



RUSSIAN MARITIME REGISTER OF SHIPPING

CIRCULAR LETTER

No. 314-04-1849c

dated 09.11.2022

Re:

amendments to the Rules for the Classification and Construction of Sea-Going Ships, 2022, ND No. 2-020101-152-E

Item(s) of supervision:

materials and welding

Entry-into-force date:

01.01.2023

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Appendices:

Appendix 1: information on amendments introduced by the Circular Letter

Appendix 2: text of amendments to Parts XIII "Materials" and XIV "Welding"

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 the 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, 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 on materials used onboard the ships contracted for construction or conversion on or after 01.01.2023, in the absence of information on the ship, in case of the request for review and approval of the technical documentation on materials submitted on or after 01.01.2023.
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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 2.1.6, 2.2.2.9, 2.2.3.1, 2.2.6.2.4, 2.2.5.2 — 2.2.5.6, 3.2.8.1, 3.14.5, 5.1.4, 5.1.8, 7.2.3.1.1 and 7.2.3.2.9.1;

Part XIV: para 4.2.3.2, Table 4.2.3.4 and para 4.7.4.1

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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 2.1.6, 2.2.2.9, 2.2.3.1, 2.2.6.2.4, 2.2.5.2 — 2.2.5.6, 3.2.8.1, 3.14.5, 5.1.4, 5.1.8, 7.2.3.1.1 and 7.2.3.2.9.1)	Throughout the text of Part XIII, references to international standards have been specified considering IACS Unified Requirements (UR) W2 (Rev.3 Sep 2021), W13 (Rev.7 Sep 2021), W14 (Rev.3 Sep 2021), W18 (Rev.6 Sep 2021) and W25 (Rev. 6 Sep 2021)	314-04-1849c of 09.11.2022	01.01.2023
2	Part XIV (para 4.2.3.2, Table 4.2.3.4 and para 4.7.4.1)	Throughout the text of Part XIV, the references to international standards have been specified considering IACS UR W17 (Rev.6 Sep 2021)	314-04-1849c of 09.11.2022	01.01.2023

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

ND No. 2-020101-152-E

PART XIII. MATERIALS

2 PROCEDURES OF TESTING

1 **Para 2.1.6** is replaced by the following text:

"2.1.6 All the tests shall be carried out by competent personnel on testing machines of adequate capacity being maintained in the appropriate operating condition. The measurement accuracy of testing machines shall be within ± 1 %. The machines shall be regularly, as a rule at least once per year, checked and calibrated by the duly designated national authorities.

The results of regular checks shall be submitted to the Register.

Charpy machines for impact tests shall be verified in accordance with the requirements of ISO 148-2:2016 or another RS-agreed standard.

Machines for tensile/compression tests shall be verified in accordance with the requirements of ISO 7500-1:2018 or another RS-agreed standard."

2 **Para 2.2.2.9** is replaced by the following text:

"2.2.2.9 The tolerances on specimen dimensions given in 2.2.2 shall be in accordance with ISO 6892-1:2019 and ISO 6892-2:2018. If made according to the RS-agreed standards, the specimen deviations shall comply with these standards."

3 **Para 2.2.3.1** is replaced by the following text:

"2.2.3.1 The impact toughness *KCU* shall be determined on Charpy U-notch type test specimens as in Fig. 2.2.3.1-1 and Table 2.2.3.1-1, the impact energy *KV* and *KU* on Charpy V-notch type test specimens and Charpy U-notch type test specimens as in Figs. 2.2.3.1-2 and 2.2.3.1-3, and Tables 2.2.3.1-2 and 2.2.3.1-3.

The impact tests shall be carried out on Charpy machines complying with the requirements of ISO 148-2:2016 or other RS-agreed national or international standard, and having a striking energy of not less than 150 J. Where the test temperature is other than ambient, the temperature of the test specimen at the moment of breaking shall be the specified temperature within ± 2 °C.

The impact energy *KV* and *KU* is determined as an average value obtained at testing three specimens. The required mean values of the impact energy depending on the dimensions of the specimens selected for tests (*E* is the required minimum value of impact energy) are given in Table 2.2.3.1-4. The result of tests on one of the specimens therewith may be less than that given in Table 2.2.3.1-4, but its value shall not be less than 70 % of the required one.

