RUSSIAN MARITIME REGISTER OF SHIPS

HEAD OFFICE

CIRCULAR LETTER **No. 314-53-968c** dated 21.12.2016

Re:

amendments to the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk, 2016, ND No. 2-020101-093-E, in connection with coming into force of the IACS Unified Requirements (UR) W1 (Rev.3 Aug 2016)

Item of technical supervision:

hull structural steel

Implementation	01.01.2017
Valid: till	-
Validity period extended till	
Cancels / amends / supplements Circular letter No.	- dated -
Number of pages:	1+7
Appendices:	amendments to the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk, 2016, ND No. 2-020101-093-E
Director General	K.G. Palnikov

Amends Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk, 2016, ND No. 2-020101-093-E.

We hereby inform that in connection with coming into force from 01.01.2017 of a new revision of the IACS UR W1 (Rev.3 Aug 2016) "Material and welding for gas tankers" the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk, 2016, ND No. 2-020101-093-E shall be amended with regard to the requirements to materials and welding used in the construction of cargo tanks of ships carrying liquefied gases in bulk, as specified in the Appendix to the Circular Letter. These amendments shall be implemented on ships contracted for construction on 1 January 2017 or after this date.

Text of IACS UR W1 (Rev.3 Aug 2016 in English)) in English is posted on the RS internal website in the Section "External Normative Documents", 02 "Documents of IACS", 0213 W and on the IACS official website www.iacs.org.uk..

The above amendments will be introduced to the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk, 2016, ND No. 2-020101-093-E during the re-publication thereof.

It is necessary to do the following:

1. Apply the above amendments given in this Circular Letter during the review and approval of the ship technical documentation.

2. 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.

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Appendix to Circular Letter

No. 314-53-968c..... dated 21.12.2016

Amendments to the **RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SHIPS CARRYING LIQUEFIED GASES IN BULK, 2016,**

ND No. 2-020101-093-E

Part IX "Materials and Welding"

1. **Section 1. General**

In para 1.3 the second and the third paragraphs shall be amended to read:

" ...For base metal, the largest size Charpy V-notch impact test specimens specimens possible for the material thickness shall be machined. The requirements to tests of metal thickness less than 5 mm shall comply with the national and/or international standards. In the case where the material thickness is 40mm or below, the Charpy V-notch impact test specimens shall be cut with their edge within 2mm from the "as rolled" surface with their longitudinal axes parallel to the final direction of rolling of the material, and the surfaces shall be machined. For steel thickness over 40 mm the specimens shall be cut with their longitudinal axes located as near as practicable to a point midway between the surface and the centre of the thickness and the length of the notch perpendicular to the surface. V-notches shall be made perpendicular to the surface.", the rest remaining as it stands;

para 1.3 shall be supplemented with the paragraph reading as follows:

"...In case of unsatisfactory results for bending impact test the re-testing shall be conducted in compliance with 1.3.2, Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships. ";

para 1.5 shall be supplemented with a new paragraph reading as follows:

"...The bend tests shall be transverse bend tests, which may be face, root or side bends at the discretion of the Register. However, longitudinal bend tests may be required in lieu of transverse bend tests in cases where the base material and weld metal have different strength levels.";

para 1.8 shall be amended to read:

"**1.8** Where reference is made to A, B, D, E, AH, DH, EH and FH hull structural steels, these steel grades shall comply with 3.2 and 3.5 of Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships accordingly. ";

shall be supplemented with new para 1.9:

"**1.9** Macrosection, microsection observations and hardness tests may also be required by the Register in accordance with 3.2 of Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships, where required.".

2. Section 2. Material Requirements

Tables 2.1-1 to 2.1-5 shall be amended to read:

"Table 2.1-1

Plates, pipes (seamless and welded[1]), sections and forgings for cargo tanks and process pressure vessels for design temperatures not lower than 0°C.		
Chemical composition Carbon-manganese steel. Fully killed. Fine grain steel. Small additions of alloying elements by agreement with the Register. Composition limits shall be approved by the Register.		
Heat treatment Normalized, or quenched and tempered[2]		
Tensile and Charpy V-notch impact tests Plates Sections and forgings Tensile properties	Each batch shall be tested	Each piece shall be tested Specified minimum yield stress not exceeding 410 MPa[3]
Charpy V-notch impact test Plates Sections and forgings	Minimum average energy value (KV) 27J Longitudinal test pieces Minimum average energy value (KV) 41J	Transverse test pieces
Test temperature Thickness *S* (in mm) $S \leq 20$ $20 < S \leq 40$[4]	Test temperature (°C) 0 -20	

[1] For seamless pipes and fittings in compliance with the requirements of the Rules for the Classification and Construction. The use of longitudinally or spirally welded pipes shall be specially approved by the Register. Charpy V-notch impact tests are not required for pipes.

