



# RUSSIAN MARITIME REGISTER OF SHIPPING

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**CIRCULAR LETTER**

**No. 314-04-1778c**

dated 27.05.2022

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Re:

amendments to the Rules for the Classification and Construction of Sea-Going Ships

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Item(s) of supervision:

materials and welding

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Entry-into-force date:

**01.07.2022**

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~~Cancels / amends / adds Circular Letter No.~~

~~dated~~

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Number of pages: 1 + 7

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Appendices:

Appendix 1: information on amendments introduced by the Circular Letter

Appendix 2: text of amendments to Parts XIII "Materials", XIV "Welding" and XVI "Structure and Strength of Fiber-Reinforced Plastic Ships"

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Director General

Konstantin G. Palnikov

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Text of CL:

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

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It is necessary to do the following:

1. Bring the content of the Circular Letter to the notice of the RS surveyors, 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 and when performing technical supervision during manufacture of materials for ships contracted for construction or conversion on or after 01.07.2022, in the absence of a contract, in accordance with 5.10, Part II "Technical Documentation" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships, starting from 01.07.2022.
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List of the amended and/or introduced paras/chapters/sections:

Rules for the Classification and Construction of Sea-Going Ships

Part XIII: paras 3.5.1.1 and 3.5.1.2, 3.5.3.1.1, Table 3.6.3, 3.7.1.2, 3.8.1.3, 3.12.9.2, 4.2.8.2, Table 3.16.1.6, para 6.10.1, Table 9.4.3.3-4 and para 9.4.6

Part XIV: paras 4.1.1.2, 4.1.4 and 4.1.5.4

Part XVI: Table 2.3.3.8

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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	Part XIII, paras 3.5.1.1 — 3.5.1.2	Requirements for forgings and castings with confirmed cold resistance properties have been specified	314-04-1778c of 27.05.2022	01.07.2022
2	Part XIII, para 3.5.3.1.1	Requirements for delivery of steel with additional index "Arc" have been specified	314-04-1778c of 27.05.2022	01.07.2022
3	Part XIII, Table 3.6.3	Value of test temperature has been specified	314-04-1778c of 27.05.2022	01.07.2022
4	Part XIII, para 3.7.1.2	Requirements for forgings with confirmed cold resistance properties have been specified	314-04-1778c of 27.05.2022	01.07.2022
5	Part XIII, para 3.8.1.3	Requirements for castings with confirmed cold resistance properties have been specified	314-04-1778c of 27.05.2022	01.07.2022
6	Part XIII, para 3.12.9.2	Requirements for repair of defects have been specified	314-04-1778c of 27.05.2022	01.07.2022
7	Part XIII, Table 3.16.1.6	Designation of steel grade and mark has been specified	314-04-1778c of 27.05.2022	01.07.2022
8	Part XIII, para 4.2.8.2	Requirements for repair of defects have been specified	314-04-1778c of 27.05.2022	01.07.2022
9	Part XIII, para 6.10.1	Requirements for scope of application have been specified	314-04-1778c of 27.05.2022	01.07.2022
10	Part XIII, para 9.4.2.1	Requirements for chemical composition of titanium alloy pipes have been specified	314-04-1778c of 27.05.2022	01.07.2022
11	Part XIII, para 9.4.3.1	Requirements for mechanical properties of titanium alloy pipes have been specified	314-04-1778c of 27.05.2022	01.07.2022
12	Part XIII, para 9.4.3.3	Requirements for titanium alloy grade ПТ-7М with ultrafine grained structure have been introduced	314-04-1778c of 27.05.2022	01.07.2022
13	Part XIII, Table 9.4.3.3-4	New Table has been introduced containing requirements for titanium alloy grade ПТ-7М with ultrafine grained structure	314-04-1778c of 27.05.2022	01.07.2022
14	Part XIII, para 9.4.6	Requirements for titanium alloy grade ПТ-7М with ultrafine grained structure have been introduced	314-04-1778c of 27.05.2022	01.07.2022

