

# Amended Rules for the Classification of Steel Ships

## (Part 14 Structural Rules for Container Ships)

Dec. 2019



KR

## **- Main Amendments -**

**(1) Enter into force on 1 January 2020 (the contract date for ship construction)**

- To reflect Request for Establishment/Revision of Classification Technical Rules

Present

CHAPTER 12 CONSTRUCTION

Section 1 ~ Section 2 <Omitted>  
Section 3 Design of Weld Joints

- 1. General <Omitted>
- 2. Tee or Cross Joint

2.1~ 2.3 <Omitted>

2.4 Partial or full penetration welds

2.4.1 <Omitted>

2.4.2 Partial or full penetration welding  
<Omitted>

The welding bead of the full/partial penetration welds is to cover root of the groove. Examples of partial penetration welds are given on **Figure 2**.

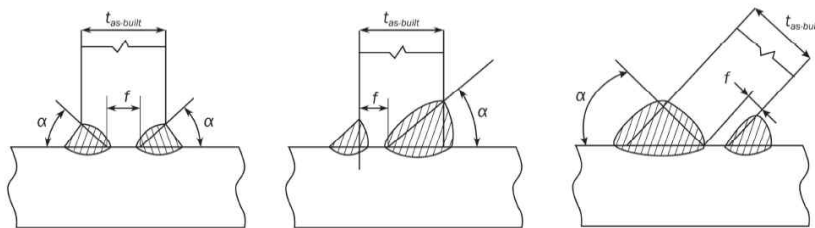


Figure 2 : Partial penetration welds

2.4.3~2.4.7 <Omitted>

Amendment

CHAPTER 12 CONSTRUCTION

Section 1 ~ Section 2 <Same as the present Rules>  
Section 3 Design of Weld Joints

- 1. General <Same as the present Rules>
- 2. Tee or Cross Joint

2.1~ 2.3 <Same as the present Rules>

2.4 Partial or full penetration welds

2.4.1 <Same as the present Rules>

2.4.2 Partial or full penetration welding  
<Same as the present Rules>

The welding bead of the full/partial penetration welds is to cover root of the groove. Examples of partial penetration welds are given on **Figure 2**. The weld size of partial penetration is to satisfy the following equation.

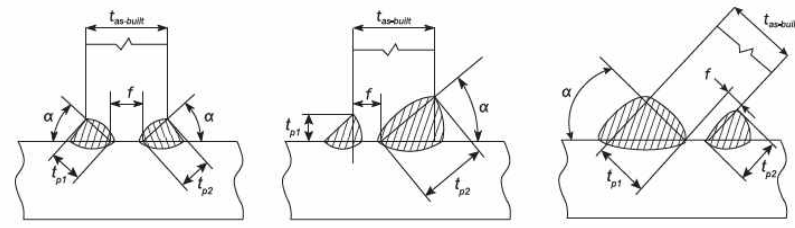


Figure 2 : Partial penetration welds

$$\frac{t_{p1} + t_{p2}}{2} \geq 2(f_{yd} \cdot f_c \cdot f_{ten} \cdot t_{as-built} + t_{gap})$$

$t_{p1}, t_{p2}$  : The weld size in **Figure 2**

$f_c$  : Position coefficient, which is 1.1 for ballast tank and bilge well and 1.0 for elsewhere

$f_{ten}$  : 0.44 as the welding factor

2.4.3~2.4.7 <Same as the present Rules>

## Present

### 2.5 Weld size criteria

2.5.1~2.5.2 <Omitted>

**Table 1 : Minimum leg size**

Area	Minimum length, in mm
Cargo hold region	4.5
Other areas	4.5

**Table 2 : Weld factors for different structural members**

2.5.3~2.5.12 <Omitted>

3. <Omitted>

### 4. Other Types of Joints

#### 4.1 Lapped joints

4.1.1~4.1.4 <Omitted>

4.1.5 Overlapped seams

~~Overlapped seams are to have continuous welds on both edges, of the sizes required by [2.5.2] for the boundaries of tank/hold or watertight bulkheads. Seams for plates with as-built thickness of 12.5mm or less, which are clear of tanks/holds, may have one edge with intermittent welds in accordance with [2.5.2] for watertight bulkhead boundaries.~~

5. <Omitted>

## Amendment

### 2.5 Weld size criteria

2.5.1~2.5.2 <Same as the present Rules>

**Table 1 : Minimum leg size**

Area	Minimum length, in mm
Cargo hold region	4.5
<u>Superstructures and deckhouses</u>	<u>3.5</u>
Other areas	4.5

