

**§ 38.15-1**

automatic float, gage, or other alternate means acceptable to the Commandant may be used.

(f) A gaging device shall be designed for a pressure at least equal to the maximum allowable pressure of the tank on which it is installed.

(g) Gage glasses of the columnar type are prohibited.

(h) Flat sight glasses may be used in the design of automatic float continuous reading tape gages: *Provided*, That such glasses shall be made of high strength material suitable for the operating temperatures of not less than one-half inch in thickness and adequately protected by a metal cover.

**Subpart 38.15—Special Requirements**

**§ 38.15-1 Filling of tanks—TB/ALL.**

(a) Refrigerated and semirefrigerated tanks shall be filled so that there is an outage of at least 2 percent of the volume of the tank at the temperature corresponding to the vapor pressure of the cargo at the safety relief valve setting. A reduction in the required outage may be permitted by the Commandant when warranted by special design considerations. Normally then, the maximum volume to which a tank may be loaded is:

$$V_L = 0.98 d_r V / d_L$$

where:

$V_L$  = maximum volume to which tank may be loaded.

$V$  = volume of tank.

$d_r$  = density of cargo at the temperature required for a cargo vapor pressure equal to the relief valve setting.

$d_L$  = density of cargo at the loading temperature and pressure.

(b) Nonrefrigerated tanks shall be filled so that their filling densities shall not exceed the ratios indicated in Table 38.15-1(b).

(c) The "filling density" is defined as the percent ratio of the weight of the gas in a tank to the weight of water the tank will hold at 60° F.

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**TABLE 38.15-1(b)—MAXIMUM PERMISSIBLE FILLING DENSITIES FOR TANKS OPERATING AT OR NEAR AMBIENT TEMPERATURE**

Specific gravity at 60 °F.	Maximum permitted filling density		
	Unlagged tanks—water capacity		Lagged tanks— all capacities
	1,200 gal. and under	Over 1,200 gal.	
0.473-0.480 .....	38	41	42
0.481-0.488 .....	39	42	43
0.489-0.495 .....	40	43	44
0.496-0.503 .....	41	44	45
0.504-0.510 .....	42	45	46
0.511-0.519 .....	43	46	47
0.520-0.527 .....	44	47	48
0.528-0.536 .....	45	48	49
0.537-0.544 .....	46	49	50
0.545-0.552 .....	47	50	51
0.553-0.560 .....	48	51	52
0.561-0.568 .....	49	52	53
0.569-0.576 .....	50	53	54
0.577-0.584 .....	51	54	55
0.585-0.592 .....	52	55	56
0.593-0.600 .....	53	56	57
0.601-0.608 .....	54	57	58
0.609-0.617 .....	55	58	59
0.618-0.626 .....	56	59	60
0.627-0.634 .....	57	60	61

NOTE: Increase in filling densities to provide for seasonal changes may be considered by the Commandant upon presentation of factual evidence that safe operation can be effected.

**§ 38.15-5 Cargo hose—TB/ALL.**

(a) When the liquid and vapor line hoses used for loading and discharging the cargo are carried on board the vessel, they shall be of flexible metal and fabricated of seamless steel pipe and flexible joints of steel or bronze, or of other suitable material resistant to the action of the cargo. Hose used in refrigerated systems shall be suitable for the minimum temperature to which it may be subjected and shall be acceptable to the Commandant.

(b) Hose subject to tank pressure, or the discharge pressure of pumps or vapor compressors, shall be designed for a bursting pressure of not less than five times the maximum safety relief valve setting of the tank, pump, or compressor.

(c) Before being placed in service each new cargo hose, with all necessary fittings attached, shall be hydrostatically tested by its manufacturer to a pressure not less than twice its maximum working pressure nor more than two-fifth its bursting pressure. The hose shall be marked with its maximum working pressure, and if used in