Amendments of the Rules

Pt. 7 Ships of Special Service
Pt. 7 Ships of Special Service (Ch 5, 6)

Hull Rule Development Team

Present	Amendment
CHAPTER 2 ORE CARRIERS	**CHAPTER 2 ORE CARRIERS**
Section 1 General	**Section 1 General**
101. Application [See Guidance]	**101. Application** [See Guidance]
1. ~ 3. <omission>	**1. ~ 3.** <omission>
4. Ore carriers which are different construction from the scope of application given above or the length of which exceeds 230 m and the requirements in this Chapter are considered to be not applicable, matters are to be determined as deemed appropriate by the Society.	**4.** Ore carriers which are different construction from the scope of application and the requirements in this Chapter are considered to be not applicable, matters are to be determined as deemed appropriate by the Society.
5. Except where specially required in this Chapter, the requirements in Chapter 3 are to be applied.	**5.** Except where specially required in this Chapter, the requirements in **Ch 3** are to be applied.
Section 2 <omission>	**Section 2** <omission>
Section 3 Wing Tanks or Void Spaces	**Section 3 Wing Tanks or Void Spaces**
301. ~ 302. <omission>	**301. ~ 302.** <omission>
303. Longitudinals and Stiffeners	**303. Longitudinals and Stiffeners**
1. ~ 7. <omission>	**1. ~ 7.** <omission>
8. In case where assembled members, special shape steels or flanged plates are used for frames, beams or stiffeners in cargo oil tanks and deep tanks whose scantlings are specified only in terms of section modulus, the thickness of web is intended to be greater than the required level due to reasons other than strength, it may be suitably modified. $t = 0.015 k_0 d_0 + 2.5$ (mm) <omission>	**8.** In case where assembled members, special shape steels or flanged plates are used for frames, beams or stiffeners in cargo oil tanks and deep tanks whose scantlings are specified only in terms of section modulus, the thickness of web is not to be less than the value from the following formula. However where the stiffener have the sufficient buckling strength or the depth of web is intended to be greater than the required level due to reasons other than strength, it may be suitably modified. $t = 0.015 k_0 d_0 + 2.5$ (mm) <omission>
9. <omission>	**9.** <omission>

Present	Amendment
304. <omission>	**304. <omission>**
1. ~ 5. <omission>	**1. ~ 5. <omission>**
6. The scantlings of bottom transverses are to be in accordance with the requirements in the following (1) to (3): (1), (2) <omission> (3) The section modulus of transverses at bilge and at the lower end of longitudinal bulkheads is not to be less than that obtained from the following formula. ~~Where, however, bottom transverses and vertical webs on longitudinal bulkheads in centre tanks or inner tanks are connected with large brackets extending to the lowest cross ties, the section modulus of transverses specified above may be properly reduced.~~ In calculating the section modulus, the neutral axis of section is to be taken as located at the middle of the depth d_b (See **Fig 7.2.2**) of transverses.	**6.** The scantlings of bottom transverses are to be in accordance with the requirements in the following (1) to (3): (1), (2) <omission> (3) The section modulus of transverses at bilge and at the lower end of longitudinal bulkheads is not to be less than that obtained from the following formula. In calculating the section modulus, the neutral axis of section is to be taken as located at the middle of the depth d_b (See **Fig 7.2.2**) of transverses.
<omission>	**<omission>**
Section 4 ~ Section 10 <omission>	**Section 4 ~ Section 10 <omission>**

Present	Amendment
CHAPTER 3 BULK CARRIERS	**CHAPTER 3 BULK CARRIERS**
Section 1 ~ Section 8 <omission>	**Section 1 ~ Section 8 <omission>**
Section 9 Hatch Covers and Hatch Coamings ~	**Section 9 Hatch Covers and Hatch Coamings ~**
901. ~ 903. <omission>	**901. ~ 903. <omission>**
904. Hatch coamings and local details	**904. Hatch coamings and local details**
1. Load model The pressure P_{coam} (kN/m^2) on the No. 1 forward transverse hatch coaming is given by: $P_{coam} = 220$, when a forecastle is fitted in accordance with **Pt 7, Ch 3, Sec. 13** $= 290$ in the other cases The pressure P_{coam} (kN/m^2) on the other coamings is given by: $P_{coam} = 220$	**1. Load model** The pressure P_{coam} (kN/m^2) on the No. 1 forward transverse hatch coaming is given by: $P_{coam} = 220$, where there is a forecastle to which l_F according to **Sec. 13** is applied $= 290$ in the other cases The pressure P_{coam} (kN/m^2) on the other coamings is given by: $P_{coam} = 220$
2. ~ 5. <omission>	**2. ~ 5. <omission>**
905. Closing arrangements	**905. Closing arrangements**
1. <omission>	**1. <omission>**
2. Stoppers (1), (2) <omission> (3) No. 1 hatch cover is to be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 230 kN/m^2, but this pressure may be reduced to 175 kN/m^2 when a forecastle is fitted in accordance with **Pt 7, Ch 3, Sec. 13.** (4) <omission>	**2. Stoppers** (1), (2) <omission> (3) No. 1 hatch cover is to be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 230 kN/m^2, but this pressure may be reduced to 175 kN/m^2 where there is a forecastle to which l_F according to **Sec. 13** is applied (4) <omission>
3. <omission>	**3. <omission>**
906. <omission>	**906. <omission>**
Section 10 ~ Section 18 <omission>	**Section 10 ~ Section 18 <omission>**

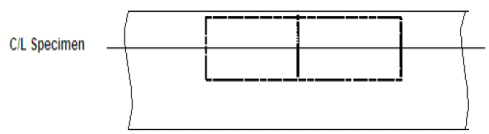
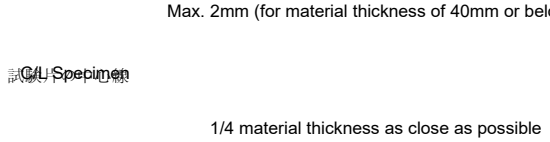
Present	Amendment
CHAPTER 4 Containers Ships	**CHAPTER 4 Containers Ships**
Section 1 ~ Section 2 <omission>	**Section 1 ~ Section 2 <same as current>**
Section 3 Double Bottoms	**Section 3 Double Bottoms**
301. General ***(2018)***	**301. General** ***(2018)***
1. The construction of double bottoms in holds which are exclusively loaded with containers is to be in accordance with the requirements of this Section. Unless expressly specified otherwise, the requirements in **Pt.3 Ch.7** are ~~also~~ to be applied.	**1.** The construction of double bottoms in holds which are exclusively loaded with containers is to be in accordance with the requirements of this Section. Except where required in this section, the requirements in **Pt.3 Ch.7** are to be applied.
2. ~ **5. <omission>**	**2.** ~ **5.** <same as current>
Section 4 Double Side Construction	**Section 4 Double Side Construction**
401. General [See Guidance]	**401. General [See Guidance]**
1. <omission>	**1.** <same as current>
2. The construction of double side in holds which are exclusively loaded with containers is to be in accordance with the requirements in **Pt 3, Ch 14** in addition to the requirements of this Section.	**2.** The construction of double side in holds which are exclusively loaded with containers is to be in accordance with the requirements in the requirements of this Section. Except where required in this section, such construction is to be in accordance with the requirements in **Pt 3, Ch 14**.
3. Double side shell structures which are used as deep tanks are to be in accordance with the requirements in **Pt 3, Ch 15** unless otherwise specified in this Section.	**3.** <same as current>
4. ~ 12. <omisson>	**4. ~ 12.** <same as current>
402. ~ 406. <omission>	**402. ~ 406. <same as current>**
Section 4 ~ Section 11 <omission>	**Section 4 ~ Section 11 <same as current>**

Present	Amendment
<errata>	**<errata>**
Ch. 3 Sec. 14	**Ch. 3 Sec. 14**
1402. Application	**1402. Application**
<omission>	<omission>
Ships constructed before 1 January 2007 are to be in accordance with the requirements in **Pt 1, Ch.2, 1602.**	Ships constructed before 1 January 2007 are to be in accordance with the requirements in **Pt 1, Ch.2, 1702.**

Present	Amendment
CHAPTER 5 SHIPS CARRYING LIQUEFIED GASES IN BULK	**CHAPTER 5 SHIPS CARRYING LIQUEFIED GASES IN BULK**
Section 1 General	**Section 1 General**
101. <omission>	**101. <omission>**
102. Approval for plans	**102. Approval for plans**
1. Plans and data for approval (1) Manufacturing specifications for cargo tanks, insulations and secondary barriers (including welding procedures, inspection and testing procedures for weld and cargo tanks, properties of insulation materials and secondary barriers and their processing manual and working standards) (2) Details of cargo tank construction (3) Arrangement of cargo tank accessories including details of fittings inside the tanks (4) ~ (24) <omission>	**1. Plans and data for approval** (1) Manufacturing specifications for cargo tanks, insulations and secondary barriers (including welding procedures, inspection and testing procedures for weld and cargo tanks, properties of insulation materials and secondary barriers and their processing manual and working standards) (2) Details of cargo tank construction and cargo containment system (2019) (3) Arrangement of cargo tank accessories including details of fittings inside the tanks (4) ~ (24) <omission>
2. Plans and data for reference <omission>	**2. Plans and data for reference <omission>**
103. ~ 105. <omission>	**103. ~ 105. <omission>**
Section 2 <omission>	**Section 2 <same as current>**