Impact energy *KV* for the rolled products having thickness *t* of less than 10 mm is determined under test specimens as in Fig. 2.2.3.1-2 with width *b* equal to rolled thickness with no machining of the sides. For welded joints of such rolled products, the impact energy *KV* is determined on machined specimens of maximum possible thickness considering removal of weld undercuts. It is recommended to use welded specimens with thickness of *b* = 7,5, 5 and 2,5 mm.

The required impact value *E(b)* for specimens with width *b* < 10 mm may be calculated based on the required minimum average impact energy for specimens 10 mm wide (*E*₁₀) using formula

$$E(b)=(b/15+1/3)E_{10} \quad (2.2.3.1)$$

rounding to the whole number in J. The test result for one of the specimens may be lower than the value calculated by the Formula (2.2.3.1), but it shall be equal to at least 70 % of the required one.

The tests on the rolled products with thickness of less than 6 mm shall be performed upon the Register request considering the requirements in 3.5. The tests on the rolled products with thickness of less than 2,5 mm shall not be performed.

The impact toughness *KCU* is determined as an average value obtained at testing two specimens. In this case, each of the impact toughness values obtained shall not be less than required. Necessity of testing impact toughness of material having a thickness of less than 10 mm as well as corresponding estimation criteria shall be justified in the documentation submitted to the Register."

Tables 2.2.3.1-1 — 2.2.3.1-4 and Figures 2.2.3.1-1— 2.2.3.1-3 remain unchanged.

4 **Paras 2.2.5.2 — 2.2.5.6** are replaced by the following text:

2.2.5.2 Flattening tests are carried out on specimens (pipe lengths) having a length from 10 mm to 100 mm.

The specimen ends shall be plain and smooth with their cuts perpendicular to the tube axis (ISO 8492:2013).

2.2.5.3 Drift expanding tests are carried out on specimens made in accordance with the requirements of ISO 8493:1998 (refer to Fig. 2.2.5.3).

For metallic tubes, the specimen length (tube length) *L* is equal to twice the external diameter *D* of the tube if the angle of the drift *b* is 30°, and *L* is equal to 1,5*D* if the angle of the drift is 45° or 60°. The test piece may be shorter, provided that after testing the remaining cylindrical portion is not less than 0,5*D*.

The rate of mandrel penetration shall not exceed 50 mm/min.

2.2.5.4 Ring tensile tests are carried out in accordance with the requirements of ISO 8496:2013. The length of specimens (tube lengths) is equal to 15 mm and the rate in tests shall not exceed 5 mm/s.

2.2.5.5 Flanging tests are carried out on specimens (tube lengths) having a length of 1,5*D* in accordance with the requirements of ISO 8494:2013 (refer to Fig. 2.2.5.5). The test piece may be shorter, provided that after testing the remaining cylindrical portion is not less than 0,5*D*.

The rate of mandrel penetration shall not exceed 50 mm/min.

2.2.5.6 Ring expanding tests are carried out in accordance with the requirements of ISO 8495:2013 (refer to Fig. 2.2.5.6). The length of specimens (tube lengths) may vary from 10 mm to 16 mm and the rate of mandrel penetration shall not exceed 30 mm/s."

Figures 2.2.5.3, 2.2.5.5 and 2.2.5.6 remain unchanged.

5 **Para 2.2.6.2.4** is replaced by the following text:

2.2.6.2.4 The specimens to determine nil-ductility temperature are manufactured in accordance with ASTM E-208:2019 standard. Tests shall be carried out on the specimen types indicated in Table 2.2.6.2.4.

Table 2.2.6.2.4

Specimen type	Thickness	Width	Length
P-1	25 ± 2,5	90 ± 2,0	360 ± 2,0
P-2	19 ± 1,0	50 ± 1,0	130 ± 1,0
P-3	16 ± 0,5	50 ± 1,0	130 ± 1,0

The dimensions of specimens are chosen so that the specimen thickness shall be closest to the thickness of the semi-product subjected for the testing. Exception: if actual material yield strength exceeds 900 MPa, only specimens of types P-2 and P-3 are used."

3 STEEL AND CAST IRON

6 **Para 3.2.8.1** is replaced by the following text:

"3.2.8.1 Application.

These requirements apply to the tolerance on thickness of steel plates and wide flats with widths of 600 mm or greater with thicknesses of 5 mm and over, covering the following steel grades:

- .1 normal and higher strength hull structural steels according to 3.2;
- .2 high strength hull structural steels according to 3.13;
- .3 steels for machinery structures.