Nos.	Amended paras/chapters/ sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
15	Part XIV, para 4.1.1.2	Requirements for the Certificate of Approval for Welding Consumables (COCM) have been specified	314-04-1778c of 27.05.2022	01.07.2022
16	Part XIV, para 4.1.4	Requirements for issuance and renewal of the Certificate of Approval for Welding Consumables have been specified	314-04-1778c of 27.05.2022	01.07.2022
17	Part XIV, para 4.1.5.4	Scope of tests during renewal of the Certificate of Approval for Welding Consumables has been specified	314-04-1778c of 27.05.2022	01.07.2022
18	Part XVI, Table 2.3.3.8	Values of shear modulus and ultimate shear strain for PVC foam with density of 200 have been specified	314-04-1778c of 27.05.2022	01.07.2022

## RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS, 2021,

### ND No. 2-020101-138-E

#### PART XIII. MATERIALS

##### 2 STEEL AND CAST IRON

1 **Paras 3.5.1.1 — 3.5.1.2** are replaced by the following text:

**3.5.1.1** The present requirements apply to the following materials used in structures and machinery of ships and MODU/FOP:

Grade F higher strength steel plates, strips, sections and bars;

steel plates, strip, sections and bars of higher and high strength with index "Arc";

forgings and castings with confirmed cold resistance properties at the required sub-zero temperature.

**3.5.1.2** The general requirements for rolled products depending on the strength level specified and operation conditions including manufacture, inspection, identification, marking and documentation for rolled products, are given in 3.2, 3.13, 3.14 and 3.17.

The general requirements for manufacture, inspection, identification, marking and documentation for forgings and castings are specified in 3.7 and 3.8 accordingly. Requirements for non-destructive testing of forgings and castings are specified in 2.5, Part III "Technical Supervision during Manufacture of Materials" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.

Additional requirements for Grade F steel rolled products of higher strength are given in 3.5.2.

Additional requirements for steels with index "Arc" are given in 3.5.3.

Additional requirements for rolled products with thickness of 15 mm and less are given in 3.5.4.

Additional requirements for forgings and castings with confirmed cold resistance properties at required sub-zero temperature are given in 3.5.5 and 3.5.6, accordingly."

2 **Para 3.5.3.1.1** is replaced by the following text:

**3.5.3.1.1** "Arc" is the symbol added to the designation of steel grade for which additional tests were performed according to the Register programs to determine ductility and cold resistance properties (refer to 2.2.10 and 3.5.3.3 — 3.5.3.3.5) meeting the relevant requirements for Z-properties not less than 35 % according to the requirements of 3.14. The minimum material service/operating temperature  $T_d$  (without the minus symbol) down to which the steel may be used for any structural members without limitations shall be indicated next to the symbol. Example of designation: PCF40Arc30. The firm recognized as manufacturer of steel with index "Arc" may deliver rolled products with this index and temperature values in the range of  $-10^{\circ}\text{C}$  up to  $T_d$ ."

3 **Table 3.6.3.** In column "Test temperature, °C" value "720" is replaced by "-20".

4 **Para 3.7.1.2** is replaced by the following text:

**3.7.1.2** The requirements of this Chapter are applicable only to steel forgings (or rolled steel when used instead of steel forgings as specified in 3.7.1.1) where the designation is determined proceeding from the properties at room temperature.

Additional requirements for the forgings with confirmed cold resistance properties at the required sub-zero temperature are given in 3.5.5.

Requirements for the forgings intended for operation at cryogenic temperatures are specified in Part IX "Materials and Welding" of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk."

5 **Para 3.8.1.3** is replaced by the following text:

**"3.8.1.3** The requirements for alloy steel castings with special properties shall be defined by the product designer in accordance with the national/international standards and thereafter approved by the Register. The documents submitted to the Register for approval shall contain detailed information on the chemical composition, mechanical and special properties, heat treatment procedures and scope of testing the castings.

Additional requirements for the castings with confirmed cold resistance properties at the required sub-zero temperature are given in 3.5.6.

Requirements for the castings intended for operation at cryogenic temperatures are specified in Part IX "Materials and Welding" of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk."

6 **Para 3.12.9.2.** The second paragraph is deleted.

7 **Table 3.16.1.6.** Designation of steel grade and mark "43Ti" is replaced by "430Ti".

#### 4 COPPER AND COPPER-BASE ALLOYS

8 **Para 4.2.8.2.** The second paragraph is deleted.

