

Basic Drainage area in centimeters<sup>2</sup> =  $4389.12 \times [(\text{Recess Volume} \times \text{Recess Ratio}) + (\text{Weather Deck Volume} \times \text{Weather Deck Ratio})]$ ; or

Basic Drainage area in inch<sup>2</sup> =  $(\text{Recess Volume} \times \text{Recess Ratio}) + (\text{Weather Deck Volume} \times \text{Weather Deck Ratio})$

Recess Volume =  $(B_R \times D_R) - V_R$

$B_R$ =average height in centimeters (feet) of the bulwark above the well deck or cockpit deck;

$D_R$ =total deck area of the cockpit or well deck in the after  $\frac{2}{3}$  of the vessel length (LOD) measured in centimeters<sup>2</sup> (feet<sup>2</sup>).

$V_R$ =volume of any weather tight structure below the bulwark of the well deck or cockpit deck.

Recess Ratio =  $L_R / L_C$

$L_R$ =the length of the recess in the after  $\frac{2}{3}$  vessel length (LOD).

$L_C$ = $\frac{2}{3}$  vessel length (LOD).

Weather Deck Volume =  $(B_D \times D_D) - V_S$

$B_D$ =average height in centimeters (feet) of the bulwark above the weather deck;

$D_D$ =total deck area of the weather deck adjacent to bulwarks but not in way of the cockpit or well deck in the after  $\frac{2}{3}$  of the vessel length (LOD) measured in centimeters<sup>2</sup> (feet<sup>2</sup>).

$V_S$ =volume of any weather tight superstructure below the bulwark on the weather deck located within  $D_D$ .

Weather Deck Ratio =  $L_D / L_C$

$L_D$ =the length of the weather deck bulwark in the after  $\frac{2}{3}$  of the vessel length (LOD).

$L_C$ = $\frac{2}{3}$  vessel length (LOD).

(b) Vessels with bulwarks in the forward part of the vessel shall not form a well with the deckhouse which retains water.

[CGD 85-080, 61 FR 966, Jan. 10, 1996; 61 FR 20557, May 7, 1996]

### Subpart E—Special Installations

#### § 178.510 Ballast.

(a) Any solid fixed ballast used to comply with the requirements of parts 170, 171, 178, and 179 of this chapter must be:

(1) Stowed in a manner that prevents shifting of the ballast; and

(2) Installed to the satisfaction of the cognizant OCMI.

(b) Solid fixed ballast may not be located forward of the collision bulkhead unless the installation and arrange-

ment of the ballast and the collision bulkhead minimizes the risk of the ballast penetrating the bulkhead in a collision.

(c) Solid fixed ballast may not be removed from a vessel or relocated unless approved by the cognizant OCMI except that ballast may be temporarily moved for a vessel examination or repair if it is replaced to the satisfaction of the OCMI.

(d) Water ballast, either as an active system or permanent, must be approved by the Commanding Officer, Marine Safety Center.

## PART 179—SUBDIVISION, DAMAGE STABILITY, AND WATERTIGHT INTEGRITY

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AUTHORITY: 43 U.S.C. 1333; 46 U.S.C. 2103, 3306, 3703; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

SOURCE: CGD 85-080, 61 FR 971, Jan. 10, 1996, unless otherwise noted.

### Subpart A—General Provisions

#### § 179.115 Applicability to existing vessels.

An existing vessel must comply with the subdivision, damage stability, and watertight integrity regulations which were applicable to the vessel on March 10, 1996, or, as an alternative, the vessel

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may comply with the regulations in this part.

**Subpart B—Subdivision and Damage Stability Requirements**

**§ 179.210 Collision bulkhead.**

(a) A vessel of more than 19.8 meters (65 feet) in length must have a collision bulkhead.

