§ 170.165 International Code on Intact Stability.

(a) Each vessel issued one or more of the certificates listed in paragraphs (a)(1) through (4) of this section, must comply with the Introduction and Part A of the International Code on Intact Stability, 2008 (2008 IS Code), unless permitted otherwise (incorporated by reference, see § 170.015).

(1) International Load Line Certificate.

(2) SOLAS Passenger Ship Safety Certificate.

(3) SOLAS Cargo Ship Safety Construction Certificate.

(4) High-speed Craft Safety Certificate.

(b) A vessel not subject to the requirements of paragraph (a) of this section is permitted to comply with the applicable criteria contained in the 2008 IS Code as an alternative to the requirements of §§ 170.170 and 170.173 of this part.

[USCG–2007–0030, 75 FR 78084, Dec. 14, 2010]

§ 170.170 Weather criteria.

(a) Each vessel must be shown by design calculations to have a metacentric height (GM) that is equal to or greater than the following in each condition of loading and operation:

$$GM \geq \frac{PAH}{W \tan(T)}$$

Where—

P=.005+(L/14,200)^2 tons/ft^2 . . . for ocean service, Great Lakes winter service, or service on exposed waters.

P=.055+(L/1309)^2 metric tons/m^2 . . . for ocean service, Great Lakes winter service, or service on exposed waters.

P=.0033+(L/14,200)^2 tons/ft^2 . . . for Great Lakes summer service or service on partially protected waters.

P=.036+(L/1309)^2 metric tons/m^2 . . . for Great lakes summer service or service on partially protected waters.

P=.0025+(L/14,200)^2 tons/ft^2 . . . for service on protected waters.

P=.028+(L/1309)^2 metric tons/m^2 . . . for service on protected waters.

L=LBP in feet (meters).

A=projected lateral area in square feet (square meters) of the portion of the vessel and deck cargo above the waterline.

H=the vertical distance in feet (meters) from the center of A to the center of the under-water lateral area or approximately to the one-half draft point.

W=displacement in long (metric) tons.

T=either:

(1) the lesser of either 14 degrees heel or the angle of heel in degrees at which one-half the freeboard to the deck edge is immersed; or

(2) for a sailing vessel, T = the lesser of either 14 degrees or the angle of heel in degrees to the deck edge.

The deck edge is to be taken as the intersection of the sideshell and the uppermost continuous deck below which the sideshell is weathertight.

(b) If approved by the Coast Guard Marine Safety Center or the ABS, a larger value of T may be used for a vessel with a discontinuous weather deck or abnormal sheer.

(c) When doing the calculations required by paragraph (a) of this section for a sailing vessel or auxiliary sailing vessel, the vessel must be assumed—

(1) To be under bare poles; or

(2) If the vessel has no auxiliary propulsion, to have storm sails set and trimmed flat.

(d) The criterion specified in this section is generally limited in application to the conditions of loading and operation of flush deck, mechanically powered vessels of ordinary proportions and form for which the righting arm (GZ) at the angle (T), calculated after the vessel is permitted to trim free until the trimming moment is zero, is not less than the minimum metacentric height (GM) calculated in paragraph (a) of this section multiplied by sin(T). On other types of vessels, the Coast Guard Marine Safety Center requires calculations in addition to those in paragraph (a) of this section. On a mechanically powered vessel under 328 feet (100 meters) in length, other than a tugboat or a towboat, the requirements in § 170.173 are applied.

[CGD 79–023, 48 FR 51010, Nov. 4, 1983; 49 FR 37384, Sept. 24, 1984, as amended by CGD 88–070, 53 FR 34537, Sept. 7, 1988; CGD 85–080, 61 FR 944, Jan. 10, 1996; 61 FR 20556, May 7, 1996; CGD 95–028, 62 FR 51217, Sept. 30, 1997; USCG–2007–0030, 75 FR 78084, Dec. 14, 2010]

§ 170.173 Criterion for vessels of unusual proportion and form.

(a) If required by the Coast Guard Marine Safety Center, each mechanically powered vessel less than 328 feet (100 meters) LLL, other than a tugboat

or towboat, must be shown by design calculations to comply with—

(1) Paragraph (b) or (c) of this section if the maximum righting arm occurs at an angle of heel less than or equal to 30 degrees; or

(2) Paragraph (b) of this section if the maximum righting arm occurs at an angle of heel greater than 30 degrees.

(b) Each vessel must have—

(1) An initial metacentric height (GM) of at least 0.49 feet (0.15 meters);

(2) A righting arm (GZ) of at least 0.66 feet (0.20 meters) at an angle of heel equal to or greater than 30 degrees;

(3) A maximum righting arm that occurs at an angle of heel not less than 25 degrees;

(4) An area under each righting arm curve of at least 10.3 foot-degrees (3.15 meter-degrees) up to an angle of heel of 30 degrees;

(5) An area under each righting arm curve of at least 16.9 foot-degrees (5.15 meter-degrees) up to an angle of heel of 40 degrees or the downflooding angle, whichever is less; and

(6) An area under each righting arm curve between the angles of 30 degrees and 40 degrees, or between 30 degrees and the downflooding angle if this angle is less than 40 degrees, of not less than 5.6 foot-degrees (1.72 meter-degrees).

(c) Each vessel must have—

(1) An initial metacentric height (GM) of at least 0.49 feet (0.15 meters);

(2) A maximum righting arm that occurs at an angle of heel not less than 15 degrees;

(3) An area under each righting arm curve of at least 16.9 foot-degrees (5.15 meter-degrees) up to an angle of heel of 40 degrees or the downflooding angle, whichever is less;

(4) An area under each righting arm curve between the angles of 30 degrees and 40 degrees, or between 30 degrees and the downflooding angle if this angle is less than 40 degrees, of not less than 5.6 foot-degrees (1.72 meter-degrees); and

(5) An area under each righting arm curve up to the angle of maximum righting arm of not less than the area determined by the following equation:

$$A = 10.3 + 0.187 (30 - Y) \text{ foot-degrees}$$

$$A = 3.15 + 0.057 (30 - Y) \text{ meter-degrees}$$

where—

A=area in foot-degrees (meter-degrees).
Y=angle of maximum righting arm, degrees.

(d) For the purpose of demonstrating compliance with paragraphs (b) and (c) of this section, at each angle of heel a vessel's righting arm is calculated after the vessel is permitted to trim free until the trimming moment is zero.

(e) For the purpose of demonstrating acceptable stability on the vessels described in §170.170(d) as having unusual proportion and form, compliance with paragraphs (a) through (d) of this section or the following criteria is required:

(1) For partially protected routes, there must be—

(i) Positive righting arms to at least 35 degrees of heel;

(ii) No down flooding point to at least 20 degrees; and

(iii) At least 15 foot-degrees of energy to the smallest of the following angles:

(A) Angle of maximum righting arm.

(B) Angle of down flooding.

(C) 40 degrees.

(2) For protected routes, there must be—

(i) Positive righting arms to at least 25 degrees of heel;

(ii) No down flooding point to at least 15 degrees; and

(iii) At least 10 foot-degrees of energy to the smallest of the following angles:

(A) Angle of maximum righting arm.

(B) Angle of down flooding.

(C) 40 degrees.

[CGD 79–023, 48 FR 51010, Nov. 4, 1983, as amended by CGD 85–080, 61 FR 944, Jan. 10, 1996; CGD 95–028, 62 FR 51218, Sept. 30, 1997; 62 FR 51353, Sept. 30, 1997; USCG–2007–0030, 75 FR 78084, Dec. 14, 2010]

Subpart F—Determination of Lightweight Displacement and Centers of Gravity

§ 170.174 Specific applicability.

This subpart applies to each vessel for which the lightweight displacement and centers of gravity must be determined in order to do the calculations required in this subchapter.