#### 6 PLASTICS AND MATERIALS OF ORGANIC ORIGIN

9 **Para 6.10.1** is replaced by the following text:

**"6.10.1** The requirements of this Chapter apply to polymer material intended for installation of machinery, equipment, ship's arrangements and their components unless stipulated otherwise in the technical documentation approved by the Register. The standards specified in this Chapter may be replaced by other standards on agreement with the Register (refer to 8 of Appendix 2 to Section 5 of the Guidelines on Technical Supervision of Ships under Construction and 3.6.2, Part III "Technical Supervision during Manufacture of Materials" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships)."

#### 9 TITANIUM ALLOYS

10 **Para 9.4.2.1** is replaced by the following text:

**"9.4.2.1** The material chemical composition for titanium alloy pipes shall be selected considering the required mechanical properties at the room temperature and the design elevated one; the hydrogen content therewith shall not exceed:

for cold-formed pipes — 0,005 %;

for hot-formed pipes — 0,005 %;

for welded pipes — 0,007 %."

11 **Para 9.4.3.1** is replaced by the following text:

**"9.4.3.1** Titanium alloys for ship's piping systems are classed by a strength level as follows:

BT1-00 and BT1-0, ПТ-1М — yield stress  $\geq$  200 MPa;

ПТ-7М — yield stress  $\geq$  400 MPa;

ПТ-3В — yield stress  $\geq$  600 MPa.

The mechanical properties of pipes of titanium alloys shall meet the requirements of the Register-approved standards and/or technical documentation."

12 **Para 9.4.3.3.** Text of the para is replaced as follows:

**"9.4.3.3 Mechanical properties.**

The mechanical properties of pipes are given in Tables 9.4.3.3-1 — 9.4.3.3-4."

13 Para is supplemented with **new Table 9.4.3.3-4** reading as follows:

"Table 9.4.3.3-4

**Mechanical properties of cold-formed pipes of titanium alloys (including with spiral ribs)  
with ultrafine grained structure**

Alloy grade	Tensile strength $R_m$ , MPa	Proof stress $R_{p0,2}$ , MPa	Elongation $A_5$ , %	Tensile strength	Proof stress
				$R_m$ , MPa	$R_{p0,2}$ , MPa
				min.	
at temperature of 20 °C				at temperature of 350 °C	
ПТ-7М	580 — 770	430	20	345	220

13 **Para 9.4.6** is replaced by the following text:

**"9.4.6 Number of tests.**

Titanium alloys for ship's piping systems are classed by the strength level as follows.

Titanium pipes shall be tested in batches. The batch shall comprise the pipes of one alloy grade, the same dimensions, heat and thermal treatment.

The number of pipes in the batch shall be the following:

350 pieces for cold-formed pipes;

75 pieces for hot-formed pipes.

The tests shall be carried out on at least 5 % of pipes in the batch, but not less than on two pipes.

From each pipe prepared for testing shall be taken:

one specimen from either end of the pipe: for determining the fraction of a total mass of hydrogen;

one specimen from each end of the pipe: for tensile test at room temperature;

one specimen from each end of the pipe: for tensile test at elevated temperature;

one specimen from each end of the pipe: for flattening;

one specimen from either end of the pipe with ultrafine grained structure for preparing a transverse section and structure control;

one specimen from either end of the cold-formed pipe: for flaring.

Every pipe in the batch shall be subjected to ultrasonic testing for defects.

All pipes shall be tested by hydraulic pressure. The test pressure is specified by the standards for pipes or the Register-approved documentation.

The hydraulic tests may be omitted, if each pipe is subjected to ultrasonic or another equivalent testing."

# RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS, 2022,

ND No. 2-020101-152-E

## PART XIV. WELDING

### 4 WELDING CONSUMABLES

14 **Para 4.1.1.2** is replaced by the following text:

**4.1.1.2** The requirements of this Section apply to the initial approval, renewal and annual endorsement of the Certificate of Approval for Welding Consumables, as well as the Certificate (C), regarding the welding consumables used for welding the normal, higher and high strength hull structural steels, corrosion-resistant (stainless) steels and aluminium alloys.

This Section specifies the requirements for approval of the following categories of welding consumables:

- covered electrodes for manual arc welding, and also for gravity and contact welding;
- "wire — flux" combinations for submerged arc welding;
- "wire — gas" combinations for gas-shielded metal arc welding (including tungsten inert gas welding — TIG, as well as plasma arc welding);
- flux-cored wire with or without shielding gas for metal arc welding;
- welding consumables for electrogas and electroslag welding."