(b) A vessel of not more than 19.8 meters (65 feet) in length must have a collision bulkhead if it:

- (1) Carries more than 49 passengers;
- (2) Operates on exposed waters;
- (3) Is of more than 12.2 meters (40 feet) in length and operates on partially protected waters; or
- (4) Is constructed of wood on or after March 11, 2001, and operates in cold water.

(c) A double-ended ferry required to have a collision bulkhead must have a collision bulkhead at each end of the vessel.

**§ 179.212 Watertight bulkheads for subdivision.**

(a) A vessel of not more than 19.8 meters (65 feet) in length must comply with § 179.220 of this part if it:

- (1) Carries more than 49 passengers; or
- (2) Is constructed of wood on or after March 11, 2001, and operates in cold water.

As an alternative, the above vessels may comply with the intact stability requirements of §§ 170.170, 170.173, 171.050 and 171.055 of this chapter, and comply with the Type II subdivision requirements of §§ 171.070 through 171.073 in subchapter S of this chapter.

(b) A vessel of more than 19.8 meters (65 feet) in length must comply with the Type II subdivision requirements of §§ 171.070 through 171.073 in subchapter S of this chapter.

(c) A vessel that carries more than 12 passengers on an international voyage must meet the Type II subdivision requirements of §§ 171.070 through 171.073 in subchapter S of this chapter.

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**§ 179.220 Location of watertight bulkheads for subdivision.**

(a) The maximum distance between adjacent main transverse watertight bulkheads on a vessel, required by § 179.212(a) of this part to comply with this section, must not be more than the smaller of the following:

- (1) One third of the length of the bulkhead deck; or
- (2) The distance given by the following equation:

$$d = \frac{(F)(f)(L)}{D}$$

where:

d=the maximum length of the bulkhead deck in meters (feet) between adjacent main transverse watertight bulkheads;

F=the floodable length factor from Table 179.220(a);

f=the effective freeboard in meters (feet) calculated for each pair of adjacent bulkheads in accordance with paragraph (b) of this section;

L=Length Over Deck in meters (feet) measured over the bulkhead deck; and

D=the depth in meters (feet), measured amidships at a point one-quarter of the maximum beam out from the centerline, from the inside of the bottom planking or plating to the level of the top of the bulkhead deck at side as shown in Figure 179.220(a).

TABLE 179.220(a)—TABLE OF FLOODABLE LENGTH FACTORS

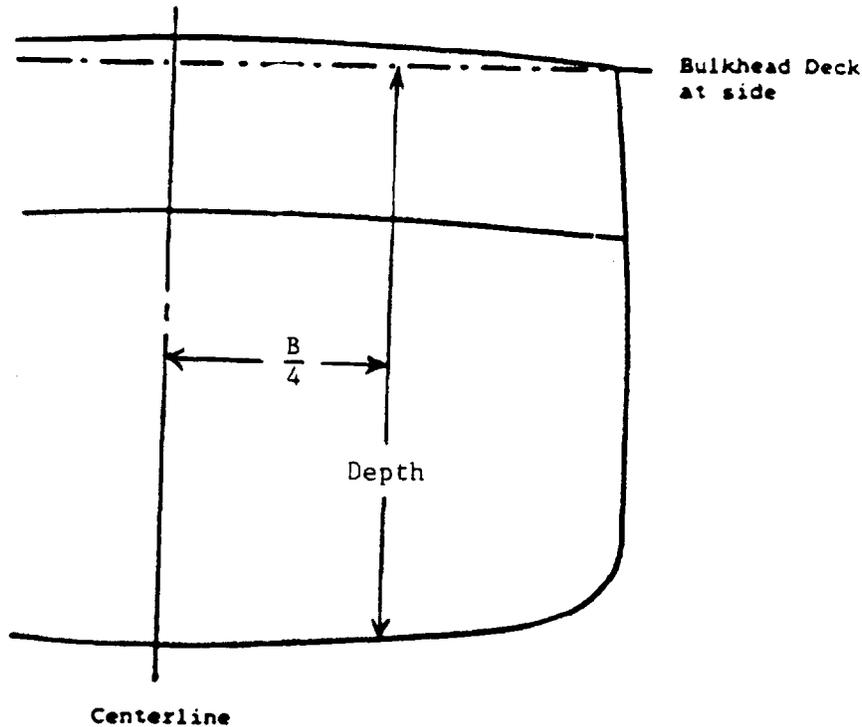
(d/L) × 100	F
0–15	0.33
20	0.34
25	0.36
30	0.38
35	0.43
40	0.48
45	0.54
50	0.61
55	0.63
60	0.58
65	0.53
70	0.48
75	0.44
80	0.40
85	0.37
90–100	0.34