[2] A controlled rolling procedure or TMCP may be used as an alternative.

[3] Materials with specified minimum yield stress exceeding 410 MPa may be specially approved by the Register. Hardness of the weld and heat affected zones shall meet the approved international and/national standards and norms.

[4] This table is generally applicable for material thicknesses up to 40mm. Proposals for greater thicknesses shall be approved by the Register.

Table 2.1-2

Plates, sections and forgings[1] for cargo tanks, secondary barriers(5) and process pressure vessels for design temperatures below 0°C and down to —55°C. Maximum thickness 25mm(2).

Chemical composition

Carbon-manganese steel. Fully killed. Aluminium treated

Chemical composition (ladle analysis), %:

C	Mn	Si	S	P
0,16 max.[3]	0,70 — 1,60	0,10 — 0,50	0,025 max.	0,025 max.

Alloys and grain refining elements may be generally in accordance with the following, %;

Ni	Cr	Mo	Cu	Nb	V	Al
0,80 max.	0,25 max.	0,08 max.	0,35 max.	0,05 max.	0,10 max.	0,02 min

Heat treatment

Normalized, or quenched and tempered[4]

Charpy V-notch impact test

Plates — Each piece shall be tested

Sections and forgings — Each batch shall be tested

Tensile properties — Specified minimum yield stress not exceeding 410 MPa[5]

Charpy V-notch impact test

Plates — Transverse specimens

Minimum average energy value (KV) 27J

Sections and forgings[1] — Longitudinal test pieces

Minimum average energy value (KV) 41J

Test temperature

5°C below the design temperature or –20°C, whichever is lower

[1]The requirements of Charpy V-notch impact test and chemical composition chemistry requirements for forgings may be considered with the Register.

[2] For material thickness more than 25mm thick, Charpy V-notch impact tests shall be conducted as follows:

Thickness S (in mm)	Test temperature (°C)
25 < S ≤ 30	5°C below the design temperature or –20°C, whichever is lower
30 < S ≤ 35	15 °C below the design temperature or -20°C, whichever is lower
35 < S ≤ 40	20 °C below the design temperature

The Charpy V-notch impact energy value shall be in accordance with the table for applicable type of test specimen.

For material more than 40mm thick, the Charpy V-notch values shall be specially considered.

Materials for tanks and parts of tanks which are completely thermally stress relieved after welding may be tested at a temperature 5°C below design temperature or —20°C, whichever is lower.

For thermally stress relieved reinforcements and other fittings, the test temperature shall be the same as that required for the adjacent tank-shell thickness.

By special agreement with the Classification Society the carbon content may be increased to 0.18% maximum provided the design temperature is not lower than —40°C.

[4] A controlled rolling procedure or TMCP may be used as an alternative to normalizing or quenching and tempering, subject to special approval by the Register. For materials exceeding 25mm in thickness for which the test temperature is —60°C or lower, the application of specially treated steel or steels in accordance with Table 2-3 may be necessary. 2-3.

[5] Materials with specified minimum yield stress exceeding 410 MPa may be specially approved by the Register. Hardness of the weld and heat affected zones shall meet the approved international and/national standards and norms.