**Table 2 : Weld factors for different structural members**

2.5.3~2.5.12 <Same as the present Rules>

3. <Same as the present Rules>

### 4. Other Types of Joints

#### 4.1 Lapped joints

4.1.1~4.1.4 <Same as the present Rules>

5. <Same as the present Rules>

## Present

**Table 2 : Weld factors for different structural members**

Hull area	Connection		$f_{weld}$	
	of	to		
General, unless otherwise specified in the table	Watertight plate	Boundary plating	0.48	
	Oil-tight plate	Boundary plating	0.51	
	Brackets at ends of members		0.48	
	Ordinary stiffener and collar plates	Deep tank bulkheads		0.24
		Web of primary supporting members and collar plates		0.38
	Web of stiffener	Plating (except deep tank bulkhead)		0.20
		Face plates of built-up stiffeners	At ends (15% of span)	0.38
			Elsewhere	0.2
Bottom and double bottom	Ordinary stiffener	Bottom and inner bottom plating		0.24
	Centre girder	Shell plates		0.38
		Inner bottom plate		0.38
	Side girder including intercostal plates	Bottom and inner bottom plating		0.24
	Floor	Shell plates and inner bottom plates	At ends, on a length equal to two frame spaces	0.38
		Centre girder and side girders in way of hopper tanks		0.38
		Elsewhere		0.24
	Bracket on centre girder	Centre girder, inner bottom, floors and shell plates		0.38
Web stiffener	Floor and girder		0.2	
Side and inner side in double side structure	Web of primary supporting members	Side plating		0.30
		Inner side plating and web of primary supporting members	in way of deck transverse and end connections	0.43
			in way of cross-tie	0.36
			elsewhere	0.30

## Present

Deck	Strength deck	$t_{as-built} \geq 13$	Side shell plating within 0.6L midship		PPW <sup>(3)</sup>	
			Elsewhere		0.48	
		$t_{as-built} < 13$	Side shell plating		0.48	
	Other deck		Side shell plating		0.38	
			Stiffeners		0.20	
	Hatch coamings		Deck plating	Longitudinal hatch coaming corners of hatchways in a length of 15% of the hatch coaming height		FPW <sup>(1(4))</sup> or PPW <sup>(3)</sup>
				Longitudinal hatch coaming on a length starting from 15% of the hatch coaming height from the corners of hatchways up to 15% of the hatch length		0.48 or PPW <sup>(3)</sup>
				Elsewhere		0.38 or PPW <sup>(3)</sup>
	Web stiffeners		Coaming webs		0.20 <sup>(2)</sup>	
	Bulkheads	Non-watertight bulkhead structure		Boundaries	Swash bulkheads	0.24
Stiffener		Bulkhead plating	At ends (25% of span), where no end brackets are fitted	0.48		
Aft peak	Internal members		Boundaries and each other: below waterline		0.38	
			Above waterline		0.20	
Fore peak	Internal members		Boundaries and each other		0.20	
Machinery space	Centre girder		Keel and inner bottom		0.48	
	Floor		Centre girder		0.48	
	Engine foundation girders		Top plate and primary hull structure		PPW <sup>(3)</sup>	
	Floors and girders		Inner bottom and shell plate		0.38	
Superstructure and deckhouse	External bulkhead (first and second tier erections)		Deck, external bulkhead		0.48	
	External bulkheads and internal bulkheads		Elsewhere		0.2	

## Present

- (1)  $f_{weld} = 0.43$  for hatch coaming other than in cargo holds.
- (2) Continuous welding.
- (3) PPW: Partial penetration welding in accordance with [2.4.2].
- (4) FPW: Full penetration welding in accordance with [2.4.2].
- (5) Bulkheads of superstructure and deckhouse are to be considered in the row corresponding to "Superstructure and deck house".

## Amendment

**Table 2 : Weld factors for different structural members**

Hull area	Connection		$f_{weld}$	
	of	to		
General, unless otherwise specified in the table	Watertight plate	Boundary plating	0.48	
	Brackets at ends of members		0.48	
	Ordinary stiffener and collar plates	Deep tank bulkheads		0.24
		Web of primary supporting members and collar plates		0.38
	Web of stiffener	Plating (except deep tank bulkhead)		0.20
		Face plates of built-up stiffeners	At ends (15% of span)	0.38
			Elsewhere	0.2
Bottom and double bottom	Ordinary stiffener	Bottom and inner bottom plating	0.24	
	Centre girder	Shell plates	0.38	
		Inner bottom plate	0.38	
	Side girder including intercostal plates	Bottom and inner bottom plating	0.24	
	Floor	Shell plates and inner bottom plates	At ends, on a length equal to two frame spaces	0.38
		Centre girder and side girders in way of hopper tanks		0.38
		Elsewhere		0.24
	Bracket on centre girder	Centre girder, inner bottom, floors and shell plates		0.38
Web stiffener	Floor and girder		0.2	
Side and inner side in double side structure	Side plating		0.30	
	Web of primary supporting members	Inner side plating and web of primary supporting members	in way of deck transverse and end connections	0.43
		elsewhere		0.30



