

§ 54.10-10

46 CFR Ch. I (10-1-22 Edition)

[USCG-2003-16630, 73 FR 65167, Oct. 31, 2008]

§ 54.10-10 Standard hydrostatic test (modifies UG-99).

(a) All pressure vessels shall satisfactorily pass the hydrostatic test prescribed by this section, except those pressure vessels noted under § 54.10-15(a).

(b) The hydrostatic-test pressure must be at least one and three-tenths (1.30) times the maximum allowable working pressure stamped on the pressure vessel, multiplied by the ratio of the stress value “S” at the test temperature to the stress value “S” at the design temperature for the materials of which the pressure vessel is constructed. The values for “S” shall be taken from tables UCS 23, UNF 23, UHA 23, or UHT 23 of section VIII of the ASME Boiler and Pressure Vessel Code (incorporated by reference, see 46 CFR 54.01-1). The value of “S” at test temperature shall be that taken for the material of the tabulated value of temperature closest to the test temperature. The value of “S” at design temperature shall be as interpolated from the appropriate table. No ratio less than one shall be used. The stress resulting from the hydrostatic test shall not exceed 90 percent of the yield stress of the material at the test temperature. External loadings which will exist in supporting structure during the hydrostatic test should be considered. The design shall consider the combined stress during hydrostatic testing due to pressure and the support reactions. This stress shall not exceed 90 percent of the yield stress of the material at the test temperature. In addition the adequacy of the supporting structure during hydrostatic testing should be considered in the design.

(c) The hydrostatic test pressure shall be applied for a sufficient period of time to permit a thorough examination of all joints and connections. The test shall not be conducted until the vessel and liquid are at approximately the same temperature.

(d) Defects detected during the hydrostatic test or subsequent examination shall be completely removed and then inspected. Provided the marine inspector gives his approval, they may then be repaired.

(e) Vessels requiring stress relieving shall be stress relieved after any welding repairs have been made. (See UW-40 of section VIII of the ASME Boiler and Pressure Vessel Code.)

(f) After repairs have been made the vessel shall again be tested in the regular way, and if it passes the test, the marine inspector may accept it. If it does not pass the test, the marine inspector can order supplementary repairs, or, if in his judgment the vessel is not suitable for service, he may permanently reject it.

[CGFR 68-82, 33 FR 18828, Dec. 18, 1968, as amended by USCG-2003-16630, 73 FR 65170, Oct. 31, 2008]

§ 54.10-15 Pneumatic test (modifies UG-100).

(a) Pneumatic testing of welded pressure vessels shall be permitted only for those units which are so designed and/or supported that they cannot be safely filled with water, or for those units which cannot be dried and are to be used in a service where traces of the testing medium cannot be tolerated.

(b) Proposals to pneumatically test shall be submitted to the cognizant Officer in Charge, Marine Inspection, for approval.

(c) Except for enameled vessels, for which the pneumatic test pressure shall be at least equal to, but need not exceed, the maximum allowable working pressure to be marked on the vessel, the pneumatic test pressure shall be at least equal to one and one-tenth (1.10) times the maximum allowable working pressure to be stamped on the vessel multiplied by the lowest ratio (for the materials of which the vessel is constructed) of the stress value “S” for the test temperature of the vessel to the stress value “S” for the design temperature (see UG-21 of section VIII of the ASME Boiler and Pressure Vessel Code (incorporated by reference; see 46 CFR 54.01-1)). In no case shall the pneumatic test pressure exceed one and one-tenth (1.10) times the basis for calculated test pressure as defined in UA-60(e) of section VIII of the ASME Boiler and Pressure Vessel Code.

(d) The pneumatic test of pressure vessels shall be accomplished as follows: