19-400

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part CS Hull Construction and Equipment of Small Ships

Rules for the Survey and Construction of Steel Ships
Part CS 2019 AMENDMENT NO.2
Guidance for the Survey and Construction of Steel Ships
Part CS 2019 AMENDMENT NO.1

Rule No.103 / Notice No.70 27 December 2019
Resolved by Technical Committee on 22 July 2019

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

RULES

RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

Part CS Hull Construction and Equipment of Small Ships

2019 AMENDMENT NO.2

Rule No.103 27 December 2019

Resolved by Technical Committee on 22 July 2019

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

Rule No.103 27 December 2019
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 CS HULL CONSTRUCTION AND EQUIPMENT OF SMALL SHIPS

Amendment 2-1

Chapter 4 SUBDIVISIONS

4.1 General

Paragraph 4.1.2 has been amended as follows.

4.1.2 Definitions

For the purpose of this chapter, the following definitions apply.

(1) "Compartment" is a part of the hull formed by shells, decks and bulkheads which are to be watertight as a rule.

(2) "Group of compartments" is a part of the hull formed by two or more compartments which are adjacent with each other.

(3) "Deepest subdivision draught" (d_s) is ~~the draught which corresponds to~~ the summer draught assigned to the ship in accordance with the requirements of **Part V**.

(4) "Light service draught" (d_l) is the service draught corresponding to the lightest anticipated loading and associated tankage, including, however, such ballast as may be necessary for stability and/or immersion. Passenger ships should include the full complement of passengers and crew on board.

(5) "Partial subdivision draught" (d_p) is the draught which corresponds to the summation of light service draught specified in **(4)** above and 60% of the difference between the light service draught and the deepest subdivision draught.

(6) "Subdivision length of the ship" (L_s) is the greatest projected moulded length in metres of the ship at or below deck or decks limiting the vertical extent of flooding with the ship at the deepest subdivision draught.

(7) ~~"Mid-length" is the midpoint of L_s.~~ "Amidships" is at the middle of the length for freeboard (L_f).

(8) "Aft terminal" is the aft limit of L_s.

(9) "Forward terminal" is the forward limit of L_s.

(10) "Trim" is the difference between the draught forward and the draught aft, where the draughts are measured at the perpendiculars for the forward and aft ~~terminals respectively~~ ends of the length for freeboard (L_f), disregarding any rake of keel.

(11) "Breadth of ship" (B') is the greatest moulded breadth in metres of the ship at or below the deepest subdivision draught.

(12) "Draught" (d') is the vertical distance in metres from keel line to the water line in question at the ~~midpoint of L_s~~ amidships.

(13) "Permeability of a space" (μ) is the proportion of the immersed volume of that space (a

compartment or group of compartments) which can be occupied by water. The value μ is shown in **Table CS4.1-1** and **Table CS4.1-2** according to the purpose of the space. However, in spaces intended for the carriage of liquid, the more stringent value of μ is to be taken when calculating the subdivision index in **4.2**. Where substantiated by calculations and specifically accepted by the Society, other figures for permeability specified in **Table CS4.1-1** and **Table CS4.1-2** may be used notwithstanding the provision above.

(14) "Internal opening" is the opening provided in decks or bulkheads forming a compartment excluding those that are completely exposed.

(15) "External opening" is the opening provided in shells, exposed decks or bulkheads forming a compartment.

(16) "Machinery spaces" are spaces between the watertight boundaries of a space containing the main and auxiliary propulsion machinery, including boilers, generators and electric motors primarily intended for propulsion.

4.2 Subdivision Index

4.2.1 Subdivision Index

Sub-paragraph -2 has been amended as follows.

2 The Attained Subdivision Index (A) for ship is to be not less than the Required Subdivision Index (R), calculated in accordance with **-1** above. A is obtained by the summation of the partial indices A_s, A_p and A_l, ~~(~~weighted as shown~~)~~ and calculated for the draughts d_s, d_p and d_l specified in **4.1.2(3)** to **(5)** in accordance with the following formula:

$A = 0.4A_s + 0.4A_p + 0.2A_l$

Each partial index is a summation of contributions from all damage cases taken in consideration, using the following formula:

$A_x = \Sigma\, p_i \cdot s_i$

Where, each partial index is not less than $0.5R$.

A_x: Each partial index corresponding to draughts, d_s, d_p and d_l specified in **4.1.2(3)** to **(5)**.

p_i: Probability that a compartment or a group of compartments in question may be flooded (hereinafter referred to as "compartment flooding probability"), which is to be in accordance with the requirements in **4.2.2**.

s_i: Probability of survival after flooding a compartment or a group of compartments in question (hereinafter referred to as "survival probability"), which is to be in accordance with the requirements in **4.2.3**.

i: Indication of each compartment or group of compartments in question.

Sub-paragraph -3 has been amended as follows.

3 Partial index (A_x) is to be calculated under the following conditions:

(1) ~~Level trim~~ As a minimum, the calculation of A is to be ~~used~~ carried out at level trim for the deepest subdivision draught and the partial subdivision draught. The ~~actual~~ estimated service trim ~~is to~~ may be used for the light service draught. Where any anticipated service condition within the draught range from d_s to d_l, the trim variation in comparison with the calculated trim is greater than 0.005~~L_s~~, L_f, one or more additional calculations of A are to be ~~submitted~~ performed for the same draughts but ~~different~~ including sufficient trims ~~so~~ to ensure that, for all intended service conditions, the difference in trim in comparison with the reference trim

used for one calculation will be ~~less~~ not more than 0.005~~L_s~~ L_f. Each additional calculation of A is to comply with **-2** above.