The thickness tolerances for steel plates and wide flats below 5 mm may be taken from national or international standards, equivalent to Class B (ISO 7452:2013). In this case, minus tolerance shall not exceed 0,3 mm.

These requirements do not apply to rolled steel products intended for the constructions of boilers, heat exchangers, pressure vessels, cargo handling gear, etc., as well as independent tanks for the transportation of liquefied gases or chemicals.

Class C (ISO 7452:2013) or equivalent according to national or international standards may be applied in lieu of 3.2.8.3, in which case the requirements in 3.2.8.4 and 3.2.8.5 need not be applied.

If Class C (ISO 7452:2013) is applied, the footnote Table 2 part of which reads: "Also a minus side of thickness of 0,3 mm is permitted.", is not applicable.

Additionally, if Class C (ISO 7452:2013) is applied, it is required that the steel mill demonstrate to the satisfaction of the Register that the number of measurements and measurement distribution is appropriate to establish that the mother plates produced are at or above the specified nominal thickness."

7 **Para 3.14.5** is replaced by the following text:

"3.14.5 Inspection.

Besides fulfilment of the requirements of 3.2.7, all the rolled products shall be subject to ultrasonic testing at the final stage of manufacture.

The ultrasonic testing shall be carried out in compliance with the requirements of EN 10160:1999 (level S1/E1) and ASTM A 578:2017 (level C at a frequency of 4 MHz) or with the RS-agreed national standards."

5 ALUMINIUM ALLOYS

8 **Para 5.1.4** is replaced by the following text:

"5.1.4 Condition of supply.

Condition of supply shall be specified in accordance with EN 515:2017 or ANSI H35.1:2017. National aluminium wrought alloys shall be delivered with indication of condition of supply in accordance both with EN 515:2017 and applicable national standards.

The parameters of thermal and thermomechanical treatment providing alloys properties are determined by semi-finished products manufacturer.

Condition of supply is specified in the Manufacturer's Certificate for semi-finished product."

9 **Para 5.1.8** is replaced by the following text:

"5.1.8 Corrosion testing.

Rolled alloys of type 5083, 5383, 5059, 5086 and 5456 in H116 and H321 tempers intended for use in marine hull construction or in marine applications where frequent direct contact with seawater is expected shall be corrosion tested in the above medium with respect to exfoliation and intergranular corrosion resistance.

During the initial works survey for the purpose of its recognition, the manufacturer shall provide data concerning the relationship between microstructure and resistance to corrosion.

Reference photomicrographs taken at 500X (according to provisions in ASTM B928:2015, Section 9.4.1), shall be established for each of the alloy-tempers and thickness ranges relevant. The reference photographs shall be taken from samples, which have exhibited no evidence of exfoliation corrosion and a pitting rating of PB or better, when subjected to the test described in ASTM G66:2018 (ASSET). The samples shall also have exhibited resistance to intergranular corrosion at a mass loss no greater than 15 mg/cm², when subjected to the test described in ASTM G67:2018 (NAMLT). The tests for exfoliation corrosion and intergranular corrosion may be conducted in accordance with other RS-agreed national standards.

The documentation (reports) relating to the test results and the established relationship between microstructure and resistance to corrosion submitted by the manufacturer shall be approved by the Register. Any changes in production practices of the material shall require respective examinations to be carried out and documentation exhibiting evidence of alloy corrosion resistance to be reapproved.

For rolled alloys of type 5083, 5383, 5059 and 5086 in the H116 and H321 tempers, comparative metallographic examination of one sample selected from mid width at one end of a batch coil (semi-finished product) shall be carried out.

A longitudinal section perpendicular to the rolled surface shall be prepared for comparative metallographic examination according to provisions in ASTM B928:2015, Section 9.6.1. If the microstructure shows evidence of continuous grain boundary network of aluminium-magnesium precipitate in excess of the metal tested at the initial approval, the batch shall either be rejected or tested for exfoliation-corrosion resistance and intergranular corrosion resistance. The methods and assessment criteria of corrosion resistance test results shall be in accordance with ASTM G66:2018 and G67:2018 or the RS-agreed standards. Acceptance criteria are that the sample shall exhibit no evidence of exfoliation corrosion and a pitting rating of PB or better when test subjected to ASTM G66:2018 ASSET test, and the sample shall exhibit resistance to intergranular corrosion at a mass loss no greater than 15 mg/cm² when subjected to ASTM G67:2018 NAMLT test.

