



# RUSSIAN MARITIME REGISTER OF SHIPPING

**CIRCULAR LETTER**

**No. 314-29-1234c**

dated 31.05.2019

Re:

amendments to the Rules for the Classification and Construction of Sea-Going Ships, 2019, ND No. 2-020101-114-E, in connection with coming into force of IACS Unified Requirements (UR) W17 (Rev.5 Mar 2018) and W23 (Rev.2 Apr 2018)

Item(s) of supervision:

welding consumables

Entry-into-force date:

**01.07.2019**

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Appendices:

Appendix 1: information on amendments introduced by the Circular Letter

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

Director General

Konstantin G. Palnikov

Text of CL:

We hereby inform that in connection with coming into force of IACS Unified Requirements (UR) W17 (Rev.5 Mar 2018) "Approval of consumables for welding normal and higher strength hull structural steels" and W23 (Rev.2 Apr 2018) "Approval of welding consumables for high strength steels for welded structures" 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. Familiarize the RS surveyors, as well as interested organizations 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.

List of the amended and/or introduced paras/chapters/sections:

Part XIV: para 2.2.5, Tables 2.2.5-1 and 2.2.5-2, Table 4.1.2.3, para 4.2.3.1, Tables 4.3.1.1, 4.4.1.4 and 4.5.2.1, paras 4.6.1.2, 4.7.1.1 and 4.7.1.3, Table 4.7.2.4, para 4.7.3.1, Tables 4.7.3.3 and 4.7.4.2, para 4.7.5

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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	Para 2.2.5, Tables 2.2.5-1 and 2.2.5-2	New grades of welding consumables and requirements for welding of structures from high strength steels have been added considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019
2	Table 4.1.2.3	New grades of welding consumables for welding of high strength steels have been added considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019
3	Para 4.2.3.1	New grades of welding consumables for testing diffusible hydrogen content in the deposited metal have been added considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019
4	Table 4.3.1.1.	Notation for longitudinal cylindrical tensile test specimens has been changed considering IACS UR W17 (Rev.5, Mar 2018)	314-29-1234c of 31.05.2019	01.07.2019
5	Table 4.4.1.4	Notation for longitudinal cylindrical tensile test specimens has been changed considering IACS UR W17 (Rev.5, Mar 2018)	314-29-1234c of 31.05.2019	01.07.2019

6	Table 4.5.2.1	Notation for longitudinal cylindrical tensile test specimens has been changed considering IACS UR W17 (Rev.5, Mar 2018)	314-29-1234c of 31.05.2019	01.07.2019
7	Para 4.6.1.2	New grade for welding of higher strength steels has been added considering IACS UR W17 (Rev.5, Mar 2018)	314-29-1234c of 31.05.2019	01.07.2019
8	Para 4.7.1.1	Requirements to the conditions of supply of high strength steels considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019
9	Para 4.7.1.3	New grades of welding consumables for welding of high strength steels have been added considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019
10	Table 4.7.2.4	New grades of welding consumables for welding of high strength steels have been added considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019
11	Para 4.7.3.1	Requirements for base metal of the butt weld test assemblies have been specified considering IACS UR W17 (Rev.5, Mar 2018)	314-29-1234c of 31.05.2019	01.07.2019
12	Table 4.7.3.3	New grades of welding consumables for welding of high strength steels have been added considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019

13	Table 4.7.4.2	New grades by yield stress value have been added considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019
14	Para 4.7.5	Conditions of testing the materials for diffusible hydrogen content have been added considering IACS UR W23 (Rev.2 Apr 2018)	314-29-1234c of 31.05.2019	01.07.2019

**RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS, 2019,  
ND No. № 2-020101-114-E**

**PART XIV. WELDING**

**2 TECHNOLOGICAL REQUIREMENTS FOR WELDING**

1 **Para 2.2.5** is replaced by the following text:

**"2.2.5 Choice of welding consumables grades for welding of high strength steel structures.**

Welding consumables shall be employed for welding those high strength steel grades, for which they were permitted by the Register according to Tables 2.2.5-1 and 2.2.5-2.

Table 2.2.5-1

Identification of welding consumables by test temperature	Identification of high strength steel grades by impact test temperature			
	A(420/960)	D(420/960)	E(420/960)	F(420/690)
3Y (42/96)	+	+	—	—
4Y (42/96)	+	+	+	—
5Y (42/69)	+	+	+	+

Table 2.2.5-2

Identification of welding consumables grades by strength level	Identification of high strength steel grades by strength level							
	(A/F)420	(A/F)460	(A/F)500	(A/F)550	(A/F)620	(A/F)690	(A/E)890	(A/E)960
(3Y/5Y)42	+	—	—	—	—	—	—	—
(3Y/5Y)46	+	+	—	—	—	—	—	—
(3Y/5Y)50	+	+	+	—	—	—	—	—
(3Y/5Y)55	—	—	+	+	—	—	—	—
(3Y/5Y)62	—	—	—	+	+	—	—	—
(3Y/5Y)69	—	—	—	—	+	+	—	—
(3Y/4Y)89	—	—	—	—	—	—	+	—
(3Y/4Y)96	—	—	—	—	—	—	+	+