(2) All flooding in compartments and groups of compartments over the entire ship's subdivision length is to be taken into account.

(3) Assumed extent of hull damage is the following:
   (a) Vertical extent is to be up to d' + 12.5(m) from the baseline. However, if a lesser extent will give a more severe result, then such an extent is to be assumed.
   (b) Horizontal extent of damage is measured inboard from Ship's side, at a right angle to the centreline at the level of the deepest subdivision draught and damage of the transverse extent greater than half breadth (B'/2) of the ship may be exempted. Where the ship has a compartment formed by longitudinal watertight bulkheads which are not on the ship's centreline, all damage which extend from the outmost compartment (hereinafter referred to as "wing compartment") to the ship's centreline are to be assumed.

(4) In the flooding calculations carried, only one breach of the hull damage need to be assumed and only one free surface need to be considered.

(5) In the case of unsymmetrical arrangements, the calculated A value is to the mean value obtained from calculations involving both sides. Alternatively, it is to be taken as that corresponding to the side which evidently gives the least favourable result.

(6) When determining the positive righting lever (GZ) of the residual stability curve in the intermediate and final equilibrium stages of flooding, the displacement for the intact loading condition is to be used. All calculations are to be done with the ship freely trimming.

4.2.2 Compartment Flooding Probability (p_i) *

Sub-paragraph -1(1) has been amended as follows.

1 The Compartment Flooding Probability (p_i) for a compartment or group of compartments is to be determined by the following **(1)**, **(2)** or **(3)** according to the number of damaged compartment.

(1) Where the damage involves a single zone only:

$$p_i = p(x1_j, x2_j) \cdot [r(x1_j, x2_j, b_k) - r(x1_j, x2_j, b_{k-1})]$$

Where:

x1: The distance (m) from the aft terminal of L_s to the aft end of the zone in question

x2: The distance (m) from the aft terminal of L_s to the forward end of the zone in question

b: The mean transverse distance (m) measured at right angles to the centreline at the deepest subdivision ~~loadline~~ draught between the shell and an assumed vertical plane extended between the longitudinal limits used in calculating the factor p_i and which is a tangent to, or common with, all or part of the outermost portion of the longitudinal bulkhead under consideration. This vertical plane is to be so orientated that the mean transverse distance to the shell is a maximum, but not more than twice the least distance between the plane and the shell. If the upper part of a longitudinal bulkhead is below the deepest subdivision ~~loadline~~ draught the vertical plane used for determination of b is assumed to extend upwards to the deepest subdivision waterline. In any case, b is not to be taken greater than B'/2.

j: The aftmost damage zone number involved in the damage starting with no.1 at the stern

k: The number of a particular longitudinal bulkhead as barrier for transverse penetration in a damage zone counted from shell towards the centreline. However, value of k according to side shell is to be taken as zero.

$p(x1, x2)$: It is specified in **-2**.

$r(x1, x2, b)$: It is specified in **-3**. However, $r(x1, x2, b_0)$ is to be taken as zero.

（(2) and (3) are omitted.）

Paragraph 4.2.3 has been amended as follows.

4.2.3 Probability of Survival (s_i)

1 The Probability of Survival (s_i) for any damage case at any initial loading condition is to be obtained from the formula:

~~$s_i = \min\{s_{final,i}\}$~~

~~$s_{final,i}$: It is the probability to survive in the final equilibrium stage of flooding.~~

~~$s_{final,i} = K\sqrt{\left[\frac{GZ_{max}}{0.12}\cdot\frac{Range}{16}\right]}$~~

~~K: Coefficient given by the following:~~

~~$K = 1.0$ if $\theta_e \le \theta_{min}$~~

~~$K = 1.0$ if $\theta_e \ge \theta_{max}$~~

~~$K = \sqrt{\frac{\theta_{max} - \theta_e}{\theta_{max} - \theta_{min}}}$ Otherwise~~

~~Where, θ_{min} is 25 degrees and θ_{max} is 30 degrees for cargo ships.~~

~~GZ_{max}: It is the maximum positive righting lever (m) up to the angle~~ θ_v ~~. However, in the calculations of $s_{final,i}$, It is not to be taken as more than 0.12 m.~~

~~θ_v: It is the angle (degrees), in any stage of flooding, where the righting lever becomes negative, or the angle (degrees) at which an opening incapable of being closed weathertight becomes submerged.~~

~~*Range*: It is the range (degrees) of positive righting levers measured from the angle θ_e. However, the positive range is to be taken up to the angle θ_v and, in the calculations of $s_{final,i}$, it is not to be taken as more than 16 degrees.~~

~~θ_e: It is the equilibrium heel angle (degrees) in any stage of flooding.~~

$s_{intermediate,i}$: Probability to survive all intermediate flooding stages until the final equilibrium stage. It is calculated in accordance with **-2**.

$s_{final,i}$: Probability to survive in the final equilibrium stage of flooding. It is calculated in accordance with **-3**.

2 The factor $s_{intermediate,i}$ is to be obtained from the following formula.

(1) For cargo ships fitted with cross-flooding devices, the factor $s_{intermediate,i}$ is taken as the least of the value obtained from all flooding stages including the stage before equalization, if any, and is to be calculated as follows. Where the intermediate heel angle exceeds 30º, $s_{intermediate,i}$ is to be taken as 0.

$$s_{intermediate,i} = \left[\frac{GZ_{max}}{0.05}\cdot\frac{Range}{7}\right]^{\frac{1}{4}}$$

GZ_{max}: Maximum positive righting lever (m) up to the angle θ_v. However, in the calculations of $s_{intermediate,i}$, it is not to be taken as more than 0.05 m.

