17-450

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part I Ships Operating in Polar Waters, Polar Class Ships and Ice Class Ships

Rules for the Survey and Construction of Steel Ships
Part I 2017 AMENDMENT NO.2
Guidance for the Survey and Construction of Steel Ships
Part I 2017 AMENDMENT NO.2

Rule No.92 / Notice No.96 25 December 2017
Resolved by Technical Committee on 26 July 2017

ClassNK
NIPPON KAIJI KYOKAI

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

RULES

Part I Ships Operating in Polar Waters, Polar Class Ships and Ice Class Ships

2017 AMENDMENT NO.2

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An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

Rule No.92 25 December 2017
AMENDMENT TO THE RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Rules for the survey and construction of steel ships" has been partly amended as follows:

Part I SHIPS OPERATING IN POLAR WATERS, POLAR CLASS SHIPS AND ICE CLASS SHIPS

Chapter 8 ICE CLASS SHIPS

8.4 Fundamental Requirements of Machinery

8.4.2 Engine Output

Sub-paragraph -3 has been amended as follows.

3 For ships having features of which, there is ground to assume that they will improve the performance of the ship when navigation in ice or ships parameter values of which defined in **-1** above are beyond the range given in **Table I8.13**, ~~an engine output less than that required in **-1** may be approved, provided that it gives a minimum speed of 5 *knots* in the following brash ice channels.~~ The values for K_e or R_{CH} defined in **-1** and **-2** above may be obtained from detailed calculations or model tests provided that it gives a minimum speed of 5 *knots* in brash ice channels as specified in the following **(1)** to **(5)**:

(1) For I*A Super* ice class ships: 1.0 *m* of the brash ice and a 0.1 *m* thick consolidated layer of ice
(2) For I*A* ice class ships: 1.0 *m* of the brash ice
(3) For I*B* ice class ships: 0.8 *m* of the brash ice
(4) For I*C* ice class ships: 0.6 *m* of the brash ice
(5) For I*D* ice class ships: 0.5 *m* of the brash ice

Table I8.13 has been amended as follows.

Table I8.13 The Range of Parameters

Parameter	Minimum	Maximum
α (*deg*)	15	55
φ_1 (*deg*)	25	90
φ_2 (*deg*)	10	90
L (*m*)	65.0	250.0
B (*m*)	11.0	40.0
T (*m*)	4.0	15.0
L_{BOW} / L	0.15	0.40
L_{PAR} / L	0.25	0.75
D_P / T (1)	0.45	0.75
$A_{wf} / (LB)$	0.09	0.27

Note:

(1) When calculating D_P/T, T is a draught amidships of length L_f corresponding to the *UIWL*.

Title of Section 8.5 has been amended as follows.

8.5 Design Loads of Propulsion Units (Ice Classes I*A Super*, I*A*, I*B* and I*C*)

8.5.1 General

Sub-paragraphs -1 to -3 have been renumbered to Sub-paragraphs -2 to -4, and Sub-paragraph -1 has been added as follows.

1 The requirements in **8.5** apply to I*A Super*, I*A*, I*B* and I*C* ice class ships.
~~**1**~~**2** (Omitted)
~~**2**~~**3** (Omitted)
~~**3**~~**4** (Omitted)

Title of Section 8.6 has been amended as follows.

8.6 Design of Propellers and Propulsion Shafting Systems (Ice Classes I*A Super*, I*A*, I*B* and I*C*)

Paragraph 8.6.1 has been amended as follows.

8.6.1 General

1 The requirements in **8.6** apply to I*A Super*, I*A*, I*B* and I*C* ice class ships.

2 With respect to the design of the propeller and the propulsion shafting system, the following are to be taken into account:

(1) Propeller and propulsion shafting systems are to have sufficient strength for the loads specified in **8.5**.
(2) The blade failure load given in **8.5.10** is not to damage the propulsion shafting system other than the propeller blade itself.
(3) Propeller and propulsion shafting systems are to have sufficient fatigue strength.

Section 8.8 has been renumbered to Section 8.9, and Section 8.8 has been added as follows.

8.8 Design of Propulsion Units (Ice Class I*D*)

8.8.1 General

For I*D* ice class ships, the design of the ship is to satisfy the requirements in **8.8.2**, **8.8.3** and **8.8.4**. However, all or part of such designs may be in accordance with the requirements in **8.6** for I*C* ice class ships instead.

8.8.2 Propeller Shafts

The diameter of propeller shafts is to be increased by 5% against the value obtained by **6.2.4**, **Part D**.

8.8.3 Thickness of Propeller Blades

1 The thickness of propeller blades is to be increased by 8% against the value obtained by **7.2.1**, **Part D**.

2 The thickness of the tip of propeller blades (at a radius of 0.95*R*) is not to be less than the value obtained by the following formula:

$$t = 0.14(T + 57)\sqrt[3]{\frac{430}{\sigma_b}}$$

t: Thickness of the tip of propeller blade (at a radius of 0.95*R*) (*mm*)

T: Thickness of the root of the propeller blade specified in **8.8.3-1** (i.e., the thickness of blade at a radius of 0.25*R* for solid propellers and the thickness of blade at a radius of 0.35*R* for controllable pitch propellers) (*mm*)

σ_b: Specified tensile strength of propeller material (N/mm^2)

8.8.4 Force Fitting of Propellers

Where the propeller is force-fitted on the propeller shaft without a key, the lower limit of pull-up length is to be determined according to **7.3.1-1, Part D of the Rules**, substituting F_V'' given by following formula for F_V:

$$F_V'' = F_V + \frac{9.55H}{N_0 R_0} \times 10^4 \times 0.15 \quad (N)$$

where

H: Maximum continuous output of main propulsion machinery (*kW*)

N_0: Number of maximum continuous revolutions per minute divided by 100 (*rpm* /100)

R_0: Radius (*mm*) of the propeller shaft cone part at the mid-length

F_V: Tangential force (*N*) acting on contact surface specified in **7.3.1-1, Part D of the Rules**.

8.~~8~~9 Miscellaneous Machinery Requirements

8.~~8~~9.1 Starting Arrangements
(Omitted)

8.~~8~~9.2 Sea Inlet and Cooling Water Systems
(Omitted)

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 25 December 2017.
2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction is before the effective date.
3. Notwithstanding the provision of preceding **2.**, the amendments to the Rules may apply to ships for which the date of contract for construction is before the effective date upon request by the owner.

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AMENDMENT TO THE GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

"Guidance for the survey and construction of steel ships" has been partly amended as follows:

Part I SHIPS OPERATING IN POLAR WATERS, POLAR CLASS SHIPS AND ICE CLASS SHIPS

I8 ICE CLASS SHIPS

Title of Section I8.6 has been amended as follows.

I8.6 Design of Propellers and Propulsion Shafting Systems (Ice Classes I*A Super*, I*A*, I*B* and I*C*)

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 25 December 2017.
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3. Notwithstanding the provision of preceding **2.**, the amendments to the Guidance may apply to ships for which the date of contract for construction is before the effective date upon request by the owner.