Present	Amendment
Section 3 Ship Arrangements	**Section 3 Ship Arrangements**
301. <omission>	**301. <same as current>**
302. Accommodation, service and machinery spaces and control stations (IGC Code 3.2) [See Guidance]	**302. Accommodation, service and machinery spaces and control stations (IGC Code 3.2) [See Guidance]**
1. ~ 4. <omission>	**1. ~ 4. <same as current>**
5. Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in **4** (1), except wheelhouse windows, shall be constructed to "A-60" class. ~~Wheelhouse windows shall be constructed to not less than "A-0" class (for external fire load).~~ Sidescuttles in the shell below the uppermost continuous deck and in the first tier of the superstructure or deckhouse shall be of fixed (non-opening) type.	**5.** Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in **4** (1), except wheelhouse windows, shall be constructed to "A-60" class. Sidescuttles in the shell below the uppermost continuous deck and in the first tier of the superstructure or deckhouse shall be of fixed (non-opening) type. (2019)
6., 7 <omission>	**6., 7 <same as current>**
303. ~ 307. <same as current>	**303. ~ 307. <same as current>**
308. Bow and stern loading and unloading arrangements (IGC Code 3.8)	**308. Bow and stern loading and unloading arrangements (IGC Code 3.8)**
1. Subject to the requirements in 308, cargo piping may be arranged to permit bow or stern loading and unloading.	1. Subject to the requirements in **308.** and **Sec.5**, cargo piping may be arranged to permit bow or stern loading and unloading.
2. ~ 7. <same as current>	**2. ~ 7. <same as current>**

Present	Amendment
Section 4 Cargo Containment	**Section 4 Cargo Containment**
401. ~ 421. <omission>	**401. ~ 421. <omission>**
422. Type B independent tanks (IGC Code 4.22) [See Guidance]	**422. Type B independent tanks (IGC Code 4.22) [See Guidance]**
1. , 2. <omission>	**1. , 2. <omission>**
3. Ultimate design condition	**3. Ultimate design condition**
(1) Plastic deformation (A) For type B independent tanks, ~ <omission> The values A and B shall be shown on the **IGC Certificate** and shall have at least the following minimum values of **Table 7.5.2.**: <omission>	(1) Plastic deformation (A) For type B independent tanks, ~ <omission> The values A, B, C and D shall be shown on the **IGC Certificate** and shall have at least the following minimum values of **Table 7.5.2.**: <omission>
4. ~ 7. <omission>	**4. ~ 7. <omission>**
401. ~ 428. <omission>	**401. ~ 428. <omission>**
Section 5 <omission>	**Section 5 <same as current>**

Present	Amendment
Section 6 Materials of Construction and Quality Control	**Section 6 Materials of Construction and Quality Control**
601., 602 <omission>	**601., 602 <omission>**
603. General test requirements and specifications (IGC Code 6.3)	**603. General test requirements and specifications (IGC Code 6.3)**
1. <omission>	**1. <omission>**
2. Toughness test	**2. Toughness test**
(1) <omission> (2) For base metal, the largest size Charpy V-notch specimens possible for the material thickness shall be machined with the specimens 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 as shown in **Figure 7.5.17**.  **Fig 7.5.17 Orientation of base metal test specimen** (3), (4) <omission>	(1) <omission> (2) For base metal, the largest size Charpy V-notch specimens possible for the material thickness shall be machined with the specimens 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 as shown in **Figure 7.5.17**.  **Fig 7.5.17 Orientation of base metal test specimen** (3), (4) <omission>
604. ~ 607. <omission>	**604. ~ 607. <omission>**
Section 7 ~ Section 19 <omission>	**Section 7 ~ Section 19 <omission>**

Amendments of Guidance

Pt. 7 Ships of Special Service
Pt. 7 Ships of Special Service (Ch. 5, 6)

Hull Rule Development Team

Present	Amendment
CHAPTER 2 ORE CARRIERS	**CHAPTER 2 ORE CARRIERS**
Section 1, 2 <omit>	**Section 1, 2 <same as current>**
Section 3 Wing Tanks or Void Spaces	**Section 3 Wing Tanks or Void Spaces**
<newly added>	**302. Bulkhead plating** **1.** When the flow-through ballast water exchange operations is used in applying the requirements in **302. 1** of the Rules, the following water heads are to be additionally considered. $h_4 = z_T + h_{air} + h_{drop} - z$ z_{top} : height of highest point of tank (m) h_{air} : height of air or overflow pipe above tank top (m) h_{drop} : Overpressure due to sustained liquid flow through air pipe or overflow pipe in case of overfilling or filling during flow through ballast water exchange. It is to be defined by the designer, but not to be less than 25. z : height to the considered location (m) $h_5 = 0.85\,(h_4 + \Delta h)$ Δh : as specified in **Pt 3 Ch.15 105.** of the Rules
<newly added>	**303. Longitudinals and Stiffeners** **1.** When the flow-through ballast water exchange operations is used in applying the requirements in **303. 6** of the Rules, the following water heads are to be additionally considered. h_4 and h_5 = as specified in **302.1**
304. ~ <omit>	**304. ~ <omit>**
Section 5, Section 7 <omit>	**Section 5, Section 7 <same as current>**

Present	Amendment
CHAPTER 10 DOUBLE HULL TANKER	**CHAPTER 10 DOUBLE HULL TANKER**
Section 1 <omit>	**Section 1 <same as current>**
Section 2 Bulkhead Plating	**Section 2 Bulkhead Plating**
201. Bulkhead plating in cargo oil tanks and deep tanks	**201. Bulkhead plating in cargo oil tanks and deep tanks** [
1. ~ 3. <omit>	**1. ~ 3. <same as current>**
<newly added>	**4.** When the flow-through ballast water exchange operations is used in applying the requirements in **201. 1** of the Rules, the following water heads are to be additionally considered. $h_4 = z_T + h_{air} + h_{drop} - z$ z_{top} : height of highest point of tank (m) h_{air} : height of air or overflow pipe above tank top (m) h_{drop} : Overpressure due to sustained liquid flow through air pipe or overflow pipe in case of overfilling or filling during flow through ballast water exchange. It is to be defined by the designer, but not to be less than 25. z : height to the considered location (m) $h_5 = 0.85\,(h_4 + \Delta h)$ Δh : as specified in **Pt 3 Ch.15 105.** of the Rules
202. <omit>	**202. <same as current>**

Present	Amendment
Section 3 Longitudinals and Stiffeners	**Section 3 Longitudinals and Stiffeners**
301. <omit>	**301. <omit>**
	302. Bulkhead stiffeners in cargo oil tanks and deep tanks
<newly added>	**1.** When the flow-through ballast water exchange operations is used in applying the requirements in **302. 1** of the Rules, the following water heads are to be additionally considered.
	h_4 and h_5 = as specified in **201. 4**
Section 4 Girders	**Section 4 Girders**
401. ~ 404. <omit>	**401. ~ 404. <same as current>**
405. Girders and transverse in cargo oil tanks and deep tanks	**405. Girders and transverse in cargo oil tanks and deep tanks**
1.~ 2 <omit>	**1.~2. <same as currentt>**
<newly added>	**3.** When the flow-through ballast water exchange operations is used in applying the requirements in **405. 1.** of the Rules, the following water heads are to be additionally considered.
	h_4 and h_5 = as specified in **201. 4**
Section 5 ~ Section 10 <omit>	**Section 5 ~ Section 10 <same as current>**
⚓	⚓

Present	Amendment
CHAPTER 2 ORE CARRIERS	**CHAPTER 2 ORE CARRIERS**
Section 1 General <omission>	**Section 1 General <omission>**
Section 3 Wing Tanks or Void Spaces	**Section 3 Wing Tanks or Void Spaces**
304. Girder	**304. Girder**
1. ~ 2. <omission>	**1. ~ 2. <omission>**
3. The structural details of transverses and struts are to be in accordance with the following (1) to (3): (1) General (A) ~ (E) <omission> (F) In end bracket parts, at connections with cross ties, etc. of transverses where sharing stress and/or compressive stress are expected to be high, additional stiffeners are to be fitted. These parts are not to have lightening holes. If considered necessary, slots for penetration of longitudinals in these parts are to be reinforced with collars. (G) ~ (J) <omission> (2) The construction at the position of floors within the intersection of the inner bottom plating and longitudinal bulkhead is to comply with the following (A) and (B): (A) Scallops at the above-mentioned intersections in transverses of wing tanks are to be filled up by welding or closed with collar plates. (See **Fig 7.2.16**) (B) Transverses of wing tanks on the extended line of the inner bottom plating are to be fitted with gusset plates. (See **Fig 7.2.16**)	**3.** The structural details of transverses and struts are to be in accordance with the following (1) to (3): (1) General (A) ~ (E) <omission> (F) In end bracket parts, at connections with cross ties, etc. of transverses where sharing stress and/or compressive stress are expected to be high, additional stiffeners are to be fitted. These parts are not to have lightening holes. If considered necessary, slots for penetration of longitudinals in these parts are to be reinforced with collars. Sufficient consideration is to be taken for continuity of strength at the connection between struts and longitudinal (for example, soft brackets are to be provided on the both sides of transverse). (G) ~ (J) <omission> (2) The construction at the position of floors within the intersection of the inner bottom plating and longitudinal bulkhead is to comply with the following (A) and (B): (A) Scallops at the above-mentioned intersections in transverses of wing tanks are to be filled up by welding or closed with collar plates. (See **Fig 7.2.16**) (B) Transverses of wing tanks on the extended line of the inner bottom plating are to be fitted with gusset plates. (See **Fig 7.2.16**)
Section 5 ~ Section 7 <omission>	**Section 5 ~ Section 7 <omission>**

Present	Amendment
CHAPTER 10 DOUBLE HULL TANKER	**CHAPTER 10 DOUBLE HULL TANKER**
Section 1 General	**Section 1 General**
101. Application	**101. Application**
1. Application	**1. Application**
(1) For ships having the structural features similar to double hull tankers; ~~e.g. ships carrying dangerous chemicals in bulk~~, the requirements in **Pt 7, Ch 10** of the Rules are to be applied.	(1) For ships having the structural features similar to double hull tankers, the requirements in this Chapter of the Rules are to be applied.
(2) <omission>	(2) <same as current>
2. ~ 3. <omission>	**2. ~ 3. <same as current>**
	4. Minimum distance between asphalt cargo tank and the adjacent members
	For asphalt carrier which all cargo tanks are independent tank, the requirements of **Ch 1 Sec 1 101. 4** are applicable to these ships.
102. Location and separation of spaces	**102. Location and separation of spaces**
1. The size and arrangement of cargo oil tanks segregated ballast tanks are to comply with the requirements of **MARPOL 1973/78.**	**1.** The size and arrangement of cargo oil tanks segregated ballast tanks are to comply with the requirements of **MARPOL 1973/78 Annex 1 Reg. 19.**
2. ~ 6. <omission>	**2. ~ 6. <same as current>**
103. <omission>	**103. <same as current>**
104. Minimum distance between asphalt cargo tank and the adjacent members	
For asphalt carrier which all cargo tanks are independent tank, the requirements of **Ch 1 Sec 1 101. 4** are applicable to these ships.	
Section 4 ~ Section 10 <omission>	**Section 4 ~ Section 10 <omission>**

Present	Amendment
CHAPTER 4 CONTAINER SHIPS **Section 1 ~ Section 6 <omission>** **<refer : Rule Pt 7 Ch 4>** ***Section 9 Strength at Large Flare Location*** ***901. Shell plating [see Guidance]*** *With regard to the shell plating at a location where flare is specially large, sufficient consideration is to be paid to the reinforcement against panting impact, etc. at bow.* ***902. Frames [see Guidance]*** *The frames fitted in the bow flare position considered to endure large wave impact pressure, are to be properly strengthened taking care of the effectiveness of their end connections.* ***903. Girders [see Guidance]*** *The girders fitted in the bow flare position considered to endure large wave impact pressure, are to be properly strengthened taking care of the effectiveness of their end connections.* **Section 10 <omission>**	**CHAPTER 4 CONTAINER SHIPS** **Section 1 ~ Section 6 <same as current>** **Section 9 Strength at Large Flare Location** **901. Shell plating** The thickness of shell plating is to be in accordance with **Pt 3, Ch 4, 401.1.** **902. Frames** The scantlings of frames are to be in accordance with **Pt 3, Ch 8, 108.1.** **903. Girders** **1.** The scantlings of girders are to be in accordance with **Pt 3, Ch 9, 104.1.** **2.** Buckling strength of girders webs are to be examined by the requirements in **Pt 3, Ch 9, 104.2., 3.** **Section 10 <same as current>**

Present	Amendment
CHAPTER 10 DOUBLE HULL TANKER	**CHAPTER 10 DOUBLE HULL TANKER**
Section 1 General	**Section 1 General**
101. ~ 102. <omit>	**101. ~ 102. <omit>**
103. Minimum thickness With respect to the requirements of **103. 1** of the Rules, this requirements are not applicable to cargo oil tank and deep tank with smaller length or width than $0.1L + 5.0(\mathrm{m})$.	**103. Minimum thickness** With respect to the requirements of **103. 1** of the Rules, this requirements are applicable to cargo oil tank and deep tank with larger length or width than $0.1L + 5.0(\mathrm{m})$.
104. <omit>	**104. <omit>**
Section 2 ~ Section 10 <omit>	**Section 2 ~ Section 10 <omit>**

Present	Amendment
Annex 7-3 Guidance for Car Ferries	**Annex 7-3 Guidance for Car Ferries**
1. Application <omit>	**1. Application <same as current>**
2. Definition	**2. Definition**
(1), (2) <omit>	(1), (2) <same as current>
(3) "Vehicle area" means the vehicle loading area indicated in vehicle and cargo loading plan.	(3) "Vehicle area" means the cargo area for transporting automobiles with fuel tanks for driving.
(4) "Vehicle deck" means the deck providing passageway of vehicles or vehicle loading deck providing in vehicle area.	(4) "Vehicle deck" means the deck providing passageway of vehicles or vehicle loading deck providing in vehicle area.
(5) "Open space" means the followings:	(5) "Open space" means an area with an open area of 10% or more of the side shell plating, deck plating, or permanent openings above the total area of the side of the space and with both open ends or one open end. This area should be provided with adequate natural ventilation over the entire length.
(A) The bulkhead is not provided at the end of fore and after, and openings are not provided on the shell plating of vehicle area. In this case, the area of openings on the upper deck of considering area is to be comply with the followings.	
$\frac{a}{A} \geq \frac{1}{2}$	
a = area of opening on the upper deck	
A = area of vehicle deck	
(B) When the openings are provided on the both side shell plating in vehicle area, the area of opening is comply with the following.	
$\frac{a}{A} + \frac{5}{3}\frac{S_a}{S_A} \geq \frac{1}{2}$	
a, A = as specified in (A)	
S_a = area of opening on one side in vehicle area.	
S_A = area of shell plating on one side in vehicle area.	
(6) "Closed space" means closed space with weathertight other than above mentioned (5)	(6) "Closed space" means vehicle area other than open space mentioned (5) and exposed deck.
(7) <omit>	(7) <same as current>
3. ~ 13. <omit> ⚓	**3. ~ 13. <same as current>** ⚓

Current

CHAPTER 7 CAR FERRIES AND ROLL-ON/ROLL-OFF SHIPS

Section 3 Deck Structure

301. Application

1. Thickness of vehicle deck

<omit>

(1) Where the distance between centres of wheel prints in a panel is not less than $2S+a$ (See **Fig 7.7.1**)

$$t = C\sqrt{\frac{(2S-b')}{(2S+a)} \times \frac{P}{9.81}} + 0.5 \quad (\text{mm})$$

<omit>

Table 7.7.1 Coefficient C

Frames \ Vehicles		Vehicles used for cargo handling	Other vehicles
Midship part of strength deck	Longitudinal framing	$4.6\sqrt{K}$	$\frac{3.64\sqrt{K}}{\sqrt{1-0.64f_DK}}$
	Transverse framing	$4.9\sqrt{K}$	$\frac{5.15\sqrt{K}}{\sqrt{1-0.41(f_DK)^2}}$
Elsewhere		$4.6\sqrt{K}$	$5.2\sqrt{K}$
f_D = as specified in **Pt 3, Ch 1, 124** of the Rules. But, it is to be less than $0.79/K$.			

〈omit〉

⚓

Amendment

CHAPTER 7 CAR FERRIES AND ROLL-ON/ROLL-OFF SHIPS

Section 3 Deck Structure

301. Application

1. Thickness of vehicle deck

<omit>

(1) Where the distance between centres of wheel prints in a panel is not less than $2S+a$ (See **Fig 7.7.1**)

$$t = C\sqrt{\frac{(2S-b')}{(2S+a)} \times \frac{P}{9.81}} + 0.5 \quad (\text{mm})$$

<same as current>

Table 7.7.1 Coefficient C

Frames \ Vehicles		Vehicles used for cargo handling	Other vehicles
Midship part of strength deck	Longitudinal framing	$4.6\sqrt{K}$	$\frac{3.64\sqrt{K}}{\sqrt{1-0.64f_DK}}$
	Transverse framing	$4.9\sqrt{K}$	$\frac{5.15\sqrt{K}}{\sqrt{1-0.41(f_DK)^2}}$
Elsewhere		$4.6\sqrt{K}$	$5.2\sqrt{K}$
f_D = as specified in **Pt 3, Ch 1, 124** of the Rules. In longitudinal framing system, it is to be less than $0.79/K$.			