θ_v: Angle (°), at any stage of flooding, where the righting lever becomes negative, or the angle (°) at which an opening incapable of being closed weathertight becomes submerged.

Range: Range of positive righting levers (°) measured from the angle θ_e. However, the positive range is to be taken up to the angle θ_v and, in the calculations of $s_{intermediate,i}$, it is not to be taken as more than 7°.

θ_e: Equilibrium heel angle (°) at any stage of flooding.

(2) Where cross-flooding fittings are required, the time for equalization is not to exceed 10 min.

(3) For cargo ships not fitted with cross-flooding devices the factor $s_{intermediate,i}$ is taken as 1, except if the Administration considers that the stability in intermediate stages of flooding may be insufficient, it is to require further investigation thereof.

3 The factor $s_{final,i}$ is to be obtained from the following formula.

$$s_{final,i} = K \cdot \left[\frac{GZ_{max}}{0.12} \cdot \frac{Range}{16} \right]^{\frac{1}{4}}$$

K: Coefficient given by the following:

$K = 1.0$ if $\theta_e \le \theta_{min}$

$K = 0$ if $\theta_e \ge \theta_{max}$

$K = \sqrt{\frac{\theta_{max} - \theta_e}{\theta_{max} - \theta_{min}}}$ Otherwise

where, θ_{min} is 25° and θ_{max} is 30° for cargo ships.

θ_v : Angle (°), at any stage of flooding, where the righting lever becomes negative, or the angle (°) at which an opening incapable of being closed weathertight becomes submerged.

GZ_{max}: As specified in **-2** above. However, in the calculations of $s_{final,i}$, it is not to be taken as more than 0.12 (*m*).

θ_e : Equilibrium heel angle (°) at any stage of flooding.

Range: As specified in **-2** above. However, the positive range is to be taken up to the angle θ_v and, in calculations of $s_{final,i}$, it is not to be taken as more than 16°.

~~2~~**4** Where horizontal watertight boundaries are fitted above the waterline under consideration, the factor (*s*) calculated for the lower compartment or group of compartments is to be obtained by multiplying the value as determined in **-1** above by the factor v_m given by following formula.

$$v_m = v(H_{j,n,m}, d') - v(H_{j,n,m-1}, d')$$

$H_{j,n,m}$: It is the least height (*m*) above the baseline within the longitudinal range of $x1_{(j)} \cdots x2_{(j+n-1)}$ of the *m*-th horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

$H_{j,n,m-1}$: It is the least height (*m*) above the baseline within the longitudinal range of $x1_{(j)} \cdots x2_{(j+n-1)}$ of the *m-1*-th horizontal boundary which is assumed to limit the vertical extent of flooding for the damaged compartments under consideration;

j, n, x1 and *x2* are specified in **4.2.2-1**.

m: It is each horizontal boundary counted upwards from the waterline under consideration;

$v(H_{j,n,m}, d')$ and $v(H_{j,n,m-1}, d')$: Coefficient given by the following:

$$v(H, d') = 0.8 \frac{(H - d')}{7.8} \qquad \text{if } H_m - d' \le 7.8\ m$$

$$v(H, d') = 0.8 + 0.2 \left[\frac{(H - d') - 7.8}{4.7} \right] \quad \text{Otherwise}$$

$v(H_{j,n,m}, d')$ is to be taken as 1, if H_m coincides with the uppermost watertight boundary of the ship within the range $x1_{(j)} \cdots x2_{(j+n-1)}$, and $v(H_{j,n,0}, d')$ is to be taken as 0.

v_m is to be taken as 0, if v_m determined by above formula is taken as less than 0, and v_m is to be taken as 1, if v_m determined by above formula is taken as more than 1.

~~3~~**5** Where the requirement in **-~~3~~4** above is applied, in general, each contribution *dA* to the Attained Subdivision Index *A* is obtained from the formula:

$$dA = p_i \cdot [v_1 \cdot s_{min1} + (v_2 - v_1) \cdot s_{min2} + \cdots + (1 - v_{m-1}) \cdot s_{minm}]$$

v_m: The value calculated in accordance with **-~~3~~4** above;

s_{min}: The least factor of s for all combinations of damages obtained when the assumed damage extends from the assumed damage height H_m downwards.

~~4~~6 ~~In all cases, p~~Probability of survival (s_i) is to be taken as 0 in those cases where, taking into account sinkage, heel and trim, the openings in accordance with following **(1)** and **(2)** immerse at the final waterline:

(1) The openings through which progressive flooding may take place and such flooding is not accounted for in the calculation of probability of survival (s_i)

(2) Air-pipes, ventilators and the openings which are closed by means of weathertight doors or hatch covers

~~5~~7 The probability of survival (s_i) is to be taken as 0 if, taking into account sinkage, heel and trim, any of the following **(1)** to **(3)** occur in any intermediate stage or in the final stage of flooding:

(1) Immersion of any vertical escape hatch in the ~~bulkhead~~ freeboard deck

(2) Any controls intended for the operation of watertight doors, valves on piping or on ventilation ducts intended to maintain the integrity of watertight bulkheads from above the ~~bulkhead~~ freeboard deck become inaccessible or inoperable

(3) Immersion of piping or ventilation ducts ~~maintained a watertight and located within any compartment~~ located within the assumed extent of damage and carried through a watertight boundary if this can lead to the progressive flooding of compartments not assumed as flooded.

