



# RUSSIAN MARITIME REGISTER OF SHIPPING

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**CIRCULAR LETTER**

**No. 314-01-1289c**

dated 18.11.2019

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Re:

amendments to the Rules for the Classification and Construction of Sea-Going Ships, 2019, ND No. 2 020101-114-E

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Item(s) of supervision:

non-destructive testing of welded joints

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Entry-into-force date:  
**20.12.2019**

Valid till:-

Validity period extended till: -

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Cancels / amends / adds Circular Letter No. -

dated -

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Number of pages: 1+5

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Appendices:

Appendix 1: information on amendments introduced by the Circular Letter

Appendix 2: text of amendments to Part XIV "Welding"

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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 based on the results of scientific research "Improvement of RS requirements for welding materials and welding processes of ship hull high-strength steel structures, including the structures operating at low temperatures", shall be amended as specified in Appendix 2 to the Circular Letter.

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It is necessary to do the following:

1. Familiarize the RS surveyors, as well as the interested organization in the area of RS Branch Offices' activity with the content of the Circular Letter.
  2. Apply the provisions of the Circular Letter in the RS practical activity.
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List of the amended and/or introduced paras/chapters/sections:

Part XIV: paras 1.2.1, 3.1.5, 3.2.1 – 3.2.6, 3.2.2.8 (existing 3.2.1.8), 3.4.2.2, 3.4.3.2, 3.4.4.2, 3.4.5.4, 3.4.6.4, 3.5.2.2, 3.5.3.2 and 3.5.4.4

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"Thesis" System No. 19-302644

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

No.	Amended paras/chapters/sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
1	Para 1.2.1	A new definition "Heat input" has been introduced	314-01-1289c of 18.11.2019	20.12.2019
2	Para 3.1.5	The para has been deleted	314-01-1289c of 18.11.2019	20.12.2019
3	Para 3.2.1	A new para has been introduced with the specified requirements of the deleted para 3.1.5 for acceptance testing of welded joints considering the results of scientific research and in accordance with Table 2.5.1 of Guidelines on Technical Supervision of Ships under Construction, Existing paras 3.2.1 – 3.2.6 have been renumbered 3.2.2 – 3.2.7 accordingly	314-01-1289c of 18.11.2019	20.12.2019
4	Para 3.2.2.8	The reference to para 3.1.5.6 has been replaced by 3.2.1.6	314-01-1289c of 18.11.2019	20.12.2019
5	Chapter 3.4	Throughout the Chapter the reference to para 3.1.5 has been replaced by 3.2.1	314-01-1289c of 18.11.2019	20.12.2019
6	Chapter 3.5	Throughout the Chapter the reference to para 3.1.5 has been replaced by 3.2.1	314-01-1289c of 18.11.2019	20.12.2019

## RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS, 2019,

### ND No. 2-020101-114-E

## PART XIV. WELDING

### 1 GENERAL

1 **Para 1.2.1.** The definition "Heat input  $E_1$ " is introduced reading as follows:

"Heat input  $E_1$  – electric power consumed per unit of weld length and calculated by the formula  $E_1 = \frac{IU}{v}$ , kJ/cm, where  $I$  – welding current, A;  $U$  – welding voltage, V;  $v$  – welding speed, cm/s."

### 3 TESTING OF WELDED JOINTS

2 **Para 3.1.5** is deleted.

3 A new **para 3.2.1** is introduced reading as follows:

#### **"3.2.1 Requirements for acceptance non-destructive testing of welded joints.**

**3.2.1.1** Acceptance non-destructive testing of welded joints shall be carried out (unless otherwise specified) after completion of all welding and straightening work prior to painting or priming, or prior to application of galvanic and other coverings.

During welding of higher strength steels structures at least 48 h shall pass between completion of welding and start of acceptance testing.

During welding high strength steels structures, the acceptance testing shall be carried out in two stages: primary and duplicate testing. The primary testing shall be carried out in 48 h after the completion of welding works in accordance with the acceptance testing procedure for high strength steels.

The duplicate testing shall be performed only on welded joints made at subzero temperatures, approved by the primary testing results, not earlier than 10 days after the primary testing. The scope of the duplicate testing is assigned depending on the Class of the ship's hull structural members in accordance with 1.2.3.7 of Part II "Hull" and shall be 100 % for structural members of Class III, 50 % for structural members of Class II, and 25 % for structural members of Class I.

