

# LL60 Freeing ports in way of wells in combination with open superstructures (Regulation 24(1) and 24(4))

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In the case of vessels having open superstructures on the freeboard or superstructure decks, which open to wells formed by bulwarks on the peripheries of the open decks, the convention leaves to the satisfaction of the Administration how the freeing port areas for the open spaces within the superstructures are to be calculated.

Since water can enter only through the end bulkhead openings, the freeing port areas for the open spaces within the superstructures should be a function of the breadth of the end openings and the extent to which wells formed by the open decks and common spaces within the open superstructures are covered by the open superstructures.

To determine the minimum freeing port area on each side of the ship for the open superstructure ( $A_S$ ) and for the open well ( $A_W$ ), the following procedure is recommended:

1. Determine the total well length ( $l_t$ ) equal to the sum of the length of the open deck enclosed by bulwarks ( $l_w$ ) and the length of the common space within the open superstructure ( $l_s$ ).
2. To determine ( $A_S$ ):
  - 2.1 Calculate the freeing port area ( $A$ ) required for an open well of length  $l_t$  in accordance with regulation 24(1) with standard height bulwark assumed.
  - 2.2 Multiply by the factor of 1.5 to correct for the absence of sheer, if applicable, in accordance with regulation 24(2).
  - 2.3 Multiply by the factor ( $b_o/l_t$ ) to adjust the freeing port area for the breadth ( $b_o$ ) of the openings in the end bulkhead of the enclosed superstructure. (Note: this cancels the  $l_t$  terms from the calculation.)
  - 2.4 To adjust the freeing port area for that part of the entire length of the well which is enclosed by the open superstructure, multiply by the factor:

$$1-(l_w/l_t)^2$$

where  $l_w$  and  $l_t$  are defined in 1 above.

- 2.5 To adjust the freeing port area for the distance of the well deck above the freeboard deck, multiply by the factor:

$$0.5 (h_s/h_w)$$

where  $h_w$  is the distance of the well deck above the freeboard deck and  $h_s$  is one standard superstructure height.

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Footnote: This UI is also applicable to Regulation 24(1) and 24(4) of the 1988 Protocol.

**LL60**

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3. To determine ( $A_W$ ):
- 3.1 The freeing port area for the open well ( $A_W$ ) is to be calculated in accordance with step 2.1 above, using  $l_W$  to calculate ( $A'$ ), and then adjusted for the actual height of the bulwark ( $h_b$ ) by the application of one of the following area corrections, whichever is applicable:

For bulwarks greater than 1.2 m in height:

$$A_C = l_W ((h_b - 1.2) / (0.10)) (0.004) \text{ m}^2$$

For bulwarks less than 0.9 m in height:

$$A_C = l_W ((h_b - 0.9) / (0.10)) (0.004) \text{ m}^2$$

For bulwarks between 1.2 m and 0.9 m in height:

$$A_C = 0.00 \text{ m}^2$$

- 3.2 The corrected freeing port area, ( $A_W = A' + A_C$ ), is then adjusted for absence of sheer, if applicable, and height above freeboard deck as in steps 2.2 and 2.5 above, using  $h_S$  and  $h_W$ .
4. The resulting freeing port areas for the open superstructure ( $A_S$ ) and for the open well ( $A_W$ ) are to be provided along each side of the open space covered by the open superstructure and each side of the open well respectively.
5. The above relationships are summarised by the following equations, assuming  $l_t$ , the sum of  $l_W$  and  $l_S$ , is greater than 20 m\*:

Freeing port area  $A_W$  for the open well:

$$A_W = (0.07 l_W + A_C) (\text{sheer correction}) (0.5 h_S / h_W)$$

Freeing port area  $A_S$  for the open superstructure:

$$A_S = (0.07 l_t) (\text{sheer correction}) (b_O / l_t) (1 - (l_W / l_t)^2) (0.5 h_S / h_W)$$

\* Where  $l_t$  is 20 m or less, the basic freeing port area is  $A = 0.7 + 0.035 l_t$  in accordance with Regulation 24(1). Units are to be consistent with those in the Convention.

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