RUSSIAN MARITIME REGISTER OF SHIPPING
HEAD OFFICE

CIRCULAR LETTER **No.** 314-26 - 930c dated 23.08.2016

Re:

Coming into force of IACS Unified Interpretation (UI) GC8 (Rev.1 June 2016) "Permissible Stresses in Way of Supports Type C Cargo Tanks"

Item of technical supervision:

ships under construction

Implementation:	01.07.2016
Valid: till	-
Validity period extended till	-
Cancels / Amends/ Supplements Circular Letter No.	- dated -
Number of pages:	1+2
Appendices:	Amendments to the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk, 2016, ND No. 2-020101-093-E

Technical Director - Head of Classification Directorate Vladimir I. Evenko

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 the application of a new revision of IACS UI GC8 (Rev 1 June 2016) "Permissible Stresses in Way of Supports of Type C Cargo Tanks", Section 5, Part IV "Cargo Tanks" of the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk, 2016, ND No. 2-020101-093-E shall be amended as specified in the Appendix to the Circular Letter.

The above amendments shall apply to the ships, the keel of which was laid on or after 1 July 2016.

The original document is posted on the internal RS website in the Section "External Normative Documents", and on the official IACS website: www.iacs.org.uk

The above amendments will be introduced in the Rules for the Classification and Construction of Ships Carrying Liquefied Gases in Bulk at the re-publication.

It is necessary to do the following:

1) *Apply the provisions of the Circular Letter in the practical activity from 1 July 2016.*
2) *Bring the content of the Circular Letter to the notice of the RS surveyors and all interested organizations and persons in the area of the RS Branch Offices' activity.*

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Appendix to Circular Letter

No. 314-26-930c of 23.08.2016

RULES FOR THE CLASSIFICATION AND CONSTRUCTION OF SHIPS CARRYING LIQUEFIED GASES IN BULK, 2016, ND No. 2-020101-093-E

PART IV. CARGO TANKS

5 PERMISSIBLE STRESSES

Para 5.5 shall be supplemented with a new paragraph reading as follows:

"The allowable stresses shall not exceed:

$\sigma_m \leq f;$ (5.5-1)

$\sigma_L \leq 1{,}5f;$ (5.5-2)

$\sigma_b \leq 1{,}5f;$ (5.5-3)

$\sigma_L + \sigma_b \leq 1{,}5f;$ (5.5-4)

$\sigma_m + \sigma_b \leq 1{,}5f;$ (5.5-5)

$\sigma_m + \sigma_b + \sigma_g \leq 3{,}0f;$ (5.5-6)

$\sigma_L + \sigma_b + \sigma_g \leq 3{,}0f$ (5.5-7)

where σ_m = equivalent primary general membrane stress;

σ_L = equivalent primary local membrane stress;

σ_b = equivalent primary bending stress;

σ_g = equivalent secondary stress; and

f – the lesser of R_m/A and R_{eH}/B.".

New **paras 5.5.3.1 – 5.5.3.4** reading as follows:

"**5.5.3.1** Permissible stresses in stiffening rings.

For horizontal cylindrical tanks made of C-Mn steel supported in saddles, the equivalent stress in the stiffening rings shall not exceed the following values if calculated using finite element method:

$\sigma_e \leq \sigma_{all}$ (5.5.3.1-1)

where $\sigma_{all} = \min(0{,}57R_m; 0{,}85R_{eH});$ (5.5.3.1-2)

$$\sigma_e = \sqrt{(\sigma_n + \sigma_b)^2 + 3\tau^2}; \qquad (5.5.3.1\text{-}3)$$

σ_e = von Mises equivalent stress, in N/mm^2;

σ_n = normal stress, in N/mm^2, in the circumferential direction of the stiffening ring;

σ_b = bending stress, in N/mm^2, in the circumferential direction of the stiffening ring;

τ = shear stress, in N/mm^2, in the stiffening ring;

R_m and R_{eH} – refer to 5.3.

Equivalent stress values σ_e shall be calculated over the full extent of the stiffening ring by a procedure agreed with the Register.

5.5.3.2 The following assumptions shall be made for the stiffening rings.

The stiffening ring shall be considered as a circumferential beam formed by web, face plate, doubler plate, if any, and associated shell plating.

The effective width of the associated plating shall be taken as follows:

.1 for cylindrical shells:

an effective width, in mm, not greater than $0{,}78\sqrt{rt}$ on each side of the web. A doubler plate, if any, may be included within that distance where r – mean radius of the cylindrical shell, in mm; t – shell thickness, in mm.

.2 for longitudinal bulkheads (in the case of lobe tanks):

the effective width shall be determined according to established standards. A value of $20t_b$ on each side may be taken as a guidance value, where t_b – bulkhead thickness, in mm.

The stiffening ring shall be loaded with circumferential forces, on each side of the ring, due to the shear stress, determined by the bi-dimensional shear flow theory from the shear force of the tank.

5.5.3.3 For calculation of reaction forces at the supports, the following factors shall be taken into account:

elasticity of support material (intermediate layer of wood or similar material);

change in contact surface between tank and support, and of the relevant reactions, due to thermal shrinkage of tank, elastic deformations of tank and support material.

The final distribution of the reaction forces at the supports shall not show any tensile forces.

5.5.3.4 The buckling strength of the stiffening rings shall be examined.".