## Amendment

Deck	Strength deck	$t_{as-built} \geq 13$	Side shell plating within 0.6L midship		PPW <sup>(3)</sup>
			Elsewhere		0.48
		$t_{as-built} < 13$	Side shell plating		0.48
	Other deck	Side shell plating/ <u>bulkhead</u>		0.38	
		Stiffeners		0.20	
	Hatch coamings	Deck plating	Longitudinal hatch coaming corners of hatchways in a length of 15% of the hatch coaming height		FPW <sup>(1(4))</sup> or PPW <sup>(3)</sup>
			Longitudinal hatch coaming on a length starting from 15% of the hatch coaming height from the corners of hatchways up to 15% of the hatch length		0.48 or PPW <sup>(3)</sup>
			Elsewhere		0.38 or PPW <sup>(3)</sup>
	Web stiffeners	Coaming webs		0.20 <sup>(2)</sup>	
	Bulkheads	Non-watertight bulkhead structure	Boundaries	Swash bulkheads	<u>0.48</u>
Stiffener		Bulkhead plating	At ends (25% of span), where no end brackets are fitted	0.48	
Aft peak	Internal members	Boundaries and each other: below waterline		0.38	
		Above waterline		0.20	
Fore peak	Internal members	Boundaries and each other		0.20	
Machinery space	Centre girder	Keel and inner bottom		0.48	
	Floor	Centre girder		0.48	
	Engine foundation girders	Top plate and primary hull structure		PPW <sup>(3)</sup>	
	Floors and girders	Inner bottom and shell plate		0.38	
Superstructure and deckhouse	External bulkhead (first and second tier erections)	Deck, external bulkhead		0.48	
	External bulkheads and internal bulkheads	Elsewhere		0.2	

## Amendment

- (1)  $f_{weld} = 0.43$  for hatch coaming other than in cargo holds.
- (2) Continuous welding.
- (3) PPW: Partial penetration welding in accordance with [2.4.2].
- (4) FPW: Full penetration welding in accordance with [2.4.2].
- (5) Bulkheads of superstructure and deckhouse are to be considered in the row corresponding to "Superstructure and deck house".

Present	Amendment						
<p style="text-align: center;"><b>Section 4 Use of Extremely Thick Steel</b></p> <p>1. ~ 2. &lt;Omitted&gt;</p> <p>3. <del>Periodic NDT after delivery</del>(Measure No.2 of [5])</p> <p>3.1 Where <del>periodic NDT after delivery is required as a safety measure option B of [5], the NDT is to be in accordance with Table 1.</del></p> <p style="text-align: center;"><b>Table 1</b> : Locations, extent and timing of UT</p> <table border="1" data-bbox="342 534 1115 751"> <thead> <tr> <th data-bbox="342 534 658 571">Locations</th> <th data-bbox="658 534 819 571">Extent</th> <th data-bbox="819 534 1115 571">Timing</th> </tr> </thead> <tbody> <tr> <td data-bbox="342 571 658 708">all block to block butt joints of all upper flange longitudinal structural members in the cargo hold region</td> <td data-bbox="658 571 819 708">100% UT</td> <td data-bbox="819 571 1115 708">No. 2 Special Survey and every even Special Survey after that(e.g. No.4, No.6, etc.)</td> </tr> </tbody> </table> <p>3.2 <del>Testing procedure and acceptance criteria of UT not specified in this requirements are to comply with the requirements in [2.2].</del></p> <p>4. &lt;Omitted&gt;</p> <p>5. <b>Measures for Extremely Thick Steel Plates</b></p> <p>The thickness and the yield strength shown in the <b>Table 2</b> apply to the hatch coaming top plating and side plating, and are the controlling parameters for the application of countermeasures. If the as built thickness of the hatch coaming top plating and side plating is below the values contained in the table, countermeasures are not necessary regardless of the thickness and yield strength of the upper deck.</p> <p style="text-align: center;"><b>Table 2</b> : Measures for extremely thick steel plates</p> <p>6. &lt;Omitted&gt;</p>	Locations	Extent	Timing	all block to block butt joints of all upper flange longitudinal structural members in the cargo hold region	100% UT	No. 2 Special Survey and every even Special Survey after that(e.g. No.4, No.6, etc.)	<p style="text-align: center;"><b>Section 4 Use of Extremely Thick Steel</b></p> <p>1. ~ 2. &lt;Same as the present Rules&gt;</p> <p>3. <b>Welding to increase toughness</b>(Measure No.2 of [5])</p> <p>3.1 <u>Welding to increase toughness is to be carried out when B option in [5] is selected as a safety measure to identify and prevent brittle fracture.</u></p> <p>3.2 <u>Impact specimens are to be taken in accordance with 3.2.1.</u></p> <p>3.2.1 <u>Impact specimens are to be taken from the weld center "WM", fusion line "FL", heat affected zone of 2mm from fusion line, heat affected zone of 5mm from fusion line.</u></p> <p>3.3 <u>Impact specimens are to meet the criteria for absorbed energy of base material at impact test temperature of base material.</u></p> <p>4. &lt;Same as the present Rules&gt;</p> <p>5. <b>Measures for Extremely Thick Steel Plates</b></p> <p>The thickness and the yield strength shown in the <b>Table 2</b> apply to the hatch coaming top plating and side plating, and are the controlling parameters for the application of countermeasures. If the as built thickness of the hatch coaming top plating and side plating is below the values contained in the table, countermeasures are not necessary regardless of the thickness and yield strength of the upper deck.</p> <p style="text-align: center;"><b>Table 2</b> : Measures for extremely thick steel plates</p> <p>6. &lt;Same as the present Rules&gt;</p>
Locations	Extent	Timing					
all block to block butt joints of all upper flange longitudinal structural members in the cargo hold region	100% UT	No. 2 Special Survey and every even Special Survey after that(e.g. No.4, No.6, etc.)					