8 Notwithstanding the requirements given in **-7** above, where compartments are assumed to be flooded due to progressive flooding in the damage stability calculations, s_i may be taken as $s_{intermediate,i}$ for the flooding of those compartments under consideration.

9 Unsymmetrical flooding is to be in accordance with following **(1)** and **(2)**.

(1) Unsymmetrical flooding is to be kept to a minimum consistent with the efficient arrangements.

(2) Where it is necessary to correct large angles of heel, the means adopted is to, where practicable, be self-acting, but in any case where controls to equalization devices are provided they are to be operable from above the freeboard deck. These fittings together with their controls are to be acceptable to the Society.

Chapter 6 DOUBLE BOTTOMS

6.1 General

Paragraph 6.1.3 has been amended as follows.

6.1.3 Drainage

1 Efficient arrangements are to be provided for draining water from the tank top.

2 Regarding the application of **-1**, small wells may be constructed in the double bottom in connection with drainage arrangements ~~of holds~~. Such wells are not to extend downward more than necessary. ~~In addition, such wells are not to extend for more than one-half the depth of the double bottom as far as practicable. However, a well extending to the outer bottom is permitted at the after end of the shaft tunnel~~. The vertical distance from the bottom of such a well to a plane coinciding with the keel line is not to be less than 0.5*h* (*h* is specified in **6.1.1-1**) or 500 *mm*, whichever is greater, or as deemed appropriate by the Society.

3 Other wells (e.g. for lubricating oil under main engines) may be permitted by the Society if satisfied that the arrangements give protection equivalent to that afforded by a double bottom complying with this chapter.

~~**4** For the wells specified in **-2** and **-3** above, except those at the ends of shaft tunnels, the vertical distance from the bottom of such a well to a plane coinciding with the keel line specified in **2.1.48, Part A of the Rules** is not to be less than 0.5 *m*. This requirement may be waived, however, where bilge tanks deemed appropriate by the Society are provided instead of wells for the purpose of complying with **-1** above or where it is ascertained that the ship meets the requirements for the omission of double bottoms given in **6.1.1-2** or **6.1.1-3**.~~

Chapter 13 WATERTIGHT BULKHEADS

13.1 Arrangement of Watertight Bulkheads

Paragraph 13.1.1 has been amended as follows.

13.1.1 Collision Bulkheads*

1 All ships are to have a collision bulkhead, at a position not less than 0.05 L_f , from the forward terminal of the length for freeboard, but not more than 0.08 L_f or 0.05 L_f + 3.0 (*m*), whichever is greater, unless for special reasons which are approved by the Society. However, where any part of the ship below the waterline at 85% of the least moulded depth extends forward beyond the forward terminal of the length for freeboard, the above-mentioned distance is to be measured from the point that gives the smallest measurement from the following.

(a) The mid-length of such an extension

(b) A distance 0.015 L_f forward from the above-mentioned forward terminal

2 The bulkhead may have steps or recesses within the limits specified in **-1** above.

3 Any access openings, doors, manholes or ducts for ventilation, etc. are not to be cut in to the collision bulkhead below the ~~bulkhead~~ freeboard deck. Where a collision bulkhead extends up to a

deck above the freeboard deck in accordance with the requirements of **13.1.5(2)**, the number of openings in the extension of the collision bulkhead is to be kept to a necessary minimum and all such openings are to be provided with weathertight means of closing.

4 The arrangement of the collision bulkhead in a ship provided with bow doors is to be at the discretion of the Society. However, where a sloping ramp forms a part of the collision bulkhead above the ~~bulkhead~~ freeboard deck, the part of the ramp which is more than 2.3 *m* above the ~~bulkhead~~ freeboard deck may extend forward of the limit specified in **-1** above. In this case, the ramp is to be weathertight over its complete length. However, ramps not meeting the above requirement are to be disregarded as an extension of the collision bulkhead.

5 The factor s_i calculated in accordance with **4.2.3** will not be less than 1 at the deepest subdivision draught loading condition, level trim or any forward trim loading conditions, if any part of the ship forward of the collision bulkhead is flooded without vertical limits.

13.1.5 Height of Watertight Bulkheads*

Sub-paragraph (2) has been amended as follows.

The watertight bulkheads required in **13.1.1** to **13.1.4** are to be extended to the freeboard deck with the following exceptions:

(1) A watertight bulkheads in way of the raised quarter or the sunken forecastle deck to be extended up to the said deck.

(2) Where a forward superstructure having opening without closing appliances leads to a space below the freeboard deck, or a long forward superstructure is provided, the collision bulkhead is to extend up to the ~~superstructure~~ deck next above the freeboard deck and to be made weathertight. However, where all parts of the extension ~~is~~, including any part of the ramp attached to it are located within the limits specified in **13.1.1** and the part of the deck which forms the step is made effectively weathertight, it need not be fitted directly above the collision bulkhead.

(3) The aft peak bulkhead may terminate at a deck below the freeboard deck and above the designed maximum load line, provided that this deck is made watertight to the stern of the ship.

13.4 Other Watertight Construction

Paragraph 13.4.1 has been amended as follows.

13.4.1 Maintaining the Watertightness of Trunks

~~For the application of this chapter, t~~Trunks, etc. required to maintain watertightness are to ~~be capable of withstanding internal or external pressure under the most severe conditions at the intermediate or final stages of flooding~~ comply with this chapter.

Chapter 16 PLATE KEELS AND SHELL PLATING

16.1 General

Paragraph 16.1.3 has been amended as follows.

