§ 157.600 Purpose and applicability.

(a) The purpose of this subpart is to establish mandatory safety and operational requirements to reduce environmental damage resulting from the discharge of other non-petroleum oil.

(b) This subpart applies to each tank vessel specified in § 157.01 of this part that—

(1) Is 5,000 gross tons or more;

(2) Carries other non-petroleum oil in bulk as cargo or cargo residue; and

(3) Is not equipped with a double hull meeting § 157.10d of this part, or an equivalent to the requirements of § 157.10d, but required to be equipped with a double hull at a date set forth in 46 U.S.C. 3703a (b)(3) and (c)(3).

§ 157.610 Operational measures.

An owner or operator of a tank vessel that carries other non-petroleum oil in bulk as cargo or cargo residue shall comply with the requirements in all sections of subpart G of this part.

APPENDIX A TO PART 157—DAMAGE ASSUMPTIONS, HYPOTHETICAL OUTFLOWS, AND CARGO TANK SIZE AND ARRANGEMENTS

1. *Source.* The procedures for the damage assumption calculations contained in this Appendix conform to Regulations 24, 25, and 26 of Annex I of the International Convention for the Prevention of the Pollution from Ships, 1973, done at London, November 2, 1973.

2. *Assumptions.* For the purpose of calculating hypothetical outflow from tank vessels, three dimensions of the extent of damage of a parallelepiped on the side and bottom of the vessel are assumed.

(a) For side damage, the conditions are as follows:

Damage	Conditions
(1) Longitudinal extent l_c	$\frac{1}{3}\ L^{2/3}$ or 14.5 m, whichever is less.
(2) Transverse extent (t_c) (inboard from the vessel's side at right angles to the centerline at the level corresponding to the assigned summer freeboard).	B —or 11.5 m, whichever is 5 less.
(3) Vertical extent (v_c)	From the base line upwards without limit.

(b) For bottom damage, two conditions to be applied individually to the stated portions of the vessel, as follows:

Damage	Conditions	
	For 0.3L from the forward perpendicular of ship	Any other part of ship
(1) Longitudinal extent (l_s)	L/10	L/10 or 5 meters, whichever is less.
(2) Transverse extent (t_s)	B/6 or 10 meters, whichever is less but not less than 5 meters.	5 meters.
(3) Vertical extent from the base line (v_s).	B/15 or 6 meters, whichever is less	B/15 or 6 meters, whichever is less.

3. *Hypothetical Outflow of Oil.* (a) The hypothetical outflow of oil in the case of side damage (O_c) and bottom damage (O_s) is calculated by the following formula with respect to compartments breached by damage to all conceivable locations along the length of the vessel to the extent as defined in section 2 of this Appendix.

(1) For side damages: Formula

$$O_c = \Sigma\, W_i + \Sigma\, K_i C_i$$

(2) For bottom damage: Formula II

$$O_s = \tfrac{1}{3}(\Sigma\, Z_i W_i + \Sigma\, Z_i C_i)$$

Where:

W_i=Volume of a wing tank assumed to be breached by the damage as specified in section 2 of this Appendix; W_i for a segregated ballast tank may be taken equal to zero;

C_i=Volume of a center tank assumed to be breached by the damage as specified in section 2 of this Appendix; C_i for a segregated ballast tank may be taken equal to zero;

$$K_i = 1 - \frac{b_i}{t_c}$$

when b_i is equal to or greater than t_c, K_i is equal to zero;

$$Z_i = 1 - \frac{h_i}{v_s}$$

when h_i is equal to or greater than v_s, Z_i is equal to zero;

b_i=Minimum width of wing tank under consideration measured inboard from the vessel's side at right angles to the centerline at the level corresponding to the assigned summer freeboard; and

h_i=Minimum depth of the double bottom under consideration; where no double bottom is fitted, h_i is equal to zero.

(b) If a void space or segregated ballast tank of a length less than l_c is located between wing oil tanks, O_c in formula I of this section may be calculated on the basis of volume W_i being the actual volume of one such tank (where they are of equal capacity) or the smaller of the two tanks (if they differ in capacity), adjacent to such space, multiplied by S_i as defined below and taking for all other wing tanks involved in such a collision the value of the actual full volume.

$$S_i = 1 - \frac{l_i}{l_c}$$

Where l_i=length of void space or segregated ballast tank under consideration.

