

## CHAPTER 4 SAFETY CLEARANCE, FREEBOARD AND DRAUGHT MARKS

### 4-1 GENERAL

4-1.1 This chapter specifies the minimum freeboard for inland waterway vessels. It also contains requirements concerning the indication of the freeboard mark **and draught scale**.

4-1.2 This chapter assumes that the nature and stowage of the cargo, ballast, etc., are such as to ensure adequate stability and as to obviate any excessive structural fatigue.

4-1.3 Freeboards as prescribed in this chapter shall be assigned on the assumption, first, that navigation will cease when weather conditions are such that the maximum wave height defining the zone or zones in which a vessel is to navigate may be exceeded, and second that in such conditions vessels already under way will seek shelter as quickly as possible.

4-1.4 The Administration may consider it sufficient if the vessel has been built and maintained in conformity with the rules of a recognized Classification Society.

### 4-2 TYPES OF VESSELS

For the purpose of this chapter, vessels shall be divided into three types:

- Type A – Decked vessels
- Type B – Tankers
- Type C – Open vessels

Type A: Decked vessels: Decked vessels are vessels whose hatch covers are satisfactorily strong, rigid, watertight for zone 1 and sprayproof for zones 2 and 3.

Type B: Tankers and similar vessels: These vessels have only small openings giving access to the tanks, the openings being closed by steel or equivalent covers with watertight fittings. Such vessels have the following characteristics:

- (i) Very high watertight integrity of the exposed deck;
- (ii) Very high resistance to flooding, through low permeability of the loaded compartments and through the degree of subdivision applied in general.

Type C: Open vessels: Open vessels are either vessels whose hatch covers are not satisfactorily strong, rigid, sprayproof or vessels whose cargo hatchways are open.

### 4-3 APPLICATION AND DEROGATIONS

4-3.1 The maximum draught level shall be so determined that both the freeboard requirements and the safety-distance requirements are observed. For safety reasons, however, the Administration may prescribe a higher figure for the freeboard.

4-3.2 Vessels so constructed that application of the provisions of this chapter is unwarranted or impracticable shall be assigned freeboards by the Administration in such a way that the safety conditions are equivalent to those of this chapter.

4-3.3 In the case of zone 1, derogations from the conditions of assignment of freeboard may be allowed to vessels to which a freeboard in excess of the minimum freeboard is assigned, provided that the safety conditions are deemed satisfactory by the Administration.

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<sup>1</sup> or load line??

#### 4-3.4<sup>1</sup>

### 4-4 DETERMINATION OF FREEBOARDS

#### 4-4.1 General Deck line, draught marks, load line

##### 4-4.1.1 Deck line

The deck line is the upper edge of a horizontal rectangle 300 mm long and 25 mm wide. This rectangle shall be marked amidships on each side of the hull, and its upper edge shall normally pass through the point where the continuation outwards of the upper surface of the freeboard deck intersects the outer surface of the shell amidships. However, the deck line may also be marked at a different height provided that the freeboard is corrected accordingly.

**4-4.1.2** ~~Article 4.04(1)~~ *The plane of maximum draught shall be determined in such a way that the specifications concerning minimum freeboard and minimum safety clearance are both met. However, for safety reasons, the inspection body may lay down a greater value for the safety clearance or freeboard. The plane of maximum draught shall be determined at least for Zone 3.*

**4-4.1.3** ~~Article 4.04(2)~~ *The plane of maximum draught shall be indicated by means of highly visible, indelible draught marks.*

**4-4.1.4** ~~Article 4.04(3)~~ *The draught marks for Zone 3 shall consist of a rectangle 300 mm long and 40 mm deep, the base of which is horizontal and coincides with the plane of the maximum authorised draught. Any differing draught marks shall include such a rectangle.*

**4-4.1.5** ~~Article 4.04(4)~~ *Vessels shall have at least three pairs of draught marks, of which one pair shall be centrally located and the two others located, respectively, at a distance from the bow and stern that is equal to roughly one-sixth of the length.*

*However,*

*(i) where a vessel is less than 40 m in length it will suffice to affix two pairs of marks at a distance from the bow and stern, respectively, that is equal to a quarter of the length;*

*(ii) where vessels are not intended for the carriage of goods, a pair of marks located roughly halfway along the vessel will suffice.*

**4-4.1.6** ~~Article 4.04(5)~~ *Marks or indications which cease to be valid following a further inspection shall be deleted or marked as being no longer valid under the supervision of the inspection body. If a draught mark should disappear, it may only be replaced under the supervision of an inspection body.*

**4-4.1.7** ~~Article 4.04(6)~~ *Where a vessel has been measured in implementation of the 1966 Convention on the Measurement of Inland Navigation Vessels and the plane of the measurement marks meets the requirements of this Directive, those measurement marks shall take the place of the draught marks; this shall be mentioned in the ~~Community~~ vessel's certificate.*

**4-4.1.8** ~~Article 4.04(7)~~ *For vessels operating on zones of inland waterways other than Zone 3 (Zones 1, 2 or 4) the bow and stern pairs of draught marks provided for in paragraph 4 shall be supplemented by adding a vertical line to which one or, in the case of several zones, several*

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<sup>1</sup> Here we propose to include a paragraph which will be a connection between freeboard for zone 3 and zones 1 and 2. For example, if the vessel is designed for navigation in zones 1 or 2, it shall comply with 4-4.2. If the vessel may perform single voyages in zones 1 and 2, 4-4.4 may be applied provided that ...



The load line for zones 1 and 2 shall consist of a ring intersected through its centre by a horizontal line which shall be supplemented if necessary by additional freeboard lines.

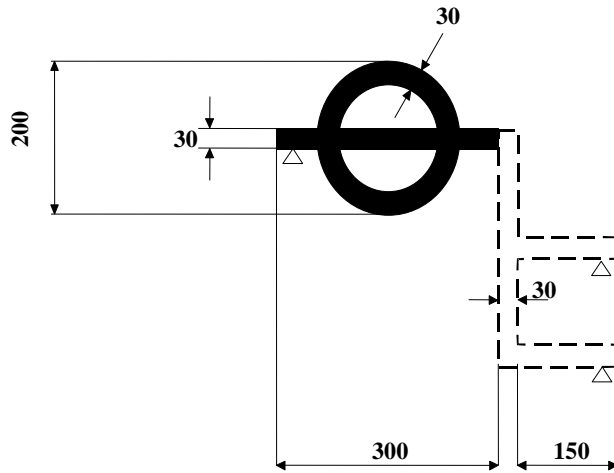


Fig. 4-4.1.2

The width of the ring and of all the other lines of the freeboard mark shall be 30 mm; the outer diameter of the ring shall be 200 mm; the length of the horizontal line intersecting the ring shall be 300 mm; and the size of the numerals designating the zones shall be 60 x 40 mm (Figure 4-4.1.11).

The centre of the ring shall be placed amidships. The lower edge of the horizontal line which intersects the ring shall pass through the centre of the ring and shall constitute the freeboard line.

If the vessel is intended to navigate in several navigation zones, a vertical line *and* additional freeboard lines 150 mm in length shall be applied forward of the centre of the ring.

The lower edge of each freeboard line shall correspond to the freeboard prescribed for the navigation zone concerned.

If the vessel is measured in accordance with the Convention on the Measurement of Inland Navigation Vessels, it shall bear, in addition to the freeboard mark, a measurement mark in accordance with the requirements of this Convention.

The freeboard mark and the measurement mark may be combined. In this case, the width of the freeboard mark rectangle (the width of the upper line if there are a number of freeboard marks) should be 40 mm.