16.1.3 Moving Parts Penetrating the Shell Plating

Moving parts penetrating the shell plating below the deepest subdivision draught specified in **4.1.2(3)**, are to be fitted with a watertight sealing arrangement acceptable to the Society. The inboard gland is to be located within a watertight space of such volume that, if flooded, the ~~bulkhead~~ freeboard deck is not to be submerged. The Society may require that if such a compartment is flooded, essential or emergency power and lighting, internal communication, signals or other emergency devices remain available in other parts of the ship.

Chapter 17 DECKS

17.2 General

Paragraph 17.2.2 has been amended as follows.

17.2.2 Watertightness of Decks

1 Weather decks, except where hatchway and other openings specified in **Chapter 20** are provided, are to be made watertight.

~~**2** Special consideration is to be given to the water influx to the compartments under the bulkhead deck on ro-ro spaces.~~

~~**3**~~**2** Special consideration is to be given to maintaining watertightness where the decks are required to be watertight in compliance with the requirements of **Chapter 4**.

Chapter 21 BULWARKS, GUARDRAILS, FREEING ARRANGEMENTS, CARGO PORTS AND OTHER SIMILAR OPENINGS, SIDE SCUTTLES, RECTANGULAR WINDOWS, VENTILATORS AND GANGWAYS

21.3 Bow Doors and Inner Doors

21.3.2 Arrangement of Doors and Inner Doors

Sub-paragraph -6 has been amended as follows.

6 Doors ~~and~~, inner doors and ramps are to be arranged so as to preclude the possibility of the door or ramp causing structural damage to the inner door or to the bulkhead when damage to or detachment of the door or ramp occurs. If this is not possible, a separate inner weathertight door is to be installed, as indicated in **13.1.1**.

21.5 Side Scuttles and Rectangular Windows

21.5.2 General Requirement for Position of Side Scuttles

Sub-paragraph -3(2) has been amended as follows.

3 The deadlights of side scuttles deemed appropriate by Society may be portable, provided that such scuttles comply with the following requirements **(1)** to **(4)**:

(1) Fitting class *A* side scuttles or class *B* side scuttles is not required.

(2) Such side scuttles are fitted abaft one eighth of ~~the subdivision length (L_s) specified in **4.1.2(6)**~~ the length for freeboard from the forward perpendicular.

(3) Such side scuttles are fitted above a line drawn parallel to the bulkhead deck at side and having its lowest point at a height of 3.7 *m* plus 2.5% of the breadth of the ship (*B*') specified in **4.1.2(11)** above the deepest subdivision draught specified in **4.1.2(3)**.

(4) Such portable deadlights are to be stowed adjacent to the side scuttles they serve.

EFFECTIVE DATE AND APPLICATION (Amendment 2-1)

1. The effective date of the amendments is 1 January 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships other than ships that fall under the following:

(1) for which the contract for construction is placed on or after the effective date; or

(2) in the absence of a contract for construction, the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2020; or

(3) the delivery of which is on or after 1 January 2024.

(Note) The term "a similar stage of construction" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

Amendment 2-2

Chapter 4 SUBDIVISIONS

4.3 Openings

4.3.1 Internal Openings

Sub-paragraph -2(2) has been amended as follows.

1 Internal openings below the final damage waterline or the intermediate waterline and considered to prevent progressive flooding in the calculation of the subdivision index are to be watertight.
2 The number of internal openings required to be watertight under the requirement of **-1** above is to be minimized, and their closing appliances are to comply with the following **(1)** to **(5)**. Relaxation of the requirements regarding water openings above the freeboard deck may be considered, where deemed by the Society that the safety of the ship is not impaired.
(1) (Omitted)
(2) Closing appliances for internal openings which are used while at sea are to be sliding watertight doors complying with the following conditions.
((a) and (b) are omitted.)
(c) Provided with position indicators <u>on the bridge and at all operating positions</u> showing whether the doors are open or closed ~~at all operating positions~~
((d) and (e) are omitted.)
((3) to (5) are omitted.)

Chapter 13 WATERTIGHT BULKHEADS

13.3 Watertight Doors

Paragraph 13.3.5 has been amended as follows.

13.3.5 Indication

~~**1**~~ Watertight doors, except those permanently closed at sea, are to be provided with position indicators showing whether the doors are open or closed on the bridge and at all operating positions.
~~**2** For watertight doors which are to be capable of being remotely closed, an indication is to be placed locally showing that the door is in remote control mode.~~

EFFECTIVE DATE AND APPLICATION (Amendment 2-2)

1. The effective date of the amendments is 1 January 2020.

2. Notwithstanding the amendments to the Rules, the current requirements apply to ships other than ships that fall under the following:

(1) for which the contract for construction* is placed on or after the effective date; or

(2) in the absence of a contract for construction, the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2020; or

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.

(3) the delivery of which is on or after 1 January 2024.

* "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29.

IACS PR No.29 (Rev.0, July 2009)

1. The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.

2. The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.

For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:

(1) such alterations do not affect matters related to classification, or

(2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.

The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.

3. If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply.

4. If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:
This Procedural Requirement applies from 1 July 2009.

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

GUIDANCE

Part CS Hull Construction and Equipment of Small Ships

2019 AMENDMENT NO.1

Notice No.70 27 December 2019
Resolved by Technical Committee on 22 July 2019

Notice No.70 27 December 2019
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 CS HULL CONSTRUCTION AND EQUIPMENT OF SMALL SHIPS

Chapter CS6 has been added as follows.

CS6 DOUBLE BOTTOMS

CS6.1 General

CS6.1.1 Application

1 "Ships deemed by the Society to not require a double bottom for special reasons" stipulated in **6.1.1-2, Part CS** of the Rules refer to the following.