(c) Credit is only given in respect to double bottom tanks which are either empty or carrying clean water when cargo is carried in the tanks above.

(1) If the double bottom does not extend for the full length and width of the tank involved, the double bottom is considered nonexistent and the volume of the tanks above the area of the bottom damage must be included in formula II of this section even if the tank is not considered breached because of the installation of such a partial double bottom.

(2) Suction wells may be neglected in the determination of the value h_i if such wells are not excessive in area and extend below the tank for a minimum distance and in no case more than half the height of the double bottom. If the depth of such a well exceeds half the height of the double bottom, h_i is taken equal to the double bottom height minus the well height.

(d) In the case where bottom damage simultaneously involves four center tanks, the value of O_s may be calculated according to formula III as follows:

$O_s = \frac{1}{4}(\Sigma Z_i W_i + \Sigma Z_i C_i)$

(e) Credit for reduced oil outflow from bottom damage may be applied to formula III for an installed emergency high suction cargo transfer system that:

(1) transfers within two hours oil equal to one half of the volume of the largest tank involved;

(2) has sufficient ballast or cargo tankage available to receive the transferred oil; and

(3) has the high suction piping installed at a height not less than the vertical extent of bottom damage (v_s).

4. *Allowable volumes of cargo tanks.*

(a) The allowable volume of a wing cargo tank (VOL_w) is equal to seventy-five percent of O_A. In a segregated ballast tank vessel VOL_w may equal O_A for a wing cargo oil tank located between two segregated ballast tanks each of length greater than l_c and width greater than t_c.

(b) The allowable volume of a center cargo tank (VOL_c) is 50,000 cubic meters.

5. *Allowable length of cargo tanks.*

The length of each cargo tank (*1* a) must not exceed 10 meters or the distance calculated from (a), (b), or (c), as appropriate, whichever is greater:

(a) Where no longitudinal bulkhead is provided inside the cargo tanks: *1* a=[0.5(bi/B)+0.1] L, but not to exceed 0.2L.

(b) Where a centerline longitudinal bulkhead is provided inside the cargo tanks: *1* a=[0.25(bi/B)+0.15] L, but not to exceed 0.2L.

(c) Where two or more longitudinal bulkheads are provided inside the cargo tanks:

(1) For wing cargo tanks: *1* a = 0.2L.

(2) For center cargo tanks:

(i) If (bi/B) is equal to or greater than 0.2, *1* a = 0.2L.

(ii) If (bi/B) is less than 0.2:

(A) Where no centerline longitudinal bulkhead is provided, *1* a = [0.5(bi/B) + 0.1] L.

(B) Where a centerline longitudinal bulkhead is provided, *1* a = [0.25(bi/B) + 0.15] L.

(d) ''bi'' is the minimum distance from the ship's side to the outer longitudinal bulkhead of the tank in question, measured inboard at right angles to the centerline at the level corresponding to the assigned summer freeboard.

[CGD 74–32, 40 FR 48283, Oct. 14, 1975, as amended by CGD 74–32, 40 FR 49328, Oct. 22, 1975; CGD 90–051, 57 FR 36245, Aug. 12, 1992; USCG–2008–0179, 73 FR 35015, June 19, 2008]

APPENDIX B TO PART 157—SUBDIVISION AND STABILITY ASSUMPTIONS

1. *Source.* The procedures for the loading assumption calculations contained in this Appendix conform to Regulation 28 of Annex I of the International Convention for the Prevention of the Pollution from Ships, 1973, done at London, November 2, 1973.

2. *Loading Assumptions.* For the purpose of calculating subdivision and damage stability for a tank vessel, the operating drafts must reflect actual partial or full load conditions consistent with trim and strength of the vessel. Ballast conditions need not be considered if the tank vessel is not carrying oil in cargo tanks excluding oily residues. Loading condition must reflect the specific gravities of the cargo.

3. *Damage Assumptions.*

(a) Damage is applied to all conceivable locations along the length of the vessel as follows:

(1) For a vessel of more than 225 meters in length, anywhere in the vessel's length.

(2) For a vessel of more than 150 meters, but not exceeding 225 meters in length, anywhere in the vessel's length except where the after or forward bulkhead bounding a machinery space located aft is involved in the