〈same as current〉

⚓

Present	Amendment
Annex 7-2 Guidance for the Container Securing Arrangements	**Annex 7-2 Guidance for the Container Securing Arrangements**
1. General	**1. General**
(1) ~ (3) <omit>	(1) ~ (3) <same as current>
(4) Plans and information required The following plans and documents are to be submitted for the approval of the Society. (A) ~ (C) <omit> (D) Where containers of types other than ISO containers are to be incorporated in the stowage arrangement, the cargo securing manual is to indicate clearly the locations where these containers are stowed. The manual is also to indicate the container weights and required securing arrangements for stacks composed entirely of ISO standard containers.	(4) Plans and information required The following plans and documents are to be submitted for the approval of the Society. (A) ~ (C) <same as current> (D) Where containers of types other than ISO containers are to be incorporated in the stowage arrangement, the cargo securing manual is to indicate clearly the locations where these containers are stowed. In the case of non-ISO containers, the value of the criteria of strength evaluation should be specified in the he cargo securing manual. The manual is also to indicate the container weights and required securing arrangements for stacks composed entirely of ISO standard containers.

Present	Amendment
6. Container securing arrangements for stowage using cell guides (1) , (2) <omission> (3) Cell guide systems on exposed decks (A) , (B) <omission> (C) The height of guide bars above the deck is to be sufficient to ensure adequate restraint to ~~the uppermost~~ container tiers. (D) Where the cell guide structure is attached to highly stressed hull or deck elements, such as sheer strake, special attention is to be given to the design of the connection and the grade and quality of steel utilized. (4) Carriage of 20 ft containers in 40 ft cell guides in holds (A), (B) <omission> (C) Where it is desired to stow 20 ft containers without external support at the mid-bay location with or without 40 ft over-stow, so called 'mixed stowage', arrangements meeting the following requirements are applicable: (a) ~ (c) <omission> (d) Stacking cones are to be fitted at each corner between tiers of the 20 ft containers to prevent transverse and longitudinal sliding. In addition, where a 40 ft container is required to be stowed above 20 ft containers, stacking cones are to be fitted at the ends of the 40 ft container between the 40 ft container and the 20 ft containers below. (e) ~ (h) <omission> (5) <omission>	**6. Container securing arrangements for stowage using cell guides** (1) , (2) <same as current> (3) Cell guide systems on exposed decks (A) , (B) <omission> (C) The height of guide bars above the deck is to be sufficient to ensure adequate restraint to container tiers. (D) Where the cell guide structure is attached to highly stressed hull or deck elements, such as sheer strake, special attention is to be given to the design of the connection and the grade and quality of steel utilized. (4) Carriage of 20 ft containers in 40 ft cell guides in holds (A), (B) <same as current> (C) Where it is desired to stow 20 ft containers without external support at the mid-bay location with or without 40 ft over-stow, so called 'mixed stowage', arrangements meeting the following requirements are applicable: (a) ~ (c) <same as current> (d) Stacking cones are to be fitted at each corner between tiers of the 20 ft containers to prevent transverse and longitudinal sliding. <u>But where stacking cones without flanges are used, the stacking cones should be placed in one or more corners on each cross section of the 20 ft containers.</u> In addition, where a 40 ft container is required to be stowed above 20 ft containers, <u>two stacking cones on each cross section</u> are to be fitted at the ends of the 40 ft container between the 40 ft container and the 20 ft containers. (e) ~ (h) <same as current> (5) <same as current>

Present	Amendment
7. Ship Structure <omission> (1) General (A) ~ (C) <omit> (D) The evaluation of the hatch cover strength is to be in accordance with requirements in **Pt 4 Ch 2** of the Rules. <newly added> (2) Structural strength evaluation (A) Structure modelling (a) Model extent (i) The model for strength evaluation should include at least hull structure until first stringer in vertical direction and one web frame in longitudinal direction from container support structure. Generally both port and starboard of the lashing bridge structure should be modelled. <newly added> (ii) The strength evaluation of the lashing bridges on fore part, midship and after part should be carried out. And addition strength evaluations may be required when deemed necessary by the Society. (b) FE model (i) The FE model follows the right-handed coordinate system as shown in **Table 1.** **<omit>**	**7. Ship Structure <same as current>** (1) General (A) ~ (D) <same as current> (E) If a lashing bridge of the Mickey Mouse type is applied, special considerations should be taken to constrain the lateral displacement of the structure. (2) Structural strength evaluation (A) Structure modelling (a) Model extent (i) <same as current> (ii) Alternatively, the strength evaluation may be performed using only the lashing bridge model. However, strength evaluation for the hull structure in contact with the lashing bridge should be additionally performed by using the reaction force derived from the analysis of the lashing bridge model. (iii) The strength evaluation of the lashing bridges on fore part, midship and after part should be carried out. And addition strength evaluations may be required when deemed necessary by the Society. (b) <same as current>

Present	Amendment
8. Determination and application of forces	**8. Determination and application of forces**
(1) Symbols and definitions <omission> (A) <omit> $C_{XS}\,C_{YS}\,C_{ZH}\,C_{YR}\,C_{ZR}\,C_{XP}\,C_{ZP}$: dynamic motion combination factor of each ships' motion, (see **Table 5)** $C_{YG}\,C_{XG}$: dynamic motion combination factor for roll, pitch motion, (see **Table 5**) α : coefficient of wind force, (see **Table 5)**	(1) Symbols and definitions <same as current> (A) <same as current>
(2) Acceleration of ship motion (A) The following six dynamic motion cases are to be considered; HSVA : Vertical acceleration in head sea OSVA : Vertical acceleration in oblique sea BSRL : Roll motion in beam sea OSPA : Pitch acceleration in oblique sea BSHA : Heave acceleration in beam sea OSPH : Pitch motion in oblique sea For each dynamic motion case, combination factors, shown in **Table 2**, <omit> (B) <omit>	(2) Acceleration of ship motion (A) <same as current> BSRL : Roll motion in beam sea BSHA : Heave acceleration in beam sea OSPH : Pitch motion in oblique sea For each dynamic motion case, combination factors, shown in **Table 2**, <same as current> (B) <same as current>

Table 2 Dynamic motion combination factor (current)

		Acceleration					Angle		Wind
		Surge	Sway	Heave	Roll	Pitch	Roll	Pitch	
		$\underline{C_{XS}}$	$\underline{C_{YS}}$	$\underline{C_{ZH}}$	$\frac{\underline{C_{ZR}}}{\underline{C_{YR}}}$	$\frac{\underline{C_{XP}}}{\underline{C_{ZP}}}$	$\underline{C_{YG}}$	$\underline{C_{XG}}$	α
HSVA	1	-0.3	0	0.3	0	-1.0	0	0.95	0
	2	-0.3	0	-0.3	0	-1.0	0	0.95	0
	3	0.3	0	-0.3	0	1.0	0	-0.95	0
	4	0.3	0	0.3	0	1.0	0	-0.95	0
OSVA	1	0.25	-0.15	0.4	0	-1.0	0	0.6	-0.5
	2	0.25	-0.15	-0.4	0	-1.0	0	0.6	-0.5
	3	-0.25	0.15	-0.4	0	1.0	0	-0.6	0.5
	4	-0.25	0.15	0.4	0	1.0	0	-0.6	0.5
BSRL	1	0	0.1	-0.1	-1.0	0	1.0	0	1.0
	2	0	0.1	0.1	-1.0	0	1.0	0	1.0
	3	0	-0.1	0.1	1.0	0	-1.0	0	-1.0
	4	0	-0.1	-0.1	1.0	0	-1.0	0	-1.0
OSPA	1	-0.25	-0.2	-0.3	0.2	1.0	0.1	-0.6	-0.5
	2	-0.25	0.2	-0.3	-0.2	1.0	-0.1	-0.6	-0.5
	3	0.25	0.2	0.3	-0.2	-1.0	-0.1	0.6	0.5
	4	0.25	-0.2	0.3	0.2	-1.0	0.1	0.6	0.5
BSHA	1	-0.1	-0.6	1.0	0.15	-0.1	-0.1	0	-1.0
	2	-0.1	-0.6	-1.0	0.15	-0.1	-0.1	0	-1.0
	3	0.1	0.6	-1.0	-0.15	0.1	0.1	0	1.0
	4	0.1	0.6	1.0	-0.15	0.1	0.1	0	1.0
OSPH	1	0.6	0.4	0.4	-0.1	-1.0	0.1	1.0	0.5
	2	0.6	0.4	-0.4	-0.1	-1.0	0.1	1.0	0.5
	3	-0.6	-0.4	-0.4	0.1	1.0	-0.1	-1.0	-0.5
	4	-0.6	-0.4	0.4	0.1	1.0	-0.1	-1.0	-0.5