NOTE 1: Where: d=distance in meters (feet) from the mid-point of the compartment to the forward-most point on the bulkhead deck excluding sheer; and L=length over deck in meters (feet) measured over the bulkhead deck.

NOTE 2: Intermediate values of floodable length factor may be obtained by interpolation.

Figure 179.220(a)

Transverse Location for Measuring Depth (D)



(b) The effective freeboard for each compartment is calculated by the following equation:

$$f = (a+b)/2$$

where:

f=the effective freeboard in meters (feet).

a=the freeboard in meters (feet) measured:

- (1) At the forward main transverse watertight bulkhead; and
- (2) From the deepest waterline to:

- (i) The top of the bulkhead deck on a flush deck vessel; or

- (ii) If a vessel has a stepped bulkhead deck, the line shown in Figure 179.220(b); or

- (iii) If a vessel has an opening port light below the bulkhead deck, the line shown in Figure 179.220(c).

b=the freeboard in meters (feet) measured:

- (1) At the aft main transverse watertight bulkhead; and
- (2) From the deepest waterline to:

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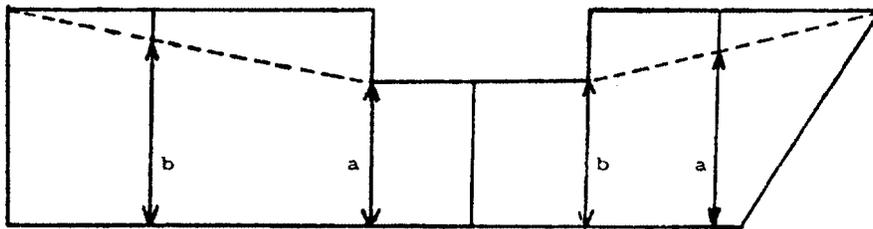
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(i) The top of the bulkhead deck on a flush deck vessel; or

(ii) If a vessel has a stepped bulkhead deck, the line shown in Figure 1 to § 179.220(b); or

Figure 1 to § 179.220(b)

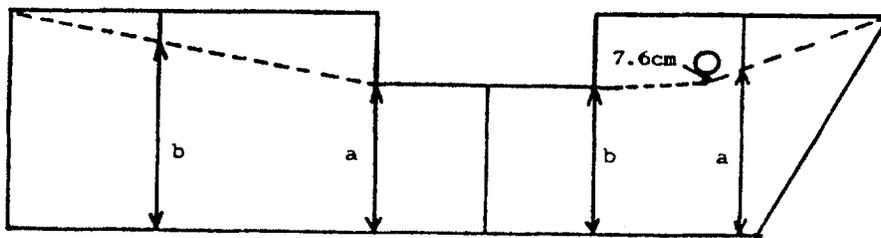
Freeboard Measurement -  
Vessel with Stepped Bulkhead Deck



(a and b shown for two sample compartments)

Figure 2 to § 179.220(b)

Freeboard Measurement -  
Vessel with Stepped Bulkhead Deck and  
a Port Light Below the Bulkhead Deck



(iii) if a vessel has an opening port light below the bulkhead deck, the line shown in Figure 2 to § 179.220(b).