**When a vessel bears the load line, the latter is combined / fixed instead of the draught marks located amidships.**

4-4.2 Minimum freeboard in zones 1 and 2

4-4.2.1 Minimum freeboard (F) for vessels of type A

Length of the vessel m	Minimum freeboard (F) mm	
	Zone 1	Zone 2
≤ 30	250	250
40	340	300
50	440	340

60	570	340
70	570	340
≥ 80	570	340
<p><u>Note:</u> In this and all subsequent tables, the values for the intermediate lengths of vessels shall be obtained by linear interpolation.</p>		

4-4.2.2 Minimum freeboard (F) for vessels of type B

Length of the vessel m	Minimum freeboard (F) mm	
	Zone 1	Zone 2
≤ 30	180	160
40	250	220
50	330	220
60	420	220
70	420	220
≥ 80	420	220

4-4.2.3 The minimum freeboard of flush-deck vessels should be obtained in the manner indicated for the vessel of type B.

4-4.2.4 The minimum freeboard for vessels of type C, regardless of length, should be not less than:

- for zone 1 – 1 000 mm
- zone 2 – 600 mm.

Furthermore, the sum of the freeboard and the height of coamings for these vessels must be not less than:

- for zone 1 – 1 200 mm
- zone 2 – 1 000 mm.

4-4.2.5 The Administration may authorize corrections for the freeboard for vessels with poop, sheer and forecastle, providing that such corrections are calculated in conformity with the rules of the Administration or of a recognized Classification Society.

4-4.3 Special requirements for Minimum freeboard in zone 3

4-4.3.1 The basic freeboard of vessels with a continuous deck without superstructures and sheer shall be 150 mm.

~~4-4.3.2 The Administration may authorize a correction for the freeboard for vessels with superstructures and sheer providing that such correction is calculated in conformity with the rules of the Administration or of a recognized Classification Society.~~

~~4.02(2) The freeboard of vessels with sheer and superstructures shall be calculated using the following formula:~~

$$F = 150 (1 - \alpha) - \frac{\beta_v \cdot Se_v + \beta_a \cdot Se_a}{15} \quad [mm]$$

where:

$\alpha$  is a correction coefficient that takes account of all of the superstructures involved;

$\beta_v$  is a coefficient for correcting the effect of the forward sheer resulting from the presence of superstructures in the forward quarter of length L of the vessel;

$\beta_a$  is a coefficient correcting the effect of the aft sheer resulting from the presence of superstructures in the aft quarter of length  $L$  of the vessel;

$Se_v$  is the effective forward sheer in mm;

$Se_a$  is the effective aft sheer in mm.

~~4.02(3)~~ **4-4.3.3** The coefficient  $\alpha$  is calculated using the following formula:

$$\alpha = \frac{\sum le_a + \sum le_m + \sum le_v}{L}$$

where:

$le_m$  is the effective length, in m, of a superstructure located in the median part corresponding to half of length  $L$  of the vessel;

$le_v$  is the effective length, in m, of a superstructure in the forward quarter of vessel length  $L$ ;

$le_a$  is the effective length, in m, of a superstructure in the aft quarter of vessel length  $L$ .

The effective length of a superstructure is calculated using the following formulae:

$$le_m = l \left( 2,5 \cdot \frac{b}{B} - 1,5 \right) \cdot \frac{h}{0,36} [m]$$

where:

$l$  is the effective length, in m, of the superstructure involved;

$b$  is the width, in m, of the superstructure involved;

$B_1$  is the width of the vessel, in m, measured on the outside of the vertical sideplates at deck level halfway along the superstructure involved;

$h$  is the height, in m, of the superstructure involved. However, in the case of hatches,  $h$  is obtained -y reducing the height of the coamings by half of the safety distance according to ~~Article 4.01(1) and (2)~~ **4-4.5.2 and 4-4.5.3**. In no case will a value exceeding 0,36 m be taken for  $h$ .

If  $\frac{b}{B}$  or  $\frac{b}{B_1}$  is less than 0,6 the effective length  $le$  of the superstructure will be zero.