Table 2 Dynamic motion combination factor (amendment)

		Acceleration					Angle		Wind
		Surge	Sway	Heave	Roll	Pitch	Roll	Pitch	
		C_{XS}	C_{YS}	C_{ZH}	$\frac{C_{ZR}}{C_{YR}}$	$\frac{C_{XP}}{C_{ZP}}$	C_{YG}	C_{XG}	α
BSRL	1	0	0.1	-0.1	-1.0	0	1.0	0	1.0
	2	0	-0.1	0.1	1.0	0	-1.0	0	-1.0
BSHA	1	-0.1	-0.6	-1.0	0.15	-0.1	-0.1	0	-1.0
	2	0.1	0.6	-1.0	-0.15	0.1	0.1	0	1.0
OSPH	1	0.6	0.4	-0.4	-0.1	-1.0	0.1	1.0	0.5
	2	-0.6	-0.4	-0.4	0.1	1.0	-0.1	-1.0	-0.5

Present	Amendment
(A) ~ (C) <omission> (D) Wind forces are generally to be based on a maximum wind speed of 36 m/sec. Wind forces are to be applied increasing ways of transverse force. (E) If a 40ft container is loaded on the outermost stack and 45ft / 48ft / 53ft container is loaded on the inner stack, the wind forces on the longitudinal protrusion is not applied. (F) If the height difference between the top of the container to which the wind forces are applied and the center of the container of the inner stack is less than 1.9 m, wind forces are not applied. For the top container on the inner stack, a wind forces of 80% is to be considered. (refer **Fig. 6)** (3) ~ (6) <omission> **9. <omission>** **Appendix 1 ~ Appendix 3 <omission>**	(A) ~ (C) <same as current> (D) Wind forces are generally to be based on a maximum wind speed of 36 m/sec. Wind forces are to be applied increasing ways of transverse force. (E) If a 40ft container is loaded on the outermost stack and 45ft / 48ft / 53ft container is loaded on the inner stack, the wind forces on the longitudinal protrusion is not applied. If only one 20ft container is loaded on the outermost side and the 45ft / 48ft / 53ft container is loaded on the rear, 45ft / 48ft / 53ft containers will have 50% wind load. (F) If the height difference between the top of the container to which the wind forces are applied and the center of the container of the inner stack is less than 1.9 m, wind forces are not applied. For the top container on the inner stack, a wind forces of 80% is to be considered. (refer **Fig. 6)** (3) ~ (6) <same as current> **9. <same as current>** **Appendix 1 ~ Appendix 3 <same as current>**

Present	Amendment
1. General (1) Application <omit> (2) Special Features Notation (A), (B) <omit> (C) Where apply the specific route reduction factors, the contents related to the application of the specific route reduction factors to be included in Cargo Securing Manual and the specific route reduction factors are applicable to onboard lashing program, the ship to be assigned the special features notation **LS(CL, RS).** (D) For the existing ship has not the above Special Feature Notation, this Annex can be applied if owner requests. (3), (4) <omit>	**1. General** (1) Application <same as current> (2) Special Features Notation (A), (B) <same as current> (C) Where apply the specific route reduction factors, the contents related to the application of the specific route reduction factors to be included in Cargo Securing Manual and the specific route reduction factors are applicable to onboard lashing program, the ship to be assigned the special features notation **LS(CL, RS).** (D) In relation to (C), if a program capable of calculating the reduction coefficient for an arbitrary route is installed in addition to the above, a special matter LS(CL, RS+) should be assigned to the ship concerned. (E) For the existing ship has not the above Special Feature Notation, this Annex can be applied if owner requests. (3), (4) <same as current>

Present	Amendment
<Newly added>	**Annex 7-11 Guidelines on providing safe working conditions for securing of containers on deck (2019)** 1. General (1) Objective The objective of the additional special feature notation CSAP should provide safe working conditions in safe access and safe places of work, when they are worked in container securing operations on deck. (2) Scope The scope of the additional special feature notation CSAP should ensure safer working conditions in container securing operations. This guidelines describe requirements covering design and arrangement of working areas, container top working, fencing and fall protection, marking of obstacles and openings, design of walkways, ladders, steps and other means of access, design and arrangement of power supplies for reefer containers and lightings of working and transit areas. (3) Application Ships complying with this guidelines will be assigned the additional special feature notation CSAP. The additional special feature notation CSAP is applicable to ships designed for carrying containers on deck. The additional special feature notation CSAP can be applied to other ships upon request.

Present	Amendment
<Newly added>	(4) Definitions (A) Definitions used in this guidelines are given as following. - working area : any positions or spaces used for operating container securing devices, e.g. in between container stows on hatch covers; lashing bridges and platforms - transit area : passage ways, stairs, decks and other areas used for moving about the ship - fencing : a generic term for guardrails, safety rails, safety barriers and similar structures that provide protection against the falls of people - stringers : the uprights or sides of a ladder - rungs : the bars that form the steps of a ladder 2 Documentation (1) CSAP should be submitted for approval and includes following. - Arrangement and detail of working area and transit area - Lighting arrangement and illumination in working and transit area - Location and detail of reefer container power outlet and adjacent working area

Present	Amendment
<Newly added>	3 Design requirements (1) General (A) The cargo safe access plan should be developed at the design stage to ensure that securing operations can be carried out safely for all intended container stowage configurations. (B) Typically the cargo safe access plan should be developed based on a risk assessment including following hazards: - slips, trips and falls, - falls from height, - injuries whilst manually handling lashing gear, - being struck by lashing gear or other objects, - potential damage due to container operations(High-risk areas should be identified in order to develop appropriate protection or other methods of preventing significant damage), - adjacent electrical risks (temperature controlled unit cable connections etc.), - adequate access to all areas that is necessary to safely perform container securing operations - ergonomics (e.g., size and weight of equipment) of lashing equipment, - implications of lashing high cube (9’6”) containers and mixed stows of 40’ and 45’ containers. (2) Transit area (A) The minimum clearance for transit areas should be at least 2.0 m high and 600 mm wide. (**Table 1** B, J and F1) (B) Transit area should have non-slip surfaces. (C) Where necessary for safety, walkways on deck should be delineated by painted lines or otherwise marked by pictorial signs. (D) All protrusions in access ways in transit area, such as cleats, ribs and brackets that may give rise to a trip hazard, should be highlighted in a contrasting colour. (E) As far as practicable, access ladders and walkways should be free of permanent obstructions and designed so that workers do not have to climb over piping.

Present	Amendment
<Newly added>	(3) Working area (A) Working areas should be designed to eliminate the use of three high lashing bars and be positioned in close proximity to lashing equipment stowage areas. (B) Working areas should be designed to provide a clear work area which is unencumbered by obstructions such as deck piping, storage bins and guides to reposition hatch covers. (C) The horizontal distance from the lashing securing points to the containers should not exceed 1,100mm, and not less than 220mm for lashing bridges and 130mm for other positions. (**Table 1**, C1, C2 and C3.) For container bays with foundations designed for 40’ and 45’ container stowage, the dimension C1 may be increased to 1,300mm when measured to 40’ containers depending on the approval of Flag state. (D) The width of working areas should not be less than 750 mm. In addition, the width of permanent lashing bridges should not be less than 750mm between top rails of fencing and should provide a minimum clear distance of 600 mm between stowage racks, lashing cleats and other obstructions. (**Table 1**, A, GL, GT, I, F and F1.) (E) Platforms should be provided on the end of hatches and outboard lashing positions. Platforms on the end of hatches and outboard lashing positions should preferably be at the same level as the top of the hatch covers. The gap between such platforms and adjacent hatch covers should not exceed 90mm.

Present	Amendment
<Newly added>	(F) Working areas which contain removable sections should be capable of being temporarily secured. (G) Working on the top of containers should be avoided, e.g. through use of semi-automatic or fully automatic twistlocks. (H) Toe boards of 150 mm in height should be provided around the sides of elevated working areas, to prevent securing equipment from falling and injuring people. In cases where toe board obstructs the stowage of containers, the height of toe board may be reduced to 100 mm. (4) Fencing design (A) Lashing bridges, platforms and other working area from which persons may fall 2.0m or more should be provided with fencing satisfying the requirements given in (D). (B) If necessary, a mobile fencing may be allowed. (C) Athwartships cargo securing walkways should be protected by fencing satisfying the requirements given in (D), if the edges of walkways are not protected when the hatch cover is removed. (D) Fencing should have a minimum of three courses. The height of the uppermost course should be at least 1.0 m, measured from the base. The opening below the lowest course of the guardrails should not exceed 230 mm. The other courses should not be more than 380 mm apart. A horizontal unfenced gap of fencing should not be greater than 300 mm. (E) At positions where movable fencings are arranged due to stowage of containers, e.g., lashing platform above outboard stanchions at 20’ container gap end, see **Fig. 3** for illustration, an alternative arrangement of the lower two courses may be accepted by the Society, as necessary, taking position of container securing device into consideration.