Besides, the following restrictions and requirements shall be followed:

.1 the scope of application of the particular welding consumable grade may be limited, based on the test results, to one base metal grade and not be extended to the high strength steel lowest grades according to Table 2.2.5-2;

.2 when joining high strength hull structural steel to the same and also joining high strength steel to higher or normal strength hull structural steel, controlled diffusible hydrogen type

welding consumables, having the classification indices H5 or H10, according to Table 4.2.3.4, shall be used;

.3 the use of a single-run and two-run welding procedure for high strength steel welded joints is not recommended. The Register's approval may be given only based on the additional tests according to the program approved by the Register;

.4 the use of an electroslag and electrogas welding for high strength steel welded joints is not recommended. The Register's approval may be given only based on the additional tests according to the program approved by the Register;

.5 the use of a multi-arc and one-side welding on backs of different types for high strength steel welded joints is not recommended. The Register's approval may be given only based on the additional tests according to the program approved by the Register;

.6 rutile and oxide-coated electrodes shall not be used for high strength steel structures welding;

.7 the use of all grades welding consumables, tested according to requirements in 4.6, for high strength steel welding is permitted only for base metal joints up to 70 mm thick. The use of welding consumables for welding of steel over 70 mm thick may be allowed only based on the additional tests according to the program approved by the Register;

.8 where the design requirements permit undermatching weld joint, then welding consumables of the lowest grade acceptable in accordance with the requirements of Table 2.2.5-2 for welding of high strength steel may be used. The said conditions shall be agreed with the Register and indicated during the issue of Welding Procedure Approval Test Certificate."

#### 4 WELDING CONSUMABLES

2 **Table 4.1.2.3** is replaced by the following text:

"Table 4.1.2.3

Strength level of deposited metal, $R_{p0.2}$ or $R_{eH}$ , MPa, min.	Impact test temperature for deposited metal and weld metal, ° C				
	+20	0	-20	-40	-60
420			3Y42	4Y42	5Y42
460			3Y46	4Y46	5Y46
500			3Y50	4Y50	5Y50
550			3Y55	4Y55	5Y55
620	—	—	3Y62	4Y62	5Y62
690			3Y69	4Y69	5Y69
890			3Y89	4Y89	—
960			3Y96	4Y96	—

3 **Para 4.2.3.1** is replaced by the following text:

"4.2.3.1 The tests for checking diffusible hydrogen content in the deposited metal shall be carried out relative to the covered electrodes and flux-cored wire of the following grades:

2, 3 and 4, if applicable, (welding consumables may be classified according to 4.2.3.4) in accordance with the application of the manufacturer;

2Y, 2Y40, 3Y, 3Y40, 4Y, 4Y40, as well as 5Y and 5Y40;

3Y (42/96), 4Y (42/96) and 5Y (42/69).

The requirements to conducting the tests and classification of the welding consumables depending on the hydrogen content, according to 4.2.3.4, are also applicable for approval of the "wire – flux" combinations intended for welding:

high strength steels (refer to 4.7.4);

higher strength steels relative to manufacture of MODU and FOP structures (refer to 2.5.4.3, Part XIII "Materials" of the Rules for the Classification, Construction and Equipment of Mobile Offshore Drilling Units (MODU) and Fixed Offshore Platforms (FOP)).

Relative to the combination of "solid wire – gas" it is not necessary to conduct the tests and classification of welding consumables with respect to the diffusible hydrogen content according to 4.2.3.4."

4     **Table 4.3.1.1.** Notation "TL" is amended to read "LT".

5     **Table 4.4.1.4..** Notation "TL" is amended to read "LT".

6     **Table 4.5.2.1.** Notation "TL" is amended to read "LT".

7     **Para 4.6.1.2** is replaced by the following text:

"**4.6.1.2** The welding consumables for electroslag and electrogas welding depending on the weld metal strength level ( $R_{eH}$ , min) are divided into the following grades:

1, 2 and 3 for normal strength steels;

1Y, 2Y, 3Y and 4Y for higher strength steels with the specified yield stress of up to 355 MPa, inclusive;

2Y40, 3Y40, 4Y40 and 5Y40 for higher strength steels with the specified yield stress of up to 390 MPa, inclusive.

The approval of welding consumables for grades 1Y, 2Y, 3Y,4Y, 2Y40, 3Y40, 4Y40 and 5Y40 may be restricted for their use only with the special types of higher strength steel which allow welding at the high values of heat input. Generally, such steels shall be tested in accordance with 2.2.3, 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, and shall have a relevant record in the grade designation (-W...). In this connection, the steels (usually niobium treated) corresponding in heat input to the technological process concerned shall be used in the approval testing.

In so doing, one should take into account that the above listed requirements for dividing into grades may, due to technical reasons, have limited application for the welding consumables in question."

