10 ppm and high level alarm set not higher than 300 ppm for hydrogen sulphide.

The hydrogen sulphide high level alarm shall activate an evacuation alarm.

If the signal of above explosive gas concentrations has not been received (acknowledged) in the indicating unit within 2 min, the signal "GAS" shall be automatically put out to the general alarm system.

**7.2.3** The automatic system for the shutdown of non-explosion proof type electrical equipment shall be activated when:

explosive gases concentration specified in [7.2.2](#) reaches 50 % of LEL; or

explosive gases concentration is detected in inlets of the air ducts directing air into non-hazardous zones.

The logic of automatic system for the shutdown of non-explosion proof type of the electrical equipment shall be consistent with the dynamic positioning system commands in case the latter is used to maintain operational control over the integrity of the well.

## **8 ELECTRIC PROTECTION SYSTEM**

**8.1** Electric protection system shall comply with the requirements of Section 8, Part X "Electrical Equipment" of the MODU Rules.



## **9 EMERGENCY ELECTRICAL INSTALLATIONS**

### **9.1 GENERAL**

**9.1.1** Emergency electrical installations shall comply with the requirements of Section 9, Part X "Electrical Equipment" of the MODU Rules.

**9.1.2** Emergency power sources on FPU shall ensure supplying of applicable consumers stated in 9.3.1, Part X "Electrical Equipment" of the MODU Rules within 18 h, as well as:

- .1** hazardous and toxic gas detection and alarm system;
- .2** electric drives and control systems of blow-out preventer, gear disconnecting FPU from the well head arrangement, as well as electric drives and control systems of production and offloading systems ensuring safety shut-down of production and offloading processes.

**9.1.3** Cables supplying the electric drives of emergency electrical equipment from emergency power source laid out via high fire hazard shall be fire-resistant or flame-resistant as specified in 16.8.1.7 and 16.8.1.8, Part X "Electrical Equipment" of the MODU Rules. This requirement covers also remote control cables of these appliances.

**9.1.4** Systems for tackling emergencies, emergency power supply as well as control and monitoring systems associated with them shall be self-contained and located in such a way that they are not damaged due to the causes affecting the main power supply system.

## **9.2 SPACES OF EMERGENCY SOURCES OF ELECTRICAL POWER**

**9.2.1** The spaces of emergency sources of electrical power shall comply with the requirements of Chapter 9.2, Part XI "Electrical Equipment" of the Rules for the Classification and Construction of Floating Offshore Oil-and-Gas Product Units.

## **10 ELECTRICAL MACHINES**

**10.1** The electrical machines shall comply with the requirements of Section 10, Part X "Electrical Equipment" of the MODU Rules.

## **11 TRANSFORMERS**

**11.1** The transformers shall comply with the requirements of Section 11, Part X "Electrical Equipment" of the MODU Rules.

## **12 POWER SEMICONDUCTOR UNITS**

**12.1** Power semiconductor units shall comply with the requirements of Section 12, Part X "Electrical Equipment" of the MODU Rules.

### **13 ACCUMULATOR BATTERIES**

**13.1** Accumulator batteries shall comply with the requirements of Section 13, Part X "Electrical Equipment" of the MODU Rules.

## **14 ELECTRICAL APPARATUS AND ACCESSORIES**

**14.1** Electrical apparatus and accessories shall comply with the requirements of Section 14, Part X "Electrical Equipment" of the MODU Rules.

## **15 ELECTRICAL COOKING AND HEATING APPLIANCES**

**15.1** Electrical cooking and heating appliances shall comply with the requirements of Section 15, Part X "Electrical Equipment" of the MODU Rules.



## **16 CABLES AND WIRES**

**16.1** The cables and wires shall comply with the requirements of Section 16, Part X "Electrical Equipment" of the MODU Rules.

**17 REQUIREMENTS FOR ELECTRICAL EQUIPMENT DESIGNED FOR A VOLTAGE  
IN EXCESS OF 1000 V UP TO 15 KV**

**17.1** Electrical equipment designed for a voltage in excess of 1000 V up to 15 kV shall comply with the requirements of Section 18, Part X "Electrical Equipment" of the MODU Rules.

Additional requirements for electrical equipment designed for a voltage in excess of 15 kV are specified in Section 19, Part XI "Electrical Equipment" of the RS Rules/C.

**17.2** The FOP power cables for submarine use shall be subjected to the sea water resistance test taking into consideration a value of hydrostatic pressure corresponding to the maximum depth of the cable operation.

## **18 SPARE PARTS**

**18.1** Spare parts shall comply with the requirements of Section 19, Part X "Electrical Equipment" of the MODU Rules.

Russian Maritime Register of Shipping

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**Part X  
Electrical Equipment**

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