Present	Amendment
<Newly added>	(5) Access openings (A) Access openings in working area with a potential fall of 2.0 m or more should be either protected by fencing in accordance with (4)(D) or possible to be closed by access covers. (B) Access openings in transit area with a potential fall of 2.0 m or more should be avoided, unless they are protected by fencing in accordance with (4)(D). (C) Access openings in working area and transit area should be highlighted in contrasting colour around the rim of the openings. (D) Access openings at different levels of lashing bridges should not be located directly below one another. (6) Ladders (A) Where a fixed ladder gives access to the outside boundary of a working area, the stringers should be connected at their extremities to the guardrails of the working area, irrespective of whether the ladder is sloping or vertical. The stringers of shell also be opened above the working area level to give a minimum clear width of 700 mm to enable a person to pass through the stringers. (B) Where a fixed ladder gives access to a working area through an opening in the working area, handholds extending at least 1.0 m above the working area should be provided, to ensure safe access through the opening. (C) A fixed ladders should not slope at angle greater than 25° from vertical. Where the slope of a ladder exceeds 15° from vertical, the ladder should be provided with suitable handrails positioned not less than 540 mm from the stringers, measured horizontally. (D) A fixed ladders should provide a foothold at least 150 mm deep. (E) A fixed ladders with a vertical height exceeding 3.0 m, and any fixed ladders, from which a person may fall into a hold, should be fitted with a guard hoops satisfying the requirements given in (F) to (G).

Present	Amendment
<Newly added>	(F) The distance between the rungs and the back of the safety cage should be minimum 750mm. Safety cage hoops should be uniformly spaced at intervals not exceeding 900mm and be connected by vertical bars inside the hoop uniformly spaced around the circumference of the hoops. (G) The stringers should be extended at least 1.0m above the working area, and the ends of the stringers should be given lateral support. The top step or rung should be at the same level of the working area. (7) Container securing equipment arrangement (A) The lashing rod's length in conjunction with the length and design of the turnbuckle should be such that the need of extension is eliminated when lashing high cube (9'6") containers. In the container securing arrangement document, typical lashing patterns for 9'6" containers should be shown, if such containers are stowed on board. (B) During tightening or loosening motions on turnbuckles, the risk for hand injury should be minimised, e.g., by keeping sufficient distance between turnbuckles. During tightening or loosening motions, the distance between turnbuckles is typically not less than 45mm. (C) Storage bins should be provided for container securing equipment

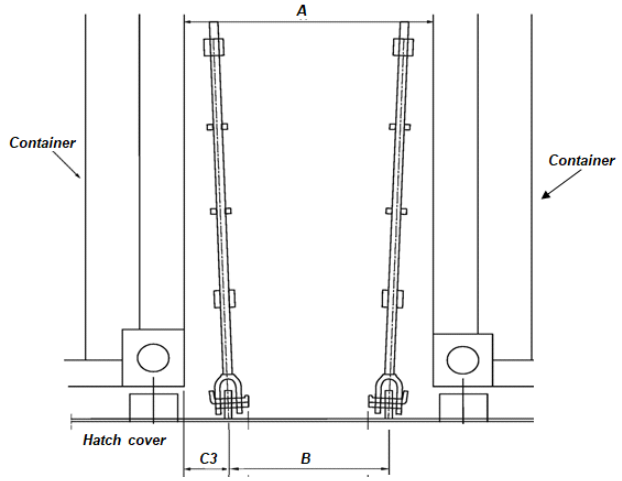
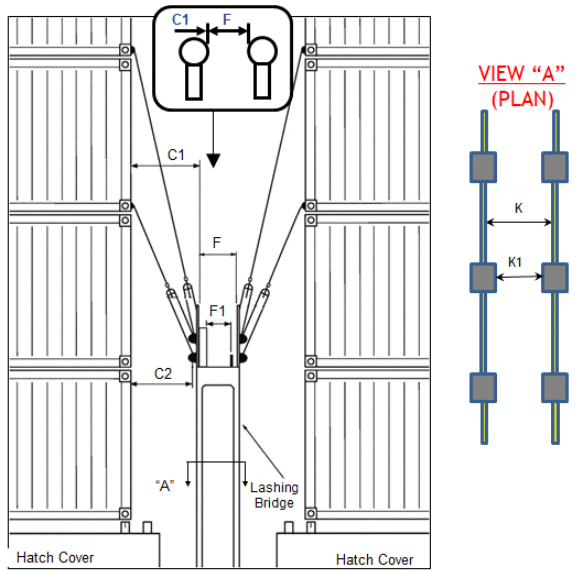
Present	Amendment
<Newly added>	(8) Power supply (A) Reefer power outlets should provide a safe, watertight electrical connection. (B) Reefers should feature a heavy-duty, interlocked and circuit-breaker protected electrical power outlets. This should ensure the outlet can not be switched on until a plug is fully engaged and the actuator rod is pushed to the “ON” position. Pulling the actuator rod to the “OFF” position should manually de-energize the circuit. (C) Reefer power outlets should de-energize automatically if the plug is accidentally withdrawn while in the “On” position. Also, the interlock mechanism should break the circuit while the pin and sleeve contacts are still engaged. (D) Reefer power outlets should be positioned and designed so as not to require the operator to stand directly in front of the socket when switching takes place. (E) The positioning of reefer power outlets should not be such that the flexible cabling needs to be laid out in such a way as to cause a tripping hazard. (9) Lighting (A) Working areas and transit areas should be provided with lighting. (B) The lighting should be designed as a permanent installation adequately guarded against breakage. Temporary lighting may be accepted by the Society, as necessary, basis at locations where permanent lighting is not practical. (C) Light intensity levels should not be less than 10lux for transit area and 50lux for working area.

Present	Amendment
<Newly added>	**Table 1 Working and transit area dimension**

Dimension (see Fig.)	Description	Requirement (mm)
A	Width of work area between container stacks (Fig. 1)	min. 750
B	Distance between lashing plates on deck or on hatch covers (Fig. 1)	min. 600
C1	Distance from lashing bridge fencing to container stack (Fig. 2)	max 1,100
C2	Distance from lashing plate to container stack (lashing bridge) (Fig. 2)	min. 220
C3	Distance from lashing plate to container stack (elsewhere) (Fig. 1)	min. 130
F	Width of lashing bridge between top rails of fencing (Fig. 2)	min. 750
F1	Width of lashing bridge between storage racks, lashing cleats and any other obstruction (Fig. 2)	min. 600
GL	Width of working platform for outboard lashing – fore/aft (Fig. 3)	min. 750
GT	Width of working platform for outboard lashing – transverse (Fig. 3)	min. 750
I	Width of work platform at end of hatch cover or adjacent to superstructure (Fig. 4)	min. 750
J	Distance from edge of hatch cover to fencing (Fig. 4)	min. 600
K	Width of lashing bridge between top rails of fencing (Fig. 2)	min. 750
K1	Width of lashing bridge between the pillars of the lashing bridge (Fig. 2)	min. 600

(Notes)

B	Measured between the centers of the lashing plates.
C1	Measured from inside of fencing.
C2, C3	Measured from center of lashing plate to end of container.
F, K	Measured to inside of fencing.
GL	Measured from end of container to inside of fencing.
GT	Measured to inside of fencing.
I	Measured to inside of fencing.
J	Measured to inside of fencing.
*	may be increased to 1,300㎜ depending on the approval of Flag state.