Notes: 1. If a manufacturer can submit a documentary evidence of resistance to cold cracking for the applied materials and welding procedure, the time between the completion of welding and start of testing may be reduced for A/F40 or lower grade steels up to 40 mm thick and for A/F500 or higher grade steels up to 20 mm thick.

2. This requirement does not cover operational technical testing performed during manufacture of products in accordance with the requirements of technical regulation (e.g., the layer testing of welded joints by visual testing, testing of welded joints with partially filled groove etc.).

3. For stem structures of icebreakers and ice class ships, at least 72 h shall pass between the completion of welding and start of acceptance testing of welded joints.

4. The duplicate testing of high strength steel welded joints shall be carried out at the manufacturers' producing high strength steel structures for the first time, as well as after eliminating defects in the form of cold cracks.

**3.2.1.2** All welded joints shall be initially subjected to acceptance based upon results of visual testing of 100 % length on both sides of joint (if this is technically feasible). All impermissible defects and deficiencies as per form and size of joint as well as other defects preventing non-destructive testing by other methods shall be eliminated, and locations of repair shall be repeatedly accepted by the welding structures manufacturer's control body. The Register

reserves a right to require additional testing areas by relevant methods in those locations where visual testing detected defects indicative of a serious breach of the welding procedure.

**3.2.1.3** If welded joints are subjected to heat treatment the final acceptance testing shall be performed upon its completion.

**3.2.1.4** A repeated non-destructive testing prior to the welded structures commissioning (handing to the customer) or at their final acceptance may be required if these structures were subjected to loads not provided for normal operation (e.g. during transportation to the place of assembly, proof load testing or testing by pressure exceeding design operating values). Methods and scope of such testing shall be approved by the Register.

**3.2.1.5** Impermissible defects detected at any testing stage of welded joints are subject to mandatory repair. A repeated repair of the same area of the welded joint is allowed only when specified in the documentation agreed with the Register. Repair of internal defects on the same weld length is usually not allowed more than twice.

**3.2.1.6** If cracks are detected during testing of welded joints the following measures shall be taken:

.1 the whole length of the technologically independent welded joint made by the welder having performed a rejected weld shall be tested. All short welds (less than 1 m) in a block or assembly performed following the similar (to the rejected) welding procedure shall be tested;

.2 welding following the similar welding procedure specification shall be suspended;

.3 reasons for cracking shall be revealed and eliminated and the measures taken for their elimination shall be reported to the Register surveyor. If necessary, the welding procedure specification shall be corrected to be repeatedly submitted for the Register approval;

**Notes:** 1. Technologically independent welded joint is a continuous joint with the same section and edge preparation performed according to the same welding procedure specification in one or continuously changing welding position.

2. Butt welds of flat bulb and T-section steel parts as well as T-joints with full penetration of branches with plating, decks or bulkheads are considered as short welds.

**3.2.1.7** If defects other than cracks (refer to 3.2.1.6.) are detected during testing of welded joints the following actions shall be taken:

.1 testing shall be continued in areas adjacent to the rejected one from both sides until satisfactory results are gained;

.2 additional testing of two new areas shall be performed according to 3.2.1.8 per one rejected area;

**Note.** This requirement does not cover testing areas adjacent to the rejected one and specified to detect the weld defective area according to 3.2.1.7.1.

.3 four similar welds performed by the same welder following the same welding procedure specification: two antecedent and two consecutive, shall be additionally tested as per short welds;

.4 if results of additional testing according to 3.2.1.7.2 and 3.2.1.7.3 bear witness of the systematic character of impermissible defects, then all technologically independent welded joints or short welds in a block performed by one welder following one welding procedure specification shall be tested along the whole length;

.5 if during initial and additional testing 50 % and more of the technologically independent welded joint length or of the number of similar short welds in a block are tested and it is established that further testing is required, then the whole length of the joint shall be tested or all similar short welds in a block shall be tested.

