RUSSIAN MARITIME REGISTER OF SHIPPING

HEAD OFFICE

CIRCULAR LETTER **№ 314-53-815c** dated 21. 04.2015

Re:

Amendments to Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships, 2015, ND No. 2-020101-082.

Item of technical supervision:

Steel testing procedures, hull structural steel, titanium alloys

Implementation	01.07.2015
Valid: till	-
Validity period extended till	
Cancels / Amends/ Supplements Circular Letter No.	- dated -
Number of pages:	1+3
Appendices:	Amendments to Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships - 3 pages

Technical Director - Head of Classification Directorate Vladimir I. Evenko

Amends Rules for the Classification and Construction of Sea-Going Ships, 2015, ND No. 2-020101-082.

We hereby inform that in compliance with the minutes of ad hoc working group "Materials and Welding" meetings of the RS Scientific and Technical Council (STC) sections of 28.01. 2015, Part XIII "Materials" of the Rules for the Classification and Construction of Sea-Going Ships, 2015, ND No. 2-020101-082, shall be amended as specified in the Appendix thereto.

It is necessary to do the following:

1. Apply the amendments to the RS Rules specified in the Appendix thereto.
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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DMS "THESIS" No. 15-62368 04.03.2015

RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SEA-GOING SHIPS (2015)

Amendments for re-publication of the Rules

Part XIII. MATERIALS

2 PROCEDURES OF TESTING

2.2 TESTING PROCEDURES FOR METALS

2.2.10.1 shall be amended to read:
"**2.2.10.1** The present procedures may be used in developing and correcting the programs needed in survey of manufacture of steel intended for use at low temperatures (refer to 3.5) including the steel marked with upper index "Arc" (refer to 3.5.2.1). The present provisions apply to:
procedures for determining the temperature of a ductile-brittle transition to estimate the material property with regard to retarding the spread of brittle failure (T_{kb}, *NDT*, *DWTT*);
procedures for determining crack resistance parameter *CTOD* for the base metal and the heat-affected zone (HAZ) in testing the specimens cut out from butt-welded joints
Where one procedure for steel production is concerned (smelting, rolling, condition of supply), the results of tests carried out for the greatest thickness of rolled products may be extended to the rolled products of less thickness."

2.2.10.2 In the third paragraph the third sentence and formula (2.2.10.2) shall be deleted, the rest remaining as it stands.

2.2.10.3 The third and fourth paragraphs shall be amended to read:
"The tests are carried out for the rolled products having a thickness over 15 mm of the specimens manufactured in compliance with 2.3.2, Part XII "Materials" of the Rules for the Classification, Construction and Equipment of Mobile Offshore Drilling Units and Fixed Offshore Platforms. The specimens are cut out from a surface. The rolled products surface is considered to be the work surface of the specimen on the side of a weld deposit. On the Register request additional specimens shall be cut out as follows:
from the mid-thickness of the plate, in the laminate plane, transversely to the direction of rolling (specimens of types 1 or 2) - for rolled products over 40 mm up to and including 50 mm thick;
from the mid-thickness of the plate perpendicular to the plate surface so that the direction of breakdown development coincides with that of the rolling.
To reduce plastic deformation, the specimen deflection in testing is restricted with a stopper."
The rest remaining as it stands.

2.2.10.4 The third paragraph shall be amended to read:
"The tests are carried out for rolled products with thickness equal to 7,5 mm and up to 40 mm according to the procedure agreed with the Register. For rolled products with thickness over 19 mm the specimens with thickness equal to 19 mm cut out from the mid-thickness of rolled products on thickness may be tested. In this case the *DWTT* is higher in comparison with the temperature of full thickness: having rolled products' full-thickness of over 19 mm and above 30 mm at 10 °C, having rolled products' thickness of over 31 and above 40 mm — at 15 °C. in accordance with Appendix IV "Special test procedures" of the Rules for the Classification and Construction of Subsea Pipelines."
The fourth paragraph and formula (2.2.10.4) shall be deleted.

2.2.10.5 The words shall be deleted from the fourth paragraph as follows: "To determine the minimum temperature T_d ... ." The rest remaining as it stands.

2.2.10.6 The words "To determine the minimum temperature T_d ... ." shall be deleted from the third paragraph, the rest remaining as it stands.
The fourth para shall be amended to read:
"In case the data scattering is considerable, and the minimum *CTOD* value is less than 0,5 of its average value the number of specimens tested at this temperature shall be increased until 5 correct test results."

The fifth paragraph shall be deleted, the rest remaining as it stands.

3 STEEL AND CAST IRON

3.5 STEEL FOR STRUCTURES USED AT LOW TEMPERATURES

3.5.1.6 In the second sentence after the words "the structure design temperature ..." "T_D" shall be introduced, the rest remaining as it stands.
In the second paragraph the words "high strength steels" shall be amended to read "high-strength steels"

Table 3.5.1.6
The text of the first line in the second column shall be replaced as follows:
"Design temperature T_D, °C".
The Table is supplemented by a note:
"Note. For the use of steel in conditions not regulated herein refer to 3.5.1.7"

3.5.1.7 shall be replaced with the following text:
"**3.5.1.7** For hull structural members of icebreakers within ice category and ice class ships with Arc ice category, the design temperature of which does not exceed – 30°C, the Register may require to use steel of improved weldability (refer to 4.2, 4.3, Part XII "Materials" of the Rules for the Classification, Construction and Equipment of Mobile Offshore Drilling Units and Fixed Offshore Platforms). Where appropriate, the use of rolled products with thickness exceeding that of 3.5.1.6, the Register may also require to use steel meeting the Register special requirements for ductility and cold resistance, i.e. steel marked with upper index "Arc" (3.5.2.1). In the latter case the condition to use material for the above mentioned structures is $T_d < T_D$, where T_d is a minimum material operating temperature determined by tests (refer to 2.2.10, 3.5.2.5.6).

