§ 57.06–3—(PW–53.2) Method of forming longitudinal test plates

(e) Test plates shall be made by the same welder producing the longitudinal and circumferential joints. If more than one welder is employed in the welding of the pressure vessel(s), the test plates shall be made by the welder designated by the marine inspector. The test plates shall be of the same thickness as the material being welded and shall be of sufficient size to provide two specimens of each type required, except that in the case of pressure vessels having no longitudinal seams, the test plate need be only of sufficient length to provide one set of test specimens, and if a retest is necessary, an additional set of test plates may be welded separately.

§ 57.06–4 Production testing specimen requirements.

(a) For test plates three-fourths inch or less in thickness one reduced section tensile specimen and two free-bend specimens shall be tested. For plates exceeding three-fourths inch in thickness one reduced section tensile specimen, one free-bend specimen and one guided side bend specimen shall be tested. In addition boiler drums of thickness five-eighths inch or greater shall have a tension test specimen of the weld metal as required by paragraph (f)(2) of this section. Toughness tests are required for Classes I-L and II-L pressure vessels as specified in §57.06–5.

(b) The test plates shall be so supported that the warping due to welding shall not throw the finished test plate out of line by an angle of over 5°.

(c) Where the welding has warped the test plates, the plates shall be straightened before being stress-relieved. The test plates shall be subjected to the same stress-relieving operation as required by this subchapter for the pressure vessel itself. At no time shall the test plates be heated to a temperature higher than that used for stress-relieving the vessel.

(d) The bend specimens shall be taken from opposite sides of the reduced-section tensile specimen in their respective test plates as shown in Figures 57.06–4(d)(1) and 57.06–4(d)(2).
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<th>DISCARD</th>
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<tr>
<td>FREE BEND</td>
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<td>TENSION TEST SPECIMEN</td>
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<td>FREE BEND</td>
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<td>TOUGHNESS TEST OR ALL WELD METAL (IF REQUIRED)</td>
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<td>DISCARD</td>
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Figure 57.06–4(D)(1)—Workmanship Test Plates for Material Three-Quarters Inch or Less in Thickness
(e) In submitting the samples for test the manufacturer shall state the minimum and maximum tensile range of the base metal.

(f) The external appearances of the welds and the amount of weld reinforcement shall conform to the requirements for fabrication, and the maximum reinforcement for the test plates shall not exceed the maximum permitted for construction.

(1) The tension-test specimen of the joint shall be transverse to the welded joint and shall be of the full thickness of the plate after the weld reinforcement has been machined flush. The form and dimensions shall be as shown in Figure 57.06-4(f)(1)(1). When the capacity of the available testing machine does not permit testing a specimen of the full thickness of the welded plate, the specimen may be cut with a thin saw into as many portions of the thickness as necessary, as shown in Figure 57.06-4(f)(1)(ii) each of which shall meet the requirements. The tensile strength of the joint specimen when it breaks in the weld shall not be less than the minimum of the specified tensile range of the plate used. If the specimen breaks in the plate at not less than 95 percent of the minimum specified tensile range...
of the plate and the weld shows no sign of weakness, the test is considered acceptable.

(2) Boiler drums fabricated of plate of thicknesses of five-eighths inch or greater shall have a tension-test specimen of the weld metal machined to form as shown in Figure 57.06–4(f)(2) taken entirely from the deposited metal. The all-weld tension test specimen shall have a tensile strength of not less than the minimum of the range of the plate which is welded and shall have a minimum elongation in 2 inches of not less than 20 percent.

Figure 57.06–4(f)(1)(i)—(PW–53.1) Reduced-section test specimen for tension test of welded joint
(g) The free bend specimens shall be of the form and dimensions shown in Figure 57.06-4(g). For plates of three-fourths inch or less in thickness one of the specimens shall be bent with the face of the weld in tension. Each
freebend specimen shall be bent cold under freebending conditions until the elongation measured within or across approximately the entire weld on the outer surface of the bend is at least 30 percent, except that for Class II and Class II-L pressure vessels, the minimum elongation shall be 20 percent. When the capacity of the available testing machine will not permit testing a full thickness specimen, the specimen may be cut with a thin saw into as many portions of the thickness as necessary as shown in Figure 57.06-4f(1)(ii), provided each such piece retains the proportion of 1 1/2 to 1, width to thickness, each of which shall meet the requirements. Cracks at the corners of the specimens or small defects in the convex surface, the greatest dimensions of which do not exceed one-sixteenth inch need not be considered as failures.

(h) The guided-bend specimen shall be bent with the side of the weld in tension, its width shall be equal to the full thickness of the plate and its thickness, after machining, shall be 0.350 inch to 0.380 inch to permit bending in a jig having the contour of the standard jig as shown in Figure QW 466.1, QW 466.2, or QW 466.3 of the ASME Code. The specimen shall withstand being bent cold to the full capacity of the jig without developing any crack exceeding one-eighth inch in any direction. Where the plate thickness exceeds two inches, the specimen shall be cut in two so that each portion does not exceed 2 inches in width. Each such portion shall be tested and shall meet the requirements.