(1) Ships complying with **Part N** or **Part S** of the Rules

(2) Ships complying with **3.2.2**, **Part 3 of the** "**Rules for Marine Pollution Prevention Systems**"

2 "Deemed appropriate by the Society" stipulated in **6.1.1-2, Part CS** of the Rules refers to cases where the safety of the ship can be ascertained through flooding calculations.

3 Application of requirements related to the omission of double bottoms or unusual bottom arrangements in **6.1.1-3, Part CS** of the Rules is to be in accordance with following **(1)** and **(2)**. For example, arrangements in which parts of the double bottom do not extended for the full width of the ship or in which the inner bottom is located higher than the partial subdivision draught (d_p) defined in **4.1.2-5, Part CS** of the Rules are to be considered to be unusual bottom arrangements.

(1) When it is assumed that such spaces are subject to a bottom damage, compartments are to be arranged to demonstrate that the factor s_i, when calculated in accordance with **4.2.3, Part CS** of the Rules, is not less than 1 for those service conditions which are the three loading conditions used to calculate the Attained Subdivision Index (A) specified in **4.2.1-2, Part CS** of the Rules. Assumed extent of damage is to be in accordance with following **Table CS6.1.1-1**. If any damage of a lesser extent than the maximum damage specified in **Table CS6.1.1-1** would result in a more severe condition, such damage is to be considered. However, for ships less than 80 m in length for freeboard (L_f), it may be assumed that the damage will only occur between the transverse watertight bulkheads.

(2) Flooding of such spaces is not to render emergency power and lighting, internal communication, signals or other emergency devices inoperable in other parts of the ship.

Table CS6.1.1-1 Assumed Extent of Damage

	For 0.3*L* from the forward perpendicular of the ship	Any other part of the ship
Longitudinal extent	$1/3\,L_f^{2/3}$ or 14.5*m*, whichever is less	$1/3\,L_f^{2/3}$ or 14.5*m*, whichever is less
Transverse extent	*B*'/6 or 10*m*, whichever is less	*B*'/6 or 5*m*, whichever is less
Vertical extent, measured from the keel line	*B*'/20, to be taken not less than 0.76 *m* and not more than 2 *m*	*B*'/20, to be taken not less than 0.76 *m* and not more than 2 *m*

Notes:
1. Keel line is to be in accordance with **2.1.48, Part A** of the Rules.
2. Ship breadth (*B*') is to be in accordance with **4.1.2(11), Part C** of the Rules.

CS6.1.3 Drainage

1 In the application of **6.1.3-1, Part CS** of the Rules, the requirements in the following **(1)** to **(3)** are to be complied with where bilge tanks are provided instead of bilge wells.

(1) Bilge tanks are to have sufficient strength as deep tanks as required in **Chapter 14, Part CS** of the Rules.

(2) Drain pipes leading to bilge tanks are to comply with the requirement in **D13.5.8**.

(3) Bilge tanks are to be provided with manholes and covers for the purpose of conducting internal inspections easily.

2 "As deemed appropriate by the Society" stipulated in **6.1.3-2, Part CS** of the Rules means that the requirements specified in **CS6.1.1-3(1)** are satisfied.

3 "Protection equivalent to that afforded by a double bottom complying with this chapter" stipulated in **6.1.3-3, Part CS** of the Rules means that the requirements specified in **CS6.1.1-3(1)** are satisfied. However, for ships not less than 80 *m* in length for freeboard (L_f), wells for lubricating oil below main engines may protrude into the double bottom below the boundary line defined by the distance *h* (*h* is specified in **6.1.1-1, Part CS** of the Rules) provided that the vertical distance between the well bottom and a plane coinciding with the keel line is not less than 0.5*h* or 500 *mm*, whichever is greater.

Appendix 1 APPLICATION OF PART C OF THE GUIDANCE

The **Part C** of the Guidance is to be applied as the Guidance related to the prescriptions in **Part CS** of the Rules, as shown in the **Table CS**.

Table CS has been amended as follows.

