

TABLE 172.065(a)—EXTENT OF DAMAGE—  
Continued

Vertical extent ..... From the baseline upward with-  
out limit.

GROUNDING PENETRATION AT THE FORWARD END BUT EXCLUD-  
ING ANY DAMAGE AFT OF A POINT 0.3L AFT OF THE FORWARD  
PERPENDICULAR

Longitudinal extent .....  $0.495L^{2/3}$  or 47.6 feet ( $(1/3)L^{2/3}$   
or 14.5m) whichever is shorter.  
Transverse extent .....  $B/6$  or 32.81 feet (10m) which-  
ever is shorter but not less  
than 16.41 feet (5m).  
Vertical extent from the .....  $B/15$  or 19.7 feet (6m) whichever  
baseline. is shorter.

GROUNDING PENETRATION AT ANY OTHER LONGITUDINAL  
POSITION

Longitudinal extent .....  $L/10$  or 16.41 feet (5m) which-  
ever is shorter.  
Transverse extent ..... 16.41 feet (5m).  
Vertical extent from the .....  $B/15$  or 19.7 feet (6m) whichever  
baseline. is shorter.

GROUNDING PENETRATION FOR RAKING DAMAGE

For tank vessels of  
20,000 DWT and  
above, the following as-  
sumed bottom raking  
damage must supple-  
ment the damage as-  
sumptions:

Longitudinal extent ..... For vessels of 75,000 DWT and  
above, 0.6L measured from the  
forward perpendicular.  
..... For vessels of less than 75,000  
DWT, 0.4L measured from the  
forward perpendicular.  
Transverse extent .....  $B/3$  anywhere in the bottom.  
Vertical extent ..... Breach of the outer hull.

<sup>1</sup> Damage applied inboard from the vessel's side at right an-  
gles to the centerline at the level of the summer load line as-  
signed under Subchapter E of this chapter.

TABLE 172.065(b)—PERMEABILITY

Spaces and tanks	Permeability (percent)
Storeroom spaces .....	60.
Accommodation spaces .....	95.
Voids .....	95.
Consumable liquid tanks .....	95 or 0. <sup>1</sup>
Other liquid tanks .....	95 or 0. <sup>2</sup>

<sup>1</sup> Whichever results in the more disabling condition.

<sup>2</sup> If tanks are partially filled, the permeability must be deter-  
mined from the actual density and amount of liquid carried.

[CGD 79-023, 48 FR 51040, Nov. 4, 1983, as  
amended by USCG-2000-7641, 66 FR 55574,  
Nov. 2, 2001]

**§ 172.070 Intact stability.**

All tank vessels of 5,000 DWT and  
above contracted after the effective  
date of this rulemaking must comply  
with the intact stability requirements  
of Regulation 25A, annex I of MARPOL  
73/78.

[USCG-2000-7641, 66 FR 55575, Nov. 2, 2001]

**Subpart E—Special Rules Per-  
taining to a Barge That Carries  
a Hazardous Liquid Regulated  
Under Subchapter O of This  
Chapter**

**§ 172.080 Specific applicability.**

This subpart applies to each tank  
barge that carries a cargo listed in  
Table 151.01-10(b) of this chapter.

**§ 172.085 Hull type.**

If a cargo listed in Table 151.05 of  
part 151 of this chapter is to be carried,  
the tank barge must be at least the  
hull type specified in Table 151.05 of  
this chapter for that cargo.

**§ 172.087 Cargo loading assumptions.**

(a) The calculations required in this  
subpart must be done for cargo weights  
and densities up to and including the  
maximum that is to be endorsed on the  
Certificate of Inspection in accordance  
with § 151.04-1(c) of this chapter.

(b) For each condition of loading and  
operation, each cargo tank must be as-  
sumed to have its maximum free sur-  
face.