[CGD 85-080, 61 FR 971, Jan. 10, 1996; 61 FR 20557, May 7, 1996]

**§ 179.230 Damage stability requirements.**

A vessel which, in accordance with § 179.212, must meet the requirements of §§ 171.070 through 171.073 in subchapter S of this chapter for Type II subdivision, shall also meet the damage stability requirements of § 171.080 in subchapter S of this chapter.

[CGD 85-080, 61 FR 971, Jan. 10, 1996, as amended at 62 FR 51357, Sept. 30, 1997]

**§ 179.240 Foam flotation material.**

(a) Foam may only be installed as flotation material on a vessel when approved by the cognizant OCMI.

(b) If foam is installed as flotation material on a vessel, the owner shall ensure that the following tests are conducted and requirements are met, to the satisfaction of the cognizant OCMI:

(1) All foam must comply with MIL-P-21929C. The fire resistance test is not required.

(2) Foam may be installed only in void spaces that are free of ignition sources, unless the foam complies with the requirements of 33 CFR 183.114;

(3) Foam may be installed adjacent to fuel tanks only if the boundary between the tank and the space has double continuous fillet welds;

(4) The structure enclosing the foam must be strong enough to accommodate the buoyancy of the foam;

(5) Piping and cables must not pass through foamed spaces unless they are within piping and cable ways accessible from both ends;

(6) Blocked foam must:

(i) Be used in each area that may be exposed to water; and

(ii) Have a protective cover, approved by the cognizant OCMI, to protect it from damage;

(7) A water submergence test must be conducted on the foam for a period of at least 7 days to demonstrate to the satisfaction of the cognizant OCMI that the foam has adequate strength to withstand a hydrostatic head equivalent to that which would be imposed if the vessel were submerged to its bulkhead deck;

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(8) The effective buoyancy of the foam must be determined at the end of the submergence test required by paragraph (b)(7) of this section. The effective buoyancy or 881 kilograms per cubic meter (55 pounds per cubic foot), whichever is less, must be used in determining the location of watertight bulkheads for subdivision required by § 179.212; and

(9) The owner or operator must obtain sample foam specimens during installation of the foam and determine the density of the installed foam.

[CGD 85-080, 61 FR 971, Jan. 10, 1996, as amended at 62 FR 51357, Sept. 30, 1997]

**Subpart C—Watertight Integrity Requirements**

**§ 179.310 Collision bulkheads.**

(a) Each collision bulkhead required by § 179.210, must be constructed in accordance with § 179.320, except that a collision bulkhead:

(1) Must extend to the weather deck or to one deck above the bulkhead deck, whichever is lower, for service on oceans or coastwise routes; and

(2) Must not be fitted with any type of penetration or opening except penetrations may be made if they are located as high and as far inboard as practicable and they have a means to make them watertight.

(b) The forward collision bulkhead required to be on a vessel by § 179.210 must be:

(1) Located at least 5 percent but not more than 15 percent of the length between perpendiculars (LBP) aft of the forward perpendicular, or for vessels with bulbous bows extending forward of the forward perpendicular and contributing more than 2 percent of the underwater volume of the vessel, located at least 5 percent but not more than 15 percent of the LBP aft of the mid-length of such extension; and

(2) Installed in a single plane, with no recess or step, up to the bulkhead deck;

(c) The after collision bulkhead on a double-ended ferry of more than 19.8 meters (65 feet) in length must be:

(1) At least 5 percent but not more than 15 percent of the LBP forward of the after perpendicular; and

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(2) Installed in a single plane, with no recess or step, at least up to the bulkhead deck.

**§ 179.320 Watertight bulkheads.**

(a) Each watertight bulkhead must be of sufficient strength to be capable of remaining watertight with a head of water to the top of the bulkhead.

(b) Each watertight bulkhead must extend to the bulkhead deck and be installed in one plane without steps or recesses insofar as is reasonable and practicable. Any steps or recesses permitted must comply with the applicable subdivision requirements in this subchapter.