3.5.1.8 The second paragraph shall be amended to read:
"Tests to determine T_d are carried out, as a rule, within the operating temperature range including temperature T_D.»

3.5.2.5.1 shall be amended to read:
"**3.5.2.5.1** "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 characteristics (refer to 2.2.10, 3.5.1.9, 3.5.2.5.6) and and meeting the relevant requirements for steels of improved weldability according to Section 4, Part XII "Materials" of the Rules for the Classification, Construction and Equipment of MODU/FOP and the requirements for Z-properties. The minimum material operating temperature Td (without the minus sign) down to which the steel may be used for any structural members without limitations shall be indicated next to the symbol (e.g. $F36W^{Arc40}$ or F36WArc40)."

3.5.2.5.4 The last sentence after the words "...is assumed to be the minimum temperature ..." shall be replaced with the following "($T_{d(CTOD)}$), for the given type of tests".

3.5.2.5.5 In the first sentence after the words "... at least 0,5 of ..." the word "... the required one..." shall be replaced with the following " ... the required one ...". The rest remaining as it stands.
In the last sentence after the words "...is assumed to be the minimum temperature ..." shall be replaced with the following "($T_{d(CTODhaz)}$), for the given type of tests".

3.5.2.5.6 shall be amended to read:
"**3.5.2.5.6** Based on the results of *NDT*, T_{kb} and *DWTT* the temperatures ($T_{d(NDT)}$, $T_{d(Tkb)}$, $Td_{(DWTT)}$) are determined, the greatest of all the values is $T_{d(b-d)}$, assumed to be the ductile-brittle transition temperature T_{kb} of the sampling steel. Depending on the rolled products thickness the required temperature values $T_{d(NDT)}$, $T_{d(Tkb)}$, $T_{d(DWTT)}$ for the steel marked with upper index "Arc" are given in Table 3.5.2.5.6.

Table 3.5.2.5.6

Rolled products thickness, mm	Depending on the rolled products thickness the required temperature values $T_{d(NDT)}$, $T_{d(Tkb)}$, $T_{d(DWTT)}$ for the steel marked with upper index "Arc" are given in Table		
	$T_{d(NDT)}$, °C	$T_{d(Tkb)}$, °C	$T_{d(DWTT)}$, °C
From 25 up to 30 incl.	*NDT* + 15	T_{kb}	*DWTT*
Over 30 up to 40 incl.	*NDT* + 20	T_{kb} - 15	*DWTT* – 10
Over 40 up to 50 incl.	*NDT* + 25	T_{kb} - 25	—
Over 50 up to 60 incl.	*NDT* + 30	T_{kb} - 30	—
Over 60	*NDT* + 30	*	—
* Provided in addition to: $T_{kb} < 0.5T_{d(NDT)}+15$			

Note. Additional condition means $T_{kb} \leq -5°$ for Arc40, and $T_{kb} \leq -15°$ for Arc60

For the metal thickness of 40 mm, in case the difference between *NDT* and T_{kb} temperatures is over 50 °C, to control discontinuity of the material properties on resistance to brittle fracture, in addition the Register may require to test *NDT* specimens cut out from the mid-thickness of rolled products in accordance with 2.2.10.3. NDT obtained during the test may be considered as a replacement of temperature $T_{d(Tkb)}$. With approval of RS it is possible to determine $T_{d(b-d)}$ based on one or two ductile-brittle transition temperatures determined: $T_{d(NDT)}$, $T_{d(Tkb)}$ or $T_{d(DWTT)}$».

New para **3.5.2.5.7** shall be introduced reading as follows:
"**3.5.2.5.7** In all types of tests the greatest value shall be accepted as the minimum operating material temperature T_d, up to which the steel in question may be used for all the structural members without limitations:
$T_d = \max(T_{d(CTODbm)}, T_{d(CTODhaz)}, T_{d(b-d)})$."

3.5.4.2 The fifth para shall be amended to read:
"The Register may require the percentage of fibrous component in the fracture of the specimen to be determined after impact testing. Regardless of this the fibrous component shall be not less than 50 per cent.

SECTION 9 TITANIUM ALLOYS

9.4.2.1 the first sentence shall be amended to read:
"**9.4.2.1** The material chemical composition for titanium alloy pipes ....", the rest remaining as it stands.

9.4.2.2 the second sentence shall be amended to read:
"Requirements to chemical composition of a titanium alloy ingot or tubular billets shall meet the requirements of Table 9.4.2.2 and be in accordance with the RS practice."

Table 9.4.2.2
Name of the table shall be amended to read:
"**Chemical composition of titanium alloy ingots or tubular billets**"

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