Table 2.1-3

Plates, sections and forgings[1] for cargo tanks, secondary barriers and process pressure vessels for design temperatures[2] below —55°C and down to —165°C. Maximum thickness[3,4] 25mm		
Minimum design temperature, °C	Chemical composition[5] and heat treatment	Charpy V-notch impact test temperature, °C
-60	1.5% nickel steel N or N+T or Q+T or TMCP [6]	-65
-65	2.25 % nickel steel N or N+T or Q+T or TMCP [6,7]	-70
-90	3.5 % nickel steel N or N+T or Q+T or TMCP [6,7]	-95
-105	5 % nickel steel N or N+T or Q+T or TMCP [6,7,8]	-110
-165	9 % nickel steel N+N+T or Q+T [6]	-196
-165	Austenitic steels such types* 304, 304L, 316, 316L, 321 and 347 Solution treated[9]	-196
-165	Aluminium alloys type* 5083 Annealed	Not required
-165	Austenitic Fe-Ni alloy (36 % Ni) Heat treatment as agreed with the Register	Not required
Tensile and charpy V-notch impact test Plates Sections and forgings	Each batch shall be tested	Each piece shall be tested
Charpy V-notch impact test Plates Sections and forgings[1]	Minimum average energy value (KV) 27J Longitudinal test pieces Minimum average energy value (KV) 41J	Transverse specimens

[1] The Charpy V-notch impact test required for forgings used in critical applications shall be subject to the Register consideration. (2).

(3). For materials 1.5% Ni, 2.25% Ni, 3.5% Ni, and 5% Ni, with thickness greater than 25 mm, the Charpy V-notch impact tests shall be conducted as follows:

[2] The requirements for materials use at design temperatures below —165°C shall be agreed with the Register.

[3] For steel 1,5 %; 2,25 %; 3,5 % and 5 % Ni, with thickness greater than 25 mm, the test temperature shall be corrected as follows:

Thickness S (in mm)	Test temperature (°C)
25 < S ≤ 30	10 °C below the design temperature
30 < S ≤ 35	15 °C below the design temperature
35 < S ≤ 40*	На 20 °C ниже расчетной

*For material more than 40mm thick, the Charpy V-notch values shall be specially considered.

The Charpy V-notch impact energy value shall be in accordance with the table for the applicable type of test specimen.

[4] For 9% Ni steels, austenitic stainless steels and aluminium alloys, thickness greater than 25 mm may be used as agreed by the Register.

[5] The chemical composition limits should shall be approved by the Register.

[6] TMCP nickel steels will be subject to acceptance by the Classification Society.

[7] A lower minimum design temperature for quenched and tempered steels may be specially agreed with the Register.

[8] A specially heat treated, e.g, 5% nickel steel, for example triple heat treated 5% nickel steel may be used down to —165°C upon special agreement with the Register, provided that the Charpy V-notch impact tests are carried out at –196°C.

[9] The Charpy V-notch impact test may be omitted subject to agreement with the Register.

*In compliance with the international and national standards.

Table 2.1-4

Pipes (seamless and welded)[1], forgings[2] and castings[2] for cargo and process piping for design temperatures[3] below 0°C and down to —165°C.(3) Maximum thickness 25mm.			
Minimum design temperature, °C	Chemical composition[5] and heat treatment	Charpy V-notch impact tests (longitudinal specimen)	
		Test temperature (°C)	Minimum average energy value, in J
-55	Carbon-manganese steel. Fully killed. Fine grain steel. N or treated as agreed with the Register[6]	-	27
-65	2.25 % nickel steel N или N+T или Q+T[6]	-70	34
-90	3.5 % nickel steel N, N+T, Q+T	-95	34
-165	Сталь с 9 % Ni[7] N, N+T, Q+T	-196	41
	Austenitic steel types* 304, 304L, 316, 316L, 321 и 347 Solution treated[8]	-196	41
	Aluminium alloys type* 5083 Annealed		Not required
Tensile and charpy V-notch impact test Each batch shall be tested			
Charpy V-notch impact test Longitudinal specimens			
[1]The use of longitudinally or spirally welded pipes shall be specially approved by the Register. [2] The requirements for forgings and castings shall be agreed with the Register. [3] The requirements for design temperatures below —165°C shall be agreed with Register. [4] The test temperature should shall be 5°C below the design temperature or —20°C whichever is lower. [5] The chemical composition limits should shall be approved by the Register. [6] A lower minimum design temperature may be specially agreed for quenched and tempered materials. [7] This chemical composition is not suitable for castings. [8] Charpy V-notch iImpact tests may be omitted subject to agreement with the Register.			
*In compliance with the international and national standards.			