8     **Para 4.7.1.1** is replaced by the following text:

"**4.7.1.1** The requirements of this Chapter supplement those in 4.3, 4.4 and 4.5 and specify the conditions for approval and testing of the welding consumables intended for welding high strength steels meeting the requirements in 3.13, Part XIII "Materials".

When the special requirements are lacking, the similar requirements for approval of the welding consumables for welding normal and higher strength hull structural steels shall apply."

9     **Para 4.7.1.3** is replaced by the following text:

"**4.7.1.3** The welding consumables for welding the high strength steels, complying with the requirements in 3.13, Part XIII "Materials", are divided into grades depending on the minimum yield stress of the base and deposited metals, as well as the temperature in impact testing the weld and deposited metal according to Table 4.1.2.3.

The designation of the welding consumable grade includes two groups of basic symbols:

3, 4 and 5 for designating the temperature during testing the impact test specimens for the deposited and weld metals;

Y42, Y46, Y50, Y55, Y62, Y69, Y89 and Y96 for designating the requirements for the minimum yield stress of the deposited metal.

For the welding consumables intended for welding high strength steels, the following additional symbols according to 4.1.2.6 are used:

H10 and H5 – for content of diffusible hydrogen in the deposited metal according to 4.2.3.4;

S – for approval of welding consumables for semiautomatic welding;  
M – for approval of welding consumables for multi-run welding technique;  
SM – for approval of welding consumables for semiautomatic and automatic multi-run welding technique."

10 **Table 4.7.2.4** is replaced by the following text:

"Table 4.7.2.4

Grade		Yield stress $R_e$ , MPa, min.	Tensile strength $R_m$ , MPa	Elongation $A_5$ ( $L_0 = 5a$ ), % min.	Impact test	
					Test temperature, °C	Impact energy KV, J, min.
3	Y42	420	520-680	20	-20	47
4					-40	
5					-60	
3	Y46	460	540-720	20	-20	47
4					-40	
5					-60	
3	Y50	500	590-770	18	-20	50
4					-40	
5					-60	
3	Y55	550	640-820	18	-20	55
4					-40	
5					-60	
3	Y62	620	700-890	18	-20	62
4					-40	
5					-60	
3	Y69	690	770-940	17	-20	69
4					-40	
5					-60	
3	Y89	890	940-1100	14	-20	69
4					-40	
3	Y96	960	980-1150	13	-20	69
4					-40	

11 **Para 4.7.3.1** is replaced by the following text:

"4.7.3.1 Depending on the type of welding consumables and the degree of the welding procedure mechanization, the butt weld test assemblies according to the relevant provisions in 4.3.3.1, 4.3.3.2, 4.4.2.3.1, 4.5.2.3.1 or 4.5.3.3.1 shall be prepared and welded. The high strength steel with the proper values of the minimum yield stress and tensile strength and compatible in impact toughness indices, matching the consumable grade being approved shall be used as the base metal for preparing the test assemblies (refer to 2.2.5)."



12 **Table 4.7.3.3** is replaced by the following text:

"Table 4.7.3.3

Grade		Tensile strength $R_m$ , MPa, min.	Impact test		Bend test	
			Test temperature, °C	Impact energy KV, J, min.	Bend angle, deg <sup>1)</sup>	Ratio $D/t$ <sup>2)</sup>
3	Y42	520	-20	47	120	4
4			-40			
5			-60			
3	Y46	540	-20	47		4
4			-40			
5			-60			
3	Y50	590	-20	50		4
4			-40			
5			-60			
3	Y55	640	-20	55		5
4			-40			
5			-60			
3	Y62	700	-20	62		5
4			-40			
5			-60			
3	Y69	770	-20	69	5	
4			-40			
5			-60			
3	Y89	940	-20	69	6	
4			-40			
3	Y96	980	-20	69	7	
4			-40			

<sup>1)</sup> The bend angle achieved before the origination of the first crack. Minor weld defects less than 3 mm long revealed on the specimen surface are acceptable.  
<sup>2)</sup>  $D$  – mandrel diameter,  $t$  – specimen thickness.

13 **Table 4.7.4.2** is replaced by the following text:

"Table 4.7.4.2

Grade by yield stress value	Classification symbols by diffusible hydrogen content	Maximum hydrogen content, cm <sup>3</sup> per 100 g of deposited metal
Y42 Y46 Y50	H10	10
Y55 Y62 Y69 Y89 Y96	H5	5

14 **Para 4.7.5** is replaced by the following text:

**"4.7.5 Annual tests.**

All the organizations recognized by the Register as welding consumables manufacturers shall be annually surveyed and their products be tested. Depending on the type of welding consumables and the degree of the welding procedure mechanization, the annual test extent includes welding the deposited metal test assemblies and carrying out the tests according to the relevant provisions in 4.3.8.1.1, 4.4.4.1.1, 4.5.5.1.1 or 4.5.5.1.2 with due regard to additional requirements in 4.7.2. For welding consumables of grades Y69 and Y96 annual test of materials for diffusible hydrogen content in the deposited metal shall be included into the test program in accordance with 4.2.3."