15 **Para 4.1.4** is replaced by the following text:

#### **4.1.4 Issuance and renewal of the Certificate.**

**4.1.4.1** Upon satisfactory completion of the survey and tests required in this Section to the extent of the initial approval, the Register issues to a manufacturer the Certificate of Approval for Welding Consumables (COCM) or the Certificate (C) of a set form. After issuance of the Certificate of Approval for Welding Consumables the manufacturer shall draw up the MC document for the batch stipulating the compliance of the consumable with RS requirements. MC content shall meet the requirements of 5.4, Part I "General Regulations for Technical Supervision" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships. The approved welding consumables, having the Certificate of Approval for Welding Consumables, and manufacturers shall be registered and entered in the special list located at the Register website (<http://www.rs-class.org/en> → "Online information" → "Approved materials and products, service suppliers, companies" → "Approved materials and products").

**4.1.4.2** Upon satisfactory completion of tests, the Register assigns one grade to the relevant welding consumable requested by the manufacturer. In accordance with the requirements of 2.2.4.4, at the manufacturer's request, the Register may assign to the welding consumable additional grades within one temperature value of impact test upon receiving satisfactory test results. In this case preparation and welding of test assemblies shall be carried out in accordance with the requirements of 4.2.1.

**4.1.4.3** Upon expiry, the Certificate of Approval for Welding Consumables is renewed provided that the relevant request from the manufacturer of welding consumables has been submitted to the Register. At that the manufacturer shall guarantee adherence to the welding and technological properties of the welding consumables, chemical composition of the deposited metal and mechanical properties of welded joints.

The scope of tests during the Certificate of Approval for Welding Consumables renewal shall be determined in accordance with 4.1.5.4."

16 **Para 4.1.5.4** is replaced by the following text:

**4.1.5.4** Where conditions of re-approval are not met, the validity of the Certificate of Approval for Welding Consumables is ceased, and the welding consumables indicated therein may no longer be used for fabrication of the structures subject to survey by the Register.

Upon expiry, in accordance with 4.1.4.3 the Certificate of Approval for Welding Consumables shall be renewed (extended by the Register with a new number) on the basis of the tests to the extent of the annual endorsement and, additionally, shall include the following tests:

checking of chemical composition of the deposited metal;

checking of diffusible hydrogen content in the deposited metal for welding consumables with relevant indices of additional classification.

Where the Certificate ceases to be valid ahead of time on the manufacturer's initiative, its extension requires tests in the scope of the renewal.

In case the manufacturer has and maintains the quality system recognized by the Register, the RS surveyor may not be present during the tests, provided they are conducted by the manufacturer in compliance with the quality control system in force at the manufacturer's and the test results are checked.

Note. The welding consumables manufacturer's quality system approval (certification) documents issued by the classification societies — IACS members, as well as by other competent bodies authorized in accordance with the national legislation or international agreements may be recognized by the Register after their review."

## PART XVI. STRUCTURE AND STRENGTH OF FIBER-REINFORCED PLASTIC SHIPS

### 2 MATERIALS

17 **Table 2.3.3.8** is replaced by the following text:

"Table 2.3.3.8

**Physical and mechanical properties of PVC foams and PUR foam**

Characteristic	Foam plastic					
	PVC foam			PUR foam		
Density, in kg/m <sup>3</sup>	40	100	200	35 — 55	100 — 120	200 — 220
Compression strength (at 10 % deformation), in MPa	at least 0,4	at least 1,5	at least 4,0	at least 0,2	at least 0,9	at least 2,5
Young's compression modulus, in MPa	30	100	250	7,5 — 10	25 — 35	100 — 120
Tensile strength, in MPa	at least 0,7	at least 2,5	at least 6,0	at least 0,16	at least 0,8	at least 2,0
Young's elongation modulus, in MPa	25	80	180	—	—	—
Shear strength, in MPa	at least 0,40	at least 1,5	at least 3,5	at least 0,1	at least 0,5	at least 1,0
Shear modulus in laminate plane, in MPa	10	35	75	—	—	—
Ultimate shear strain, in %	8	25	30	—	—	—

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