(c) The number of penetrations in a watertight bulkhead must be minimized. A penetration in a watertight bulkhead must be as high and as far inboard in the bulkhead as practicable, and made watertight.

(d) Sluice valves are not permitted in watertight bulkheads.

**§ 179.330 Watertight doors.**

(a) Hinged watertight doors are not permitted in bulkheads required by §§ 179.210 or 179.212 unless the vessel will not proceed more than 20 nautical miles from shore and:

(1) The door separates a machinery space from an accommodation space and, in the judgment of the cognizant OCMI, the door will be kept closed except when a person is passing through the door; or

(2) The Commandant determines that, due to the arrangements of the vessel, the door will be kept closed except when a person is passing through the door.

(b) A hinged watertight bulkhead door must be fitted with a quick action closing device operable from both sides of the door and indicator lights at the operating station showing whether the door is open or closed.

(c) Sliding watertight doors must meet the requirements of part 170, subpart H in subchapter S of this chapter.

(d) No more than one watertight door may be fitted in a watertight bulkhead, and it must be located as high and as far inboard as practicable.

**§ 179.340 Trunks.**

Where a trunk (i.e., an enclosed passageway through a deck or bulkhead) is installed, it must comply with the requirements of §179.360(a)(1) and with the requirements of §171.113 in subchapter S of this chapter.

**§ 179.350 Openings in the side of a vessel below the bulkhead or weather deck.**

(a) On a vessel operating on exposed or partially protected waters, an opening port light is not permitted below the weather deck unless the sill of the port light is at least 760 millimeters (30 inches) above the deepest load waterline.

(b) A port light must have an inside, hinged dead cover regardless of whether the port light is or is not capable of being opened.

(c) Except for engine exhausts, each inlet or discharge pipe that penetrates the hull below a line drawn parallel to and at least 150 millimeters (6 inches) above the deepest load waterline must have means to prevent water from entering the vessel if the pipe fractures or otherwise fails.

(d) A positive action valve or cock that is located as close as possible to the hull is an acceptable means for complying with paragraph (c) of this section.

(e) If an inlet or discharge pipe is inaccessible, the means for complying with paragraph (c) of this section must be a shut-off valve that is:

(1) Operable from the weather deck or any other accessible location above the bulkhead deck; and

(2) Labeled at the operating point for identity and direction of closing.

(f) Any connecting device or valve in a hull penetration must not be cast iron.

(g) Each plug cock in an inlet or discharge pipe must have a means, other than a cotter pin, to prevent its loosening or removal from the body.

**§ 179.360 Watertight integrity.**

(a) A hatch exposed to the weather must be watertight, except that the following hatches may be weather-tight:

(1) A hatch on a watertight trunk that extends at least 305 millimeters (12 inches) above the weather deck;

(2) A hatch in a cabin top; and

(3) A hatch on a vessel that operates only on protected waters.

(b) A hatch cover must:

(1) Have securing devices; and

(2) Be attached to the hatch frame or coaming by hinges, captive chains, or other devices of substantial strength to prevent its loss.

(c) A hatch cover that provides access to accommodation spaces must be operable from either side.

(d) A weathertight door must be provided for each opening located in a deck house or companionway. Permanent watertight coamings must be provided as follows:

(1) On a vessel on an exposed or partially protected route, a watertight coaming with a height of at least 150 millimeters (6 inches) must be provided under each weathertight door in a cockpit or a well, or on the main deck of a flush deck vessel.

(2) On a vessel on a protected route, a watertight coaming with a height of at least 75 millimeters (3 inches) must be provided under each weathertight door in a cockpit or a well.

(3) The height of the watertight coaming for a hinged watertight door need only be sufficient to accommodate the door.

**PART 180—LIFESAVING EQUIPMENT AND ARRANGEMENTS****Subpart A—General Provisions**

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