Present	Amendment
<Newly added>	 **Fig. 1 Work area between container stacks**  **Fig. 2 Lashing bridge**

Present	Amendment
<Newly added>	

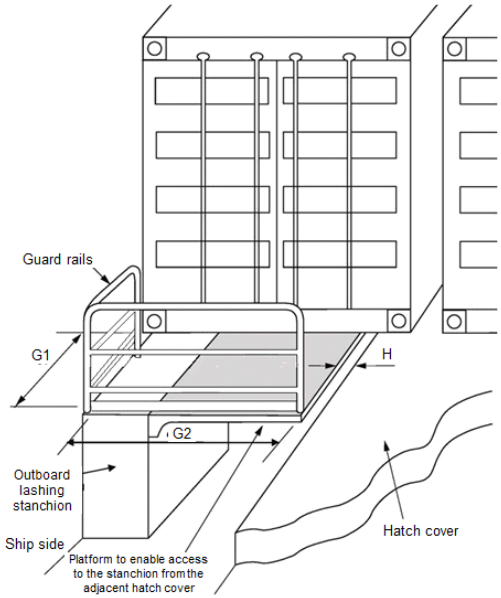


Fig.3 Lashing platforms on outboard stanchions

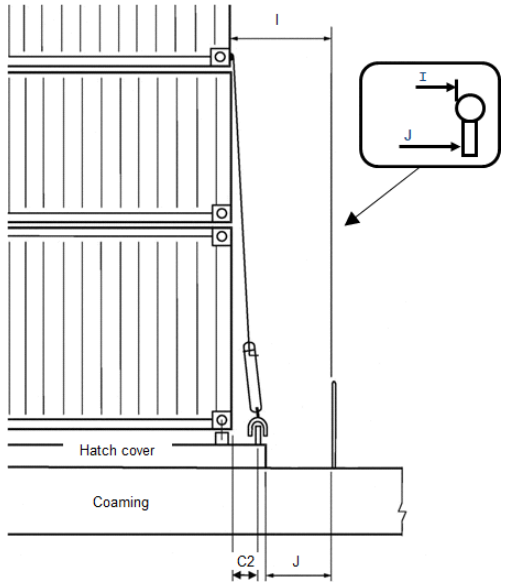
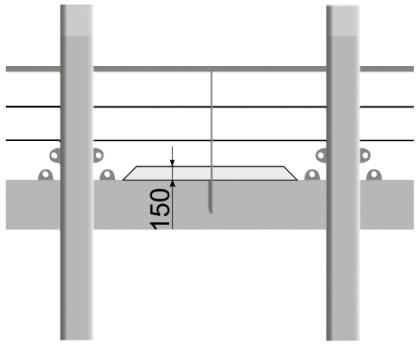


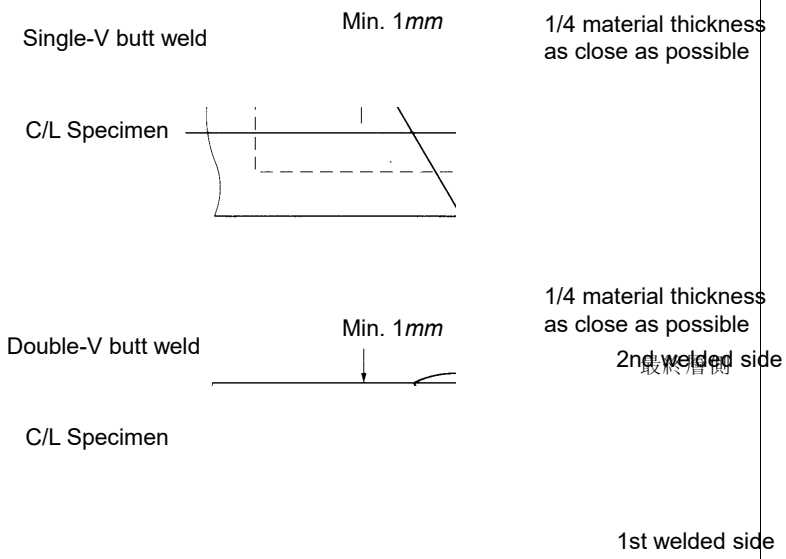
Fig.4 Work area between hatch covers

Present	Amendment
<Newly added>	 **Fig 5 Toe boards**

Present	Amendment
CHAPTER 5 SHIPS CARRYING LIQUEFIED GASES IN BULK	**CHAPTER 5 SHIPS CARRYING LIQUEFIED GASES IN BULK**
Section 1 ~ Section 3 <omission>	**Section 1 ~ Section 3 <same as current>**
Section 4 Cargo Containment	**Section 4 Cargo Containment**
403. ~ 410. <omission>	**403. ~ 410. <same as current>**
413. Functional loads [See Rules]	**413. Functional loads [See Rules]**
1. Thermally induced loads	**1. Thermally induced loads**
(1) For the purpose of the requirements in **413. 4** (1) of the Rules, arrangements for cooling down are to be provided so as not to cause excessive stress on the tank structures. Further, where cargo with temperature lower than 0°C but not lower than -55°C is carried, such installations for cooling down are also to be provided.	(1) For the purpose of the requirements in **413. 4** (1) of the Rules, arrangements for cooling down are to be provided so as not to cause excessive stress on the tank structures. (2019)
(2) ~ (6) <omission>	(2) ~ (6) <same as current>
414. ~ 418. <omission>	**414. ~ 418. <same as current>**
419. Materials [See Rules] <omission>	**419. Materials [See Rules] <same as current>**
8. Quality control of insulation materials	**7. Quality control of insulation materials**
420. ~ 423. <omission>	**420. ~ 423. <same as current>**

Present	Amendment
424. Membrane tanks 【See Rules】	**424. Membrane tanks** 【See Rules】
1. ~ 3. <omission>	**1. ~ 3.** <same as current>
4. Hull structure adjacent to membrane or semi-membrane tanks	**4. Hull structure adjacent to membrane or semi-membrane tanks (2019)**
(1) The "hydrostatically or hydropneumatically tested in accordance with recognized standards" referred to in the requirements in **424. 9** of the Rules means the hydraulic test according to the requirements in **Pt 3, Ch 1, 209.** of the Rules. In this case, hydraulic pressure may be applied from hull structures such as ballast tanks and cofferdams.	(1) The "hydrostatically tested" referred to in the requirements in **424. 9** of the Rules means the hydraulic test according to the requirements in **Pt 1, Annex1-16.** of the Guidance. In this case, hydraulic pressure may be applied from hull structures such as ballast tanks and cofferdams.
(2) The leakage test for the "other hold structure supporting the membrane" referred to in the requirements in **424. 9** of the Rules is to be in accordance with the testing procedure applicable to general hull structures as specified in **Pt 3, Ch 1, 209.** of the Rules.	(2) The leakage test for the "other hold structure supporting the membrane" referred to in the requirements in **424. 9** of the Rules is to be in accordance with the testing procedure applicable to general hull structures as specified in **Pt 1, Annex1-16.** of the Guidance.
425. ~ 428. <omission>	**425. ~ 428. <same as current>**
Section 5 Process Pressure Vessels and Liquid, Vapour and Pressure Piping Systems <omission>	**Section 5 Process Pressure Vessels and Liquid, Vapour and Pressure Piping Systems <same as current>**

Present	Amendment
Section 6 Materials of Construction and Quality Control	**Section 6 Materials of Construction and Quality Control**
603. General test requirements and specifications	**603. General test requirements and specifications**
1. ~ 3. <omission>	**1. ~ 3.** <same as current>
4. Toughness test	**4. Toughness test**
(1) For the purpose of the requirements in **603. 2** (2) of the Rules, in the case where the material thickness is 40mm or below, the Charpy V-notch impact test specimens are to be cut with their edge within 2 mm from the "as rolled" surface with their longitudinal axes either parallel or transverse to the final direction of rolling of the material ~~as shown in **Figure 7.5.27**~~.	(1) For the purpose of the requirements in **603. 2** (2) of the Rules, in the case where the material thickness is 40mm or below, the Charpy V-notch impact test specimens are to be cut with their edge within 2 mm from the "as rolled" surface with their longitudinal axes either parallel or transverse to the final direction of rolling of the material.
Max. 2mm (for material thickness of 40mm or below) 試験片の中心線 C/L Specimen 1/4 material thickness as close as possible (for material thickness of more than 40mm) **Fig 7.5.27 Sampling position of Charpy V-notch impact test spevimens(Base metal)**	<deleted>

Present	Amendment
(2) In application to **603. 2** (3) of the Rules, the position of the specimens is to be in accordance with **Figure 7.5.28**. of the Guidance.  **Fig 7.5.28 Sampling position of Charpy V-notch impact test specimens (Weld)** (3) <omission> **604. ~ 606. <omission>** **Section 7 ~ Section 19 <omission>**	<deleted> <deleted> (2) <re-number> <same as current> **604. ~ 606. <same as current>** **Section 7 ~ Section 19 <same as current>**

Present	Amendment
CHAPTER 5 SHIPS CARRYING LIQUEFIED GASES IN BULK	**CHAPTER 5 SHIPS CARRYING LIQUEFIED GASES IN BULK**
Section 1 ~ Section 2 <omit>	**Section 1 <same as current>**
Section 3 Ship Arrangements	**Section 3 Ship Arrangements**
301. <omit>	**301. <same as current>**
302. Accommodation, service and machinery spaces and control stations 【See Rules】	**302. Accommodation, service and machinery spaces and control stations 【See Rules】**
1., 2. <omit>	**1., 2. <same as current>**
3. Closing devices of air intakes and openings	**3. Closing devices of air intakes and openings**
(1) For the purpose of the requirements in **302. 6** of the Rules, closing devices for air intakes and openings are to have suitable gas-tightness where steel made fire protection flaps without gaskets are not accepted.	(1) For the purpose of the requirements in **302. 6** of the Rules, closing devices for air intakes and openings are to have suitable gas-tightness where steel made fire protection flaps without gaskets/seals are not accepted.
(2), (3) <omit>	(2), (3) <same as current>
303. ~ 308. <omit>	**303. ~ 308. <same as current>**

