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used shall be submitted to the Commandant for approval.

(4) *Liquid penetrant.* Where liquid penetrant examination is required, the entire surface of the weld being examined shall be covered. The examination shall be performed in accordance with appendix VIII to section VIII of the ASME Boiler and Pressure Vessel Code. The following standards of acceptance shall be met:

(i) All linear discontinuities and aligned penetrant indications revealed by the test shall be removed. Aligned penetrant indications are those in which the average of the center-to-center distances between any one indication and the two adjacent indications in any straight line is less than three-sixteenths inch. All other discontinuities revealed on the surface need not be removed unless the discontinuities are also revealed by radiography, in which case the pertinent radiographic specification shall apply.

(5) *Magnetic particle.* Where magnetic particle testing is required, the entire surface of the weld being examined shall be covered. The testing shall be performed in accordance with appendix VI to section VIII of the ASME Boiler and Pressure Vessel Code. The following standards of acceptance are required for welds. All linear discontinuities and aligned indications revealed by the test shall be removed. Aligned indications are those in which the average of the center-to-center distances between any one indication and the two adjacent indications in any straight line is less than three-sixteenths inch. All other revealed discontinuities need not be removed unless the discontinuities are also revealed by radiography, in which case the requirements of paragraph (c)(1) of this section shall be met.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by CGD 72–206R, 38 FR 17229, June 29, 1973; CGD 78–108, 43 FR 46546, Oct. 10, 1978; CGD 77–140, 54 FR 40615, Oct. 2, 1989; CGD 95–028, 62 FR 51202, Sept. 30, 1997; USCG–2000–7790, 65 FR 58460, Sept. 29, 2000; USCG–2003–16630, 65185, Oct. 31, 2008]

Subpart 56.97—Pressure Tests

§ 56.97–1 General (replaces 137).

(a) *Scope.* The requirements in this subpart apply to pressure tests of piping in lieu of 137 of ASME B31.1 (incorporated by reference; see 46 CFR 56.01–2). Those paragraphs reproduced are so noted.

(b) *Leak tightness.* It is mandatory that the design, fabrication and erection of piping constructed under the regulations in this subchapter demonstrate leak tightness. Except where otherwise permitted in this subpart, this requirement must be met by a hydrostatic leak test prior to initial operations. Where a hydrostatic test is not practicable, a pneumatic test (§ 56.97–35) or initial service leak test (§ 56.97–38) may be substituted if approved by the Commandant.

(1) At no time during the hydrostatic test may any part of the piping system be subjected to a stress greater than 90 percent of its yield strength (0.2 percent offset) at test temperature.

(2) Pneumatic tests may be used in lieu of the required hydrostatic test (except as permitted in paragraph (b)(3) of this section), only when—

(i) Piping subassemblies or systems are so designed or supported that they cannot be safely filled with water;[1] or

(ii) Piping subassemblies or systems are to be used in services where traces of the testing medium cannot be tolerated and, whenever possible, the piping subassemblies or system have been previously hydrostatically tested to the pressure required in § 56.97–30(e).

(3) A pneumatic test at a pressure not to exceed 25 psig may be applied before a hydrostatic or a pneumatic test as a means of locating major leaks. The preliminary pneumatic test must be carried out in accordance with the requirements of § 56.97–35.

NOTE: Compressed gas is hazardous when used as a testing medium. It is, therefore, recommended that special precautions for protection of personnel be taken whenever gas under pressure is used as the test medium.

[1] These tests may be made with the item being tested partially filled with water, if desired.

(4) The hydrostatic test of the piping system, when conducted in accordance with the requirements of this part, is acceptable as the test for piping subassemblies and may also be used in lieu of any such test required by the material specification for material used in the piping subassembly or system provided the minimum test pressure required for the piping system is met, except where the installation would prevent performing any nondestructive examination required by the material specification to be performed subsequent to the hydrostatic or pneumatic test.

[CGD 73–254, 40 FR 40167, Sept. 2, 1975, as amended by USCG–2003–16630, 73 FR 65185, Oct. 31, 2008]

§ 56.97–5 Pressure testing of nonstandard piping system components.

(a) All nonstandard piping system components such as welded valves and fittings, nonstandard fittings, manifolds, seacocks, and other appurtenances must be hydrostatically tested to twice the rated pressure stamped thereon, except that no component should be tested at a pressure causing stresses in excess of 90 percent of its yield strength.

(b) Items for which an accepted standard appears in Table 56.60–1(b) need not be tested as described in paragraph (a) of this section, but need only meet the test required in the applicable standard.

[CGFR 68–82, 33 FR 18843, Dec. 18, 1968, as amended by CGD 77–140, 54 FR 40615, Oct. 2, 1989]

§ 56.97–25 Preparation for testing (reproduces 137.2).

(a) *Exposure of joints.* All joints including welds must be left uninsulated and exposed for examination during the test.

(b) *Addition of temporary supports.* Piping systems designed for vapor or gas may be provided with additional temporary supports, if necessary, to support the weight of the test liquid.

(c) *Restraint or isolation of expansion joints.* Expansion joints must be provided with temporary restraint, if required for the additional pressure load under test, or they must be isolated from the test.

(d) *Isolation of equipment not subjected to pressure test.* Equipment that is not to be subjected to the pressure test must be either disconnected from the piping subassembly or system or isolated by a blank flange or similar means. Valves may be used if the valve with its closure is suitable for the proposed test pressure.

(e) *Treatment of flanged joints containing blinds.* Flanged joints at which blinds are inserted to blank off other equipment during the test need not be tested.

(f) *Precautions against test medium expansion.* If a pressure test is to be maintained for a period of time and the test medium in the system is subject to thermal expansion, precautions must be taken to avoid excessive pressure. A small relief valve set to 1⅓ times the test pressure is recommended during the pressure test.

[CGD 73–254, 40 FR 40167, Sept. 2, 1975]

§ 56.97–30 Hydrostatic tests (modifies 137.4).

(a) *Provision of air vents at high points.* Vents must be provided at all high points of the piping subassembly or system in the position in which the test is to be conducted to purge air pockets while the component or system is filling.

(b) *Test medium and test temperature.* (1) Water will be used for a hydrostatic leak test unless another medium is approved by the Commandant.

(2) The temperature of the test medium will be that of the available source unless otherwise approved by the Commandant upon review of the metallurgical aspects of the piping materials with respect to its brittle fracture properties.

(c) *Check of test equipment before applying pressure.* The test equipment must be examined before pressure is applied to ensure that it is tight and that all low-pressure filling lines and other items that should not be subjected to the test pressure have been disconnected or isolated by valves or other suitable means.

(d) *Examination for leakage after application of pressure.* Following the application of the hydrostatic test pressure