**3.2.1.8** When specifying additional testing areas according to 3.2.1.7.2 the following shall be followed:

.1 for circular butt joints between blocks and assembly butt joints additional testing areas shall be located somewhere in the middle between the areas tested earlier and assessed "fit";

.2 for intrablock welded joints additional testing areas shall be located on joints of which initial radiographic and ultrasonic testing was not carried out;

.3 if during initial testing at least one area was tested on all intrablock joints, additional testing shall be carried out on the welded joint with the defective area;

.4 if an area with intersection of welded joints was tested, additional testing areas shall be located on the weld with impermissible defect.

**3.2.1.9** If during additional radiographic or ultrasonic testing the welded joint area quality is assessed "fit", the testing is stopped. If the additional testing area quality is assessed "unfit", the testing shall be continued according to 3.2.1.7 until satisfactory results are gained.

**3.2.1.10** The following shall be observed during testing of welded joints after repair of impermissible defects:

.1 testing after repair of the whole technologically independent joint rejected upon the results of radiographic or ultrasonic testing shall be carried out in full scope by all testing methods provided by technical documentation for the acceptance testing of this joint;

.2 testing of separate areas of the welded joint rejected upon the results of radiographic or ultrasonic testing shall be performed after repair along the whole length by the same methods which were used for detection of repaired defects;

.3 quality assessment and acceptance of repaired welded joints shall be carried out following the same criteria as during the initial testing;

.4 if no impermissible defects are detected in the welded joint after repair, it is assessed "fit";

.5 if defects are detected in the welded joint after repair – refer to 3.2.1.5.

**3.2.1.11** When shell plating welds are tested, the radiograph shall be located at the intersection of the weld axes so as to partially cover also the seam as shown in Fig. 3.2.1.11-1. In ultrasonic testing areas wider than 100 mm shall be tested on each side of the butt as shown in Fig. 3.2.1.11-2.

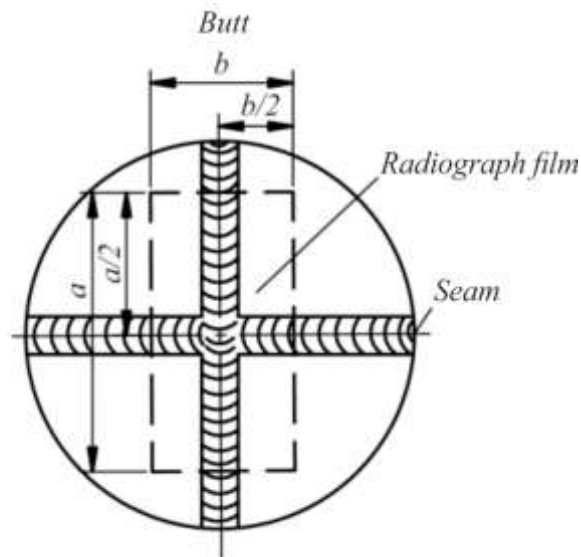


Fig. 3.2.1.11-1:  $a$  – length of radiograph equal to  $\approx 500$  mm;  $b$  – width of radiograph equal to  $\approx 100$  mm

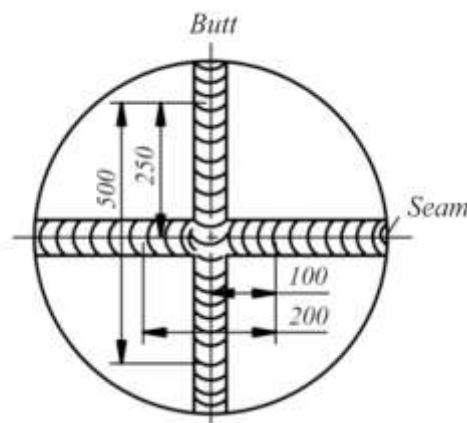


Fig. 3.2.1.11-2

- 4 **Existing paras 3.2.1 – 3.2.6** are renumbered **3.2.2 – 3.2.7** accordingly.
- 5 **Para 3.2.2.8 (existing para 3.2.1.8)**. The reference "3.1.5.6" is replaced by "3.2.1.6".
- 6 **Paras 3.4.2.2, 3.4.3.2, 3.4.4.2, 3.4.5.4, 3.4.6.4, 3.5.2.2, 3.5.3.2 and 3.5.4.4**. The reference "3.1.5" is replaced by "3.2.1".