~~4.02(4)~~ **4-4.3.4** Coefficients  $\beta_v$  and  $\beta_a$  are calculated using the following formulae:

$$\beta_v = 1 - \frac{3 \cdot le_v}{L}$$

$$\beta_a = 1 - \frac{3 \cdot le_a}{L}$$

~~4.02(5)~~ **4-4.3.5** The effective aft/forward sheers  $Se_v/Se_a$  are calculated using the following formulae:

$$Se_v = S_v \cdot p$$

$$Se_a = S_a \cdot p$$

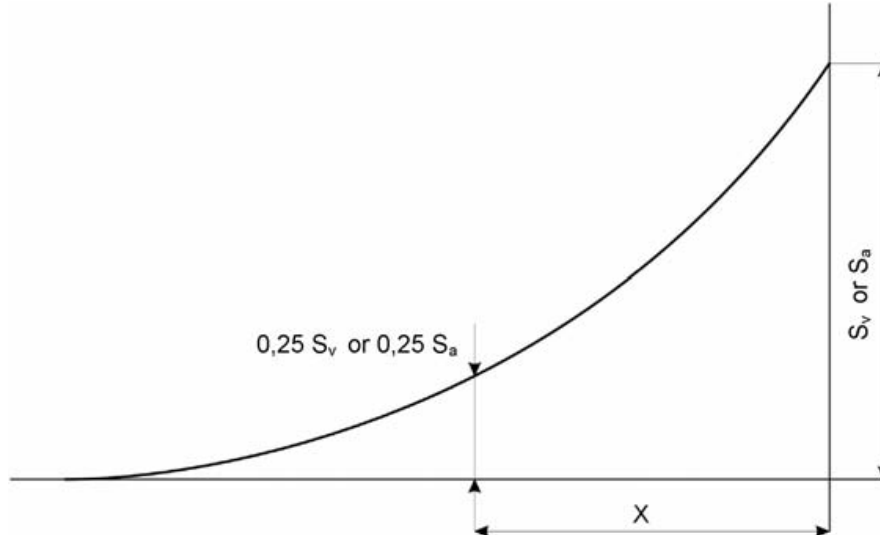
where:

$S_v$  is the actual forward sheer, in mm; however  $S_v$  shall not be taken to be more than 1 000 mm;

$S_a$  is the actual aft sheer, in mm; however  $S_a$  may not be taken to be more than 500 mm;  
 $p$  is a coefficient calculated using the following formula:

$$p = 4 \cdot \frac{x}{L}$$

$x$  is the abscissa, measured from the extremity of the point where the sheer is  $0,25 S_v$  or  $0,25 S_a$  (see figure).



However, coefficient  $p$  will not be taken to be more than 1.

~~4.02(6)~~ **4-4.3.6** If  $\beta_a \cdot S_{ea}$  is greater than  $\beta_v \cdot S_{ev}$ , the value of  $\beta_a \cdot S_{ea}$  will be taken as being the value for  $\beta_v \cdot S_{ev}$ .

~~4.03~~ **4-4.3.7** .In view of the reductions referred to in ~~Article 4.02~~ **4-4.3.2 – 4-4.3.6** the minimum freeboard shall not be less than 0 mm.

**4-4.3.8** The Administration may authorize a correction for the freeboard for vessels with superstructures and sheer providing that such correction is calculated in conformity with the rules of ~~the Administration or~~ of a recognized Classification Society.

#### **4-4.5 Safety clearance**

~~4-4.5.1~~ ~~4-4.3.11~~ For vessels of type A and type B, the safety clearance as defined in 1-2 must not be less than 600 mm for zone 2.

For vessels of type C, as well as other vessels navigating with open holds, this distance shall be increased to 400 mm in zone 2. However, this increase applies only to the coamings of open holds.

**4-4.5.2** For vessels of types A and B **navigating in zone 3**, the safety clearance must not be less than 300 mm.

**4-4.5.3** For vessels of the type C **navigating in zone 3**, the safety clearance shall be increased in such a way that each of ~~those openings~~ **that cannot be closed by ~~spray proof and weathertight~~ watertight devices** shall be at least 500 mm from the plane of maximum draught ~~must not be less than 500 mm.~~

#### **4-6 Arrangement of openings and coamings**

**4-4.6.1** All outside doors of superstructure, deckhouses and companionways, situated on the freeboard deck shall be watertight on vessels in zone 1 and sprayproof on vessels in zones 2 and 3.

4-4.6.2 The coamings of hatchways, companionways and access openings to superstructures shall be not less than 300 mm high on vessels in zone 1 and 150 mm on vessels in zone 2.