5. Properties of insulation materials

Table 7.5.3 Properties of Insulation Material for Cargo Tank Types 〈present〉

No.	Ensuring items		Integral tank	Membrane / semi-membrane tank[3)]	Type A/B independent tank	Type C independent tank	Note
4	Shrinkage			○ [1)]	○ [1)]	⊖	
8	Mechanical properties	Bending strength	○	○	○	○	
		Compress. strength		○			
		Tensile strength	○	○	○	○	
		Shearing strength	○	○	⊖ [2)]	⊖ [2)]	
9	Thermal expansion		□	○			
10	Abrasion			○	△ [1)]		
11	Cohesion		□	△		□	applied to cohered material
12	Thermal conductibility		○	○	○	○	
13	Resistance to vabration		△	△	△ [1)]		refer to **419. 3 (7)** of the Rules
14	Resistance to fire and flame spread		○	○	○	○	
(비고) 〈생략〉							

Table 7.5.3 Properties of Insulation Material for Cargo Tank Types 〈amendment〉

No.	Ensuring items		Integral tank	Membrane / semi-membrane tank[3)]	Type A/B independent tank	Type C independent tank	Note
4	Shrinkage			○ [1)]	○ [1)]		
8	Mechanical properties	Bending strength	○	○	○	○	
		Compress. strength		○			
		Tensile strength	○	○	○	○	
		Shearing strength	○	○			
9	Thermal expansion		□	○	○ [2)]	○ [2)]	
10	Abrasion			○			
11	Cohesion		□	△	△ [1)]	□	applied to cohered material
12	Thermal conductibility		○	○	○	○	
13	Resistance to vabration		△	△	△ [1)]		refer to **419. 3 (7)** of the Rules
14	Resistance to fire and flame spread		○	○	○	○	
15	Resistance to fatigue failure and crack propagation			△			
(비고) 〈생략〉							

Table 7.5.4 Test Items for Insulation Materials <present>

Test items	Test methods
1. Compatibility with the cargo	Tensile, compress., shearing, bending test after dipping in the cargo
2. Solubility in the cargo	Changes in thesize and weight of test specimen before and after dipping in the cargo
3. Absorption of the cargo	Comparison of weight of test specimen or test of water absorbing properties before and after dipping in the cargo
4. Shrinkage	ASTM D2126
5. Aging	~~ASTM D756 (Comparison of thermal conductivity before and after aging)~~
6. Closed cell content	ASTM D2856
7. Density	ASTM D1622
8. Mechanical properties	Bending (ASTM C203, D790) Compress.(ASTM D1621) Tensile (ASTM D1623) Shearing (ASTM C273)
9. Thermal expansion	ASTM D696
10. Abrasion	-
11. Cohesion	-
12. Thermal conductibility	KS L9016, ASTM C518
13. Resistance to vibration	-
14. Resistance to fire and flame spread	DIN4102

Table 7.5.4 Test Items for Insulation Materials <amendment>

Test items	Test methods
1. Compatibility with the cargo	Tensile, compress., shearing, bending test after dipping in the cargo (DIN 53428)
2. Solubility in the cargo	Changes in thesize and weight of test specimen before and after dipping in the cargo (DIN 53428)
3. Absorption of the cargo	Comparison of weight of test specimen or test of water absorbing properties before and after dipping in the cargo (DIN 53428)
4. Shrinkage	ISO 2796, ASTM D2126
5. Aging	-
6. Closed cell content	ISO 4590, ASTM D2856, D6226
7. Density	ISO 845, ASTM D1622
8. Mechanical properties	Bending (ISO 1209, ASTM C203, D790) Compress.(ASTM D695, D1621) Tensile (ISO 1926, ASTM D638, D1623) Shearing (ISO 1922, ASTM C273)
9. Thermal expansion	ASTM D696, E831
10. Abrasion	-
11. Cohesion	ASTM D1623
12. Thermal conductibility	ISO 8302, KS L9016, ASTM C177, C518
13. Resistance to vibration	ISO 10055
14. Resistance to fire and flame spread	DIN4102
15. Resistance to fatigue failure and crack propagation	-

DIN : Deutsches Institute für Normung 독일공업규격

Present	Amendment
Section 4 Cargo Containment	**Section 4 Cargo Containment**
403. ~ 412. <omit>	**403. ~ 412. <same as current>**
413. Functional loads [See Rules]	**413. Functional loads [See Rules]**
1. Thermally induced loads	**1. Thermally induced loads**
(1) For the purpose of the requirements in **413. 4** (1) of the Rules, arrangements for cooling down are to be provided so as not to cause excessive stress on the tank structures. ~~Further, where cargo with temperature lower than 0°C but not lower than -55°C is carried, such installations for cooling down are also to be provided.~~	(1) For the purpose of the requirements in **413. 4** (1) of the Rules, arrangements for cooling down are to be provided so as not to cause excessive stress on the tank structures.
(2) ~ (6) <omit>	(2) ~ (6) <same as current>
2. <omit>	**2.** <same as current>
414. ~ 419. <omit>	**414. ~ 419. <same as current>**
420. Construction processes	**420. Construction processes**
4. Gas-trial and cargo full loading test (related to 513. 2 (5) of the Rules)	**4. Gas-trial and cargo full loading test (related to 513. 2 (5) of the Rules)**
(1) <omit>	(1) <same as current>
(A) Gas-trial	(A) Gas-trial
On items given in **Table 7.5.5** of the Guidance, tests are to be conducted to verify the performance of the cargo containment system cargo handling equipment and instrumentation using a suitable quantity of the cargo after the completion of all the construction work. However, for cargo tanks with a design temperature of 0°C or more, omission of this test may be accepted if substitution is made by the operating test with the substituting medium to verify the requirements given in **Table 7.5.5** of the Guidance except for the case where the tank is of the first cargo tank manufactured by the manufacturer of cargo tanks.	On items given in **Table 7.5.5** of the Guidance, tests are to be conducted to verify the performance of the cargo containment system cargo handling equipment and instrumentation using a suitable quantity of the cargo after the completion of all the construction work. However, for cargo tanks which do not require either cool-down operations or the cargo pressure /temperature control specified in **Section 7 701. 1 of the Rules,** the omission of this gas trials may be accepted if substitution is made by the operating test with the substituting medium at manufacturing plants or shipyards to verify the requirements given in **Table 7.5.5** of the Guidance except for the case where the tank is of the first cargo tank manufactured by the manufacturer of cargo tanks.
<omit>	<same as current>

Present	Amendment
424. Membrane tanks **1. ~ 3. <omit>** **4. Hull structure adjacent to membrane or semi-membrane tanks** (1) <omit> (2) The leakage test for the "other hold structure supporting the membrane" referred to in the requirements in **424. 9** of the Rules is to be in accordance with the testing procedure applicable to general hull structures as specified in **Pt 1, Annex1-16.** of the Guidance. **425. ~ 428. <omit>**	**424. Membrane tanks** **1. ~ 3. <same as current>** **4. Hull structure adjacent to membrane or semi-membrane tanks** (1) <same as current> (2) The leakage test for the "other hold structure supporting the membrane" referred to in the requirements in **424. 9** of the Rules is to be in accordance with the requirements specified in **Pt 1, Annex1-16.** of the Guidance. **425. ~ 428. <same as current>**

GUIDANCE RELATING TO RULES FOR CLASSIFICATION OF STEEL SHIPS

(Development Review : Internal Opinion Inquiry)

Pt 7 Ch 5 Ships Carrying Liquefied Gases in Bulk

2019. 1.

Present	Amendment
Section 5 Process Pressure Vessels and Liquid, Vapour and Pressure Piping Systems	**Section 5 Process Pressure Vessels and Liquid, Vapour and Pressure Piping Systems**
512. Materials [See Rule]	**512. Materials** [See Rule]
1. ~ 3. <omitted>	**1. ~ 3.** <same as the present>
<newly added>	**4.** With reference to **3.** (1) of the Rules, the phrase 'a thermal insulation system as required to minimize heat leak into the cargo during transfer operations' means that the properties of the thermal insulation for cargo piping systems are to take into consideration the overall heat calculation undertaken for the tank containment system and the capacity of the proposed pressure/temperature control system (e.g. refrigeration plants) adopted on each ship in accordance with the requirements of **Ch.7** of the Rule. The phrase 'cargo piping systems are to be provided with a thermal insulation system as required ... to protect personnel from direct contact with cold surfaces' means that surfaces of cargo piping systems with which personnel is likely to contact under normal conditions are to be protected by a thermal insulation. with the exception for the following ones; (1) surfaces of cargo piping systems which are protected by physical screening measures to prevent such direct contact; (2) surfaces of manual valves, having extended spindles that protect the operator from the cargo temperature, (3) surfaces of cargo piping systems whose design temperature (to be determined from inner fluid temperature) is above minus 10 °C.