## Present

**Table 2 : Measures for extremely thick steel plates**

Yield Strength (kgf/mm <sup>2</sup> )	Thickness (mm)	Option	Measures			
			1	2	3+4	5
36	50<t≤85	-	NA	NA	NA	NA
	85<t≤100	-	O	NA	NA	NA
40	50<t≤85	-	O	NA	NA	NA
	85<t≤100	A	O	NA	O	O
		B	O*	O**	NA	O
47(FCAW)	50<t≤100	A	O	NA	O	O
		B	O*	O**	NA	O
47(EGW)	50<t≤100	-	O	NA	O	O

Measures:

No.	Measures
1	NDT other than visual inspection on all target block joints(during construction) [2].
2	Periodic NDT other than visual inspection on all target block joints(after delivery) [3].
3	Brittle crack arrest design against straight propagation of brittle crack along weld line to be taken(during construction) See [4.3.2], [4.3.3] or [4.3.4] of this requirements.
4	Brittle crack arrest design against deviation of brittle crack from weldline(during construction) See [4.3.1].
5	Brittle crack arrest design against propagation of cracks from other weld areas such as fillets and attachment welds(during construction) See [4.3.1].

Symbols:

- (a) "O" means "To be applied".
- (b) "N.A" means "Need not to be applied".
- (c) Selectable from option "A" and "B".

Note:

- \*: See [4.3.5]
- \*\* : See [3].

## Amendment

**Table 2 : Measures for extremely thick steel plates**

Yield Strength (kgf/mm <sup>2</sup> )	Thickness (mm)	Option	Measures			
			1	2	3+4	5
36	50<t≤85	-	NA	NA	NA	NA
	85<t≤100	-	O	NA	NA	NA
40	50<t≤85	-	O	NA	NA	NA
	85<t≤100	A	O	NA	O	O
		B	O*	O**	NA	O
47(FCAW)	50<t≤100	A	O	NA	O	O
		B	O*	O**	NA	O
47(EGW)	50<t≤100	-	O	NA	O	O

Measures:

No.	Measures
1	NDT other than visual inspection on all target block joints(during construction) [2].
2	Welding to increase toughness(during construction) See [3].
3	Brittle crack arrest design against straight propagation of brittle crack along weld line to be taken(during construction) See [4.3.2], [4.3.3] or [4.3.4] of this requirements.
4	Brittle crack arrest design against deviation of brittle crack from weldline(during construction) See [4.3.1].
5	Brittle crack arrest design against propagation of cracks from other weld areas such as fillets and attachment welds(during construction) See [4.3.1].

Symbols:

- (a) "O" means "To be applied".
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- (c) Selectable from option "A" and "B".

Note:

- \*: See [4.3.5]
- \*\* : See [3].