4-4.6.3 If the height of the coamings is less than that required by this chapter, the minimum freeboard height shall be increased by the difference between the height required in 4-4.6.2 and the actual height of the coamings.

4-4.6.4 The freeboard height may not be reduced owing to an increase in the height of coamings below the figure indicated in 4-4.6.2.

4-4.6.5 Exposed cargo hatchways and other hatchways on the freeboard deck shall be fitted with watertight closures on vessels in zone 1 and sprayproof closures on vessels in zones 2 and 3.

4-4.6.6 Ventilator heads on the exposed parts of the freeboard deck shall be fitted with a strong steel coaming of a height not less than that required for hatchway coamings. Ventilator heads for vessels in zone 1 must have watertight closures.

4-4.6.7 Pipe outlets in the ship's sides below the freeboard deck shall be fitted with efficient and accessible devices to prevent water from entering the vessel.

4-4.6.8 On vessels in zone 1, side scuttles in spaces below the freeboard deck, windows in superstructures, deckhouses and companionways and windows in skylights on the freeboard deck shall be watertight. In addition, side scuttles in spaces below the freeboard deck shall be provided with permanently attached deadlights. The distance between side scuttles in the shell and the maximum draught level shall not be less than 300 mm.

4-4.6.9 Skylights and windows must be of sturdy construction

4-4.6.10 On vessels in zones 2, skylights and windows must be fitted with sprayproof covers which shall be permanently attached if the lowest part of the openings falls within the safety clearance prescribed for the coamings of uncovered holds (para. 4-4.5.1). In this case, the height ( $h$ ) of the superstructures in which the openings are provided is limited to the lowest point of these openings.

~~4-4.3.11 For vessels of type A and type B, the safety clearance as defined in 1-2 must not be less than 600 mm for zone 2.~~

~~For vessels of type C, as well as other vessels navigating with open holds, this distance shall be increased to 400 mm in zone 2. However, this increase applies only to the coamings of open holds.~~

4-4.6.11 The covers of Kingston valves and ice boxes must be watertight.

4-4.6.12 The scuppers and freeing ports in bulwarks shall be of sufficient size to drain the decks of shipped water.

#### **4-4.7 Special requirements for safety clearance and freeboard in zone 4**

*Article 19b.01(1)* **4-4.7.1** *By way of derogation from Article 4.01(1) and (2) 4-5.2 and 4-5.3, the safety clearance of doors and openings other than hold hatches for vessels navigating on Zone 4 waterways is reduced as follows:*

- (i) for openings which can be closed spray-proof and weathertight, to 150 mm;*
- (ii) for openings which cannot be closed spray-proof and weathertight, to 200 mm.*



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*Article 19b.01(1) ~~4-4.7.2~~ By way of derogation from Article 4.02 ~~4-4.3~~, the minimum freeboard of vessels navigating on Zone 4 waterways is 0 mm, if the safety clearance according to ~~paragraph I~~ ~~4-4.7.1~~ is respected.*

**VALUES OF TABULAR FREEBOARD OF STANDARD VESSELS DEPENDING  
ON THE VESSEL TYPE AND THE NAVIGATION ZONE**

**1. LL – 66/88**

Vessel's length, m	Minimal freeboard, mm	
	Type A	Type B
30	250	250
40	334	334
50	443	443
60	573	573
70	706	721
...	...	...
135	1719	2000

**2. GL Rules**

Vessel's length, m	Minimal freeboard, mm	
	Cargo vessels	Tankers
30 and over	250	180
40	340	250
50	440	330
60 - 110	570	420

**3. Resolution No. 61**

Vessel's length, m	Minimal freeboard, mm					
	Type A		Type B		Type C	
	Zone 1	Zone 2	Zone 1	Zone 2	Zone 1	Zone 2
≤ 30	250	250	180	160	1000	600
40	340	300	250	220	1000	600
50	440	340	330	220	1000	600
60	570	340	420	220	1000	600
70	570	340	420	220	1000	600
≥ 80	570	340	420	220	1000	600