Table CS Correspondence Table of Guidance between Part CS and Part C

Part CS	Part C	Part CS	Part C	Part CS	Part C
1.1.3	**C1.1.3**[See Note 1]	13.3	**C13.3**	21.1.3	**C23.1.3**[See Note 22]
1.3.1	**C1.1.7** **C1.1.11** and **C1.1.12**	14.1.3	**C14.1.3**	21.2.1	**C23.2.1**[See Note 23]
		14.2.3	**C14.2.3**	21.2.2	**C23.2.2**[See Note 24]
		15.1.1	**C15.1.1**	21.2.3	**C23.2.3**
2.1.1	**C2.1.1**	15.2.1	**C15.2.1**	21.3	**C23.3**
2.2.2	**C2.2.2**	15.2.3	**C15.2.3**	21.4	**C23.4**[See Note 25]
2.2.3	**C2.2.3**	16.3.3	**C16.3.3**	21.5.1	**C23.5.1**[See Note 26]
2.2.4	**C2.2.4**	16.4.4	**C16.4.4**	21.5.3	**C23.5.3**[See Note 27]
3	**C3**	16.5.3	**C16.6.1**	21.5.7	**C23.5.7**[See Note 28]
4	**C4**[See Note 2]	16.6.1	**C16.7.1**	21.6.5	**C23.6.5**[See Note 29]
5	**C5**	16.6.2	**C16.7.2**	21.6.7	**C23.6.7**[See Note 30]
~~6.1.1~~	~~**C6.1.1-1 to -3** [See Note 3]~~	17.1.1-1	**C10.2.1**[See Note 10]	21.6.8	**C23.6.8**
		17.2.1	**C17.1.1**	21.7.1	**C23.7.1**[See Note 31]
~~6.1.3~~	~~**C6.1.3** [See Note 4]~~	17.2.2	**C17.1.2**	21.7.2	**C23.7.2**
6.6.2-1	**C6.4.3-2**	17.2.4	**C17.1.4**[See Note 11]	21.8.1	**C23.8.1**[See Note 32]
6.7.1	**C6.5.1-1** and **-4**	17.2.5	**C17.1.5**	22.2.1	**C24.2.1**
6.9	**C6.8**	17.3.2	**C17.2.2**	22.4.1	**C25.2.1**[See Note 33]
7.5.2	**C7.6.2**[See Note 5]	17.3.4	**C17.2.4**	22.4.2	**C25.2.2**
7.5.3	**C7.6.3**[See Note 6]	17.3.5	**C17.2.5**	22.4.3	**C25.2.3** [See Note 34]
8.3	**C7.5.3**	17.4.1	**C17.3.1**	23	**C27**
9.1.2	**C9.1.2**[See Note 7]	17.4.5	**C17.3.5**	24.1.1	**C29.1.1**[See Note 35] [See Note 36]
9.1.3	**C9.1.3**	18	**C18**		
10.1.2	**C10.1.2**	19.1.2	**C20.1.2**[See Note 12]	24.1.2	**C29.1.2**[See Note 37]
10.2.3	**C10.3.3**[See Note 8]	19.2.4	**C20.2.4**[See Note 13]	24.3.2	**C29.4.2**
10.3.2	**C10.4.2**	19.2.5	**C20.2.5**[See Note 14]	24.9.4	**C29.7.4**[See Note 38]
10.7.1	**C10.9.1**	19.2.6	**C20.2.6**[See Note 15]	24.11.5	**C29.12.4**
11.1.2	**C11.1.2**	19.2.10	**C20.2.10**[See Note 16]	25.1.2	**C34.1.2**[See Note 39]
11.2.1	**C11.2.1**	19.2.12	**C20.2.12**[See Note 17]	26	**C35**
12.1.3	**C12.1.3**	19.2.13	**C20.2.13**[See Note 18]		
12.1.4	**C12.1.4**	19.3.5	**C20.3.5**[See Note 19]		
12.2.1	**C12.2.1**[See Note 9]	19.4.2	**C20.4.2**		
13.1.1	**C13.1.1**	20.2.2	**C21.2.2**		
13.1.4	**C13.1.4**	21.1.1	**C23.1.1**[See Note 20]		
13.2.3	**C13.2.3**	21.1.2	**C23.1.2**[See Note 21]		

Notes:

1. In Guidance **C1.1.3-2(2)(a)**, **5.5.2, Part C** of the Rules is to be read as **5.4.3, Part CS** of the Rules.
   In Guidance **C1.1.3-2(2)(b)**, **7.6.2-2, Part C** of the Rules is to be read as **7.5.2-1, Part CS** of the Rules.
   In Guidance **C1.1.3-2(2)(c)**, **10.2.1-2, Part C** of the Rules is to be read as **17.1.1-2, Part CS** of the Rules.
   In Guidance **C1.1.3-2(2)(e)**, **18.2.1-1, Part C** of the Rules is to be read as **18.2.1-1, Part CS** of the Rules.
   In Guidance **C1.1.3-2(2)(g)**, **20.1.2, Part C** of the Rules is to be read as **19.1.2, Part CS** of the Rules.
   In Guidance **C1.1.3-4**, **1.1.3-5, Part C** of the Rules is to be read as **1.1.3-2, Part CS** of the Rules.
2. In Guidance **C4.2.3-2**, **23.6.5-2, Part C** of the Rules is to be read as **21.6.5-2, Part CS** of the Rules.
3. ~~In Guidance **C6.1.1-1** and **C6.1.1-2, 6.1.1-2, Part C** of the Rules is to be read as **6.1.1-2, Part CS** of the Rules.~~

~~In Guidance **C6.1.1-3**, **6.1.1-3, Part C** of the Rules is to be read as **6.1.1-3, Part CS** of the Rules.~~ (Deleted)