Table 2.1-5

Plates and sections for hull structures required by G1.9.1 and G1.9.4 of UR G1.							
Minimum design temperature of hull structure, °C	Maximum thickness (in mm) for steel grades						
	A	B	D	E	A32 A36 A40	D32 D36 D40	E32 E36 E40
0 and above[1] —5 and above[2]	In accordance with 1.4, Part II "Hull" of the Rules						
down to-5	15	25	30	50	25	45	50
down to-10	*	20	25	50	20	40	50
down to-20	*	*	20	50	*	30	50
down to-30	*	*	*	40	*	20	40
down to -30	In accordance with table 2-2, except that the thickness limitations given in note[2] to this table do not apply						
1For the cases given in 9.3, Part IV "Cargo Tanks". 2For the cases given in 9.1, Part IV "Cargo Tanks".							
* means steel grade not to be used.							

;

Chapter 2 shall be supplemented with new Chapter 2.2 reading as follows:

"**2.2** Castings and forgings intended for cargo and process piping for design temperature above 0 °C shall comply with the requirements of the recognized national and/or international standards.".

3. Section 3. Welding and Non-destructive Testing

3.1.1 shall be supplemented with a new paragraph:

"**3.1.1** These requirements shall apply to primary and secondary barriers, including the inner hull where this forms the secondary barrier."

para 3.1.1, in the first paragraph the work "stainless steel" shall be replaced by "austenitic", the rest remaining as it stands;

para 3.3.2.1 shall be supplemented with the first paragraph reading as follows:

"**3.3.2.1** The selected welding procedures for cargo tanks and process pressure vessels specified in this para shall meet the requirements of 1.2. ...", the rest remaining as it stands;

shall be supplemented with para 3.3.2.1.2 reading as follows:

".**2** longitudinal al-weld tensile testing shall be agreed with the Register;";

paras 3.3.2.1.2 to 3.3.2.1.4 shall be renumbered 3.3.2.1.3 to 3.3.2.1.5 accordingly.

para 3.4.2.1 shall be amended to read:

"**3.4.2.1** No fracture is acceptable after 180° bend over a former diameter of 4t where t is the thickness of the test pieces." ;

shall be supplemented with new paras 3.5 and 3.6 3.reading as follows:

"**3.5 Fillet Welding Procedure Tests**

3.5.1 The requirements to fillet welding procedure tests are given in Chapter 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. In such cases, welding consumables shall be selected which exhibit satisfactory Charpy V-notch impact properties.

3.6 Welding Procedure Tests for Secondary Barriers.

3.6.1 Welding procedure tests for secondary barriers shall be carried out. The scope and the requirements of the tests shall be agreed with the Register.";

existing paras 3.5 to 3.7 shall be renumbered 3.7 to 3.9 accordingly;

para 3.6.1 (new number 3.8.1) shall be supplemented by the paragraph reading as follows:

" ...Test requirements shall comply with 3.4. The test program shall be based on the technical documentation of the manufacture and shall be approved by the Register.";

para 3.6.2.2 shall be deleted.

the text of para 3.6.3 (new number 3.8.3) "The test requirements are listed in 3.4. If the impact test results are unsatisfactory, repeated tests according to 3.6.2.2 are to be conducted." shall be deleted;

para 3.6.4 (new number 3.8.4) shall be amended to read:

"**3.8.4** Production weld tests for integral and membrane cargo tanks shall be performed in accordance with 3.3.2.";

Chapter 3.7 (new number 3.9) shall be supplemented with new para 3.9.7 reading as follows:

"**3.9.7** All test procedures of non-destructive testing and acceptance standards shall be in accordance with Section 3, Part XIV "Welding" of the Rules for the Classification and Construction of Sea-Going Ships.

In accordance with the Register, a non-destructive ultrasonic test procedure in lieu of radiographic testing may be conducted. But, in addition, supplementary radiographic testing at selected locations shall be carried out to verify the results.

The manufacturer shall submit to the Register for the review a program of the non-destructive testing and the documentation of the enterprise quality assurance system to ensure the required extent of non-destructive testing of the enterprise products.

The relevant records of the testing results shall be submitted to the Register.";

para 3.7.1.3 shall be deleted.