**§ 172.090 Intact transverse stability.**

(a) Except as provided in paragraph  
(b) of this section, each tank barge  
must be shown by design calculations  
to have a righting arm curve with the  
following characteristics:

(1) If the tank barge is in river serv-  
ice, the area under the righting arm  
curve must be at least 5 foot-degrees  
(1.52 meter-degrees) up to the smallest  
of the following angles:

(i) The angle of maximum righting  
arm.

(ii) The downflooding angle.

(2) If the tank barge is in lakes, bays  
and sounds or Great Lakes summer  
service, the area under the righting  
arm curve must be at least 10 foot-de-  
grees (3.05 meter-degrees) up to the  
smallest of the following angles:

(i) The angle of maximum righting  
arm.

(ii) The downflooding angle.

(3) If the tank barge is in ocean or  
Great Lakes winter service, the area  
under the righting arm curve must be

**§ 172.095**

at least 15 foot-degrees (4.57 meter-degrees) up to the smallest of the following angles:

- (i) The angle of maximum righting arm.
- (ii) The downflooding angle.
- (b) If the vertical center of gravity of the cargo is below the weather deck at the side of the tank barge amidships, it must be shown by design calculations that the barge has at least the following metacentric height (GM) in feet (meters) in each condition of loading and operation:

$$GM = \frac{(K)(B)}{fe}$$

where—

- K=0.3 for river service.
- K=0.4 for lakes, bays and sounds and Great Lakes summer service.
- K=0.5 for ocean and Great Lakes winter service.
- B=beam in feet (meters).
- fe=effective freeboard in feet (meters).

(c) The effective freeboard is given by—

- fe=f + fa ; or
- fe=d, whichever is less.

where—

- f=the freeboard to the deck edge amidships in feet (meters).
- fa=(1.25)(a/L)((2b/B)-1)(h); or
- fa=h, whichever is less.

where—

- a=trunk length in feet (meters).
- L=LOA in feet (meters)
- b=breadth of a watertight trunk in feet (meters).
- B=beam of the barge in feet (meters).
- h=height of a watertight trunk in feet (meters).
- d=draft of the barge in feet (meters).

(d) For the purpose of this section, downflooding angle means the static angle from the intersection of the vessel's centerline and waterline in calm water to the first opening that does not close watertight automatically.

**§ 172.095 Intact longitudinal stability.**

Each tank barge must be shown by design calculations to have a longitudinal metacentric height (GM) in feet (meters) in each condition of loading and operation, at least equal to the following:

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$$GM = \frac{0.02(L)^2}{d}$$

where—

- L=LOA in feet (meters)
- d=draft in feet (meters).

**§ 172.100 Watertight integrity.**

(a) Except as provided in paragraph (b) of this section, each Type I or II hopper barge hull must have a weather-tight weather deck.

(b) If a Type I or II barge hull has an open hopper, the fully loaded barge must be shown by design calculations to have at least 2 inches (50 mm) of positive GM when the hopper space is flooded to the height of the weather deck.

(c) When doing the calculations required by this section, credit may be given for the buoyancy of the immersed portion of cargo tanks if the tank securing devices are shown by design calculations to be strong enough to hold the tanks in place when they are subjected to the buoyant forces resulting from the water in the hopper.

**§ 172.103 Damage stability.**

Each tank barge must be shown by design calculations to meet the survival conditions in §172.110 assuming the damage specified in §172.104 to the hull type specified in Table 151.05 of part 151 of this chapter.

**§ 172.104 Character of damage.**

(a) *Type I barge hull not in an integrated tow.* If a Type I hull is required and the barge is not a box barge designed for use in an integrated tow, design calculations must show that the barge can survive damage at any location including the intersection of a transverse and a longitudinal bulkhead.

(b) *Type I barge hull in an integrated tow.* If a Type I barge hull is required and the barge is a box barge designed for operation in an integrated tow, design calculations must show that the barge can survive damage—

- (1) At any location on the bottom of the tank barge except on a transverse watertight bulkhead; and