4. ~~In Guidance **C6.1.3**, **6.1.3-1** and **Chapter 14, Part C** of the Rules are to be read as **6.1.3-1** and **Chapter 14, Part CS** of the Rules.~~ (Deleted)
5. In Guidance **C7.6.2**, **7.6.2, Part C** of the Rules is to be read as **7.5.2, Part CS** of the Rules.
6. In Guidance **C7.6.3**, **7.6.2-2**, **7.7.1** and **7.8.1, Part C** of the Rules are to be read as **7.5.2-1**, **7.6.1** and **7.6.3, Part CS** of the Rules.
7. In Guidance **C9.1.2**, **9.2.2-2(2), Part C** of the Rules is to be read as **9.2.2-5, Part CS** of the Rules.
8. In Guidance **C10.3.3**, **10.3.3-1** and **10.3.3-2, Part C** of the Rules are to be read as **10.2.3-1** and **10.2.3-2, Part CS** of the Rules.
9. In Guidance **C12.2.1, 12.2.1-1** and **12.2.1-2, Part C** of the Rules are to be read as **12.2.1-1** and **12.2.1-2, Part CS** of the Rules.
10. In Guidance **C10.2.1**, **10.2.1-1, Part C** of the Rules is to be read as **17.1.1-1, Part CS** of the Rules.
11. In Guidance **C17.1.4**, **17.1.4-2, Part C** of the Rules is to be read as **17.2.4-2, Part CS** of the Rules.
12. In Guidance **C20.1.2**, **20.1.2, Part C** of the Rules is to be read as **19.1.2, Part CS** of the Rules.
13. In Guidance **C20.2.4**, **20.2.4** and **20.2.10, Part C** of the Rules are to be read as **19.2.4** and **19.2.10, Part CS** of the Rules.
14. In Guidance **C20.2.5**, **20.2.4** and **20.2.5, Part C** of the Rules are to be read as **19.2.4** and **19.2.5, Part CS** of the Rules.
15. In Guidance **C20.2.6**, **20.2**, **20.2.4**, **20.2.6** and **20.2.5, Part C** of the Rules are to be read as **19.2**, **19.2.4**, **19.2.6** and **19.2.5, Part CS** of the Rules.
16. In Guidance **C20.2.10**, **20.2.10-2, Part C** of the Rules is to be read as **19.2.10-2, Part CS** of the Rules.
17. In Guidance **C20.2.12**, **20.2.12, Part C** of the Rules is to be read as **19.2.12, Part CS** of the Rules.
18. In Guidance **C20.2.13**, **20.2.13, Part C** of the Rules is to be read as **19.2.13, Part CS** of the Rules.
19. In Guidance **C20.3.5**, **20.3.5** and **20.1.2, Part C** of the Rules are to be read as **19.3.5** and **19.1.2, Part CS** of the Rules.
20. In Guidance **C23.1.1**, **23.1.1-2(2)**, **Part C** of the Rules is to be read as **21.1.1-2(2)**, **Part CS** of the Rules.
21. In Guidance **C23.1.2**, **23.1.2, Part C** of the Rules is to be read as **21.1.2, Part CS** of the Rules.
22. In Guidance **C23.1.3**, **23.1.3-4, Part C** of the Rules is to be read as **21.1.3-4, Part CS** of the Rules.
23. In Guidance **C23.2.1**, **23.2.1-3**, **23.2.1-4** and **23.2.2-4, Part C** of the Rules are to be read as **21.2.1-3**, **21.2.1-4** and **21.2.2-4, Part CS** of the Rules.
24. In Guidance **C23.2.2**, **23.2.2**, **23.2.2-1**, **23.2.2-2** and **23.2.2-3, Part C** of the Rules are to be read as **21.2.2**, **21.2.2-1**, **21.2.2-2** and **21.2.2-3, Part CS** of the Rules.
25. In Guidance **C23.4.5-2**, "L'" is to be read as "L". L is ship's length specified in **2.1.2, Part A** of the Rules.
26. In Guidance **C23.5.1-2**, **23.5.1-1** and **Table C23.5, Part C** of the Rules is to be read as **21.5.1-1** and **Table CS21.5, Part CS** of the Rules.
27. In Guidance **C23.5.3**, **23.5.3-5, Part C** of the Rules is to be read as **21.5.3-5, Part CS** of the Rules.
28. In Guidance **C23.5.7**, **23.5.7-3, Part C** of the Rules is to be read as **21.5.7-3, Part CS** of the Rules.
29. In Guidance **C23.6.5**, **23.6.5** and **23.6.5-1**, **Part C** of the Rules are to be read as **21.6.5** and **21.6.5-1**, **Part CS** of the Rules.
30. In Guidance **C23.6.7**, **23.6.7**, **23.6.1** and **20.1.2, Part C** of the Rules are to be read as **21.6.7**, **21.6.1** and **19.1.2, Part CS** of the Rules.
31. In Guidance **C23.7.1**, **Chapter 19**, **23.1.2-2** and **23.7.1, Part C** of the Rules are to be read as **Chapter 18**, **21.1.2-2** and **21.7.1, Part CS** of the Rules.
32. In Guidance **C23.8.1**, **23.8.1, Part C** of the Rules is to be read as **21.8.1, Part CS** of the Rules.
33. Ships not engaged on international voyages need not to apply the provisions of **C25.2.1-2**.
34. In Guidance **C25.2.3**, **25.2.3, Part C** of the Rules is to be read as **22.4.3, Part CS** of the Rules.
35. In Guidance **C29.1.1-1(1)**, **Chapter 29, Part C** of the Rules is to be read as **Chapter 24, Part CS** of the Rules.
36. In Guidance **C29.1.1-3(1)(b)i)**, **29.4**, **29.5** and **29.6, Part C** of the Rules are to be read as **24.3**, **24.4** and **24.7, Part CS** of the Rules.
37. In Guidance **C29.1.2-4(1)**, **29.1.2-2, Part C** of the Rules is to be read as **24.1.2-2, Part CS** of the Rules.
38. In Guidance **C29.7.4**, **29.7.4, Part C** of the Rules is to be read as **24.9.4, Part CS** of the Rules.
39. In Guidance **C34.1.2**, **34.1.2-1, Part C** of the Rules is to be read as **25.1.2-1, Part CS** of the Rules.

EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 1 January 2020.

2. Notwithstanding the amendments to the Guidance, the current requirements apply to ships other than ships that fall under the following:

(1) for which the contract for construction is placed on or after the effective date; or

(2) in the absence of a contract for construction, the keels of which are laid or which are at *a similar stage of construction* on or after 1 July 2020; or

(3) the delivery of which is on or after 1 January 2024.

(Note) The term "*a similar stage of construction*" means the stage at which the construction identifiable with a specific ship begins and the assembly of that ship has commenced comprising at least 50 *tonnes* or 1% of the estimated mass of all structural material, whichever is the less.