If the results from testing satisfy the above criteria, the batch is accepted.

As an alternative to metallographic testing, each batch may be tested for exfoliation-corrosion resistance and intergranular corrosion resistance, in accordance with ASTM G66:2018 and G67:2018 under the conditions specified in ASTM B928:2015, or the equivalent RS-agreed standards. If this alternative is used, then the results of the test shall satisfy the acceptance criteria stated in 5.1.8."

7 ANCHOR AND MOORING CHAIN CABLES

10 **Para 7.2.3.1.1** is replaced by the following text:

"**7.2.3.1.1** Drawings accompanied by design calculations, giving the detailed design of chain and accessories made by, or supplied through, the chain manufacturer shall be submitted to the Register for approval. Typical designs are given in ISO 1704:2008. For studless chain the shape and proportions shall comply with the requirements of this Section. Application of studless chains and accessories of designs other than specified in this Section is considered by the Register to be application of new or non-standard designs of chains, shackles or fittings. For application of the latter results of fatigue and corrosion fatigue tests shall be submitted. Documentation specifying the characteristics of the chain and fittings shall be approved by the Register."

11 **Para 7.2.3.2.9.1** is replaced by the following text:

"**7.2.3.2.9.1** The shape and proportion of links and accessories shall conform to ISO 1704:2008 or the relevant documentation approved by the Register. "

PART XIV. WELDING

4 WELDING CONSUMABLES

12 **Para 4.2.3.2** is replaced by the following text:

"4.2.3.2 The following methods may be used to determine the content of diffusible hydrogen:

.1 the so-called mercury method standardized by ISO 3690:2018 and considered as the reference method, which requires degassing of the specimens in the mercury environment at the atmospheric pressure and at room temperature. The method is called "mercury" due to the sealing and manometer type fluid. The vacuum system used for the mercury method is used to prepare the installation for measurements as well as for preliminary drying (degassing) surface of the specimen;

.2 methods standardized by ISO 3690:2018 and based on degassing of the specimens in an inert carrier environment with the use of the thermal conductivity detectors (TCD) as instruments. These methods are also referred to as gas chromatographic because of the name of the equipment used to measure the amount of the precipitated hydrogen;

.3 vacuum methods based on degassing the specimens in vacuum at room temperature and providing results comparable to ISO 3690:2018 method (for example, method 2 according to GOST 23338-91). The amount of the precipitated gas can be determined by a liquid manometer or other types of manometers providing the required accuracy in the used measurement range;

.4 methods based on degassing the specimens and collecting the precipitated hydrogen in the glycerine environment at the normal pressure and temperature of 45 °C. The selected test temperature is determined by viscosity-vs-temperature properties of glycerine as 45 °C is the minimum temperature when free bubble can float up and build up a regular shape meniscus in the manometer tube used for gas volume measurement."

13 **Table 4.2.3.4** is replaced by the following text:

"Table 4.2.3.4

Classification notation by hydrogen content ¹	Content of diffusion hydrogen in the deposited metal when using the method, max. cm ³ /100 g of deposited metal	
	ISO 3690:2018 ²	Glycerine ³
H 15	15	15
H 10	10	10
H 5	5	Not applicable

¹ For very low hydrogen welding consumables, an additional notation 3 may be used to indicate an average value of diffusion hydrogen content max. 3,0 cm³/100 g of deposited metal.
² Together with mercury and TCD (gas chromatographic) methods regulated by ISO 3690:2018, diffusion hydrogen content may be determined using the vacuum method (GOST 23338-91, method 2) provided that all the requirements specified in 5.4.6, 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 are met.
³ If all the requirements to this test method as specified in 5.4.6, 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 are met.

14 **Para 4.7.4.1** is replaced by the following text:

"4.7.4.1 The all grades welding consumables for welding high strength steels, except "solid wire — gas" combinations, shall be subjected to tests for checking diffusible hydrogen content in the deposited metal using the following methods:

vacuum-mercury method complying with the requirements of ISO 3690:2018;

vacuum method complying with the requirements in GOST 23338-91 (method 2);

chromatographical method complying with the requirements in GOST 23338-91 (method 1) or the Register-agreed procedure. In the latter case the cooling rate and the time for specimens preparation, and also the diffusible hydrogen amount to be determined shall be comparable with those specified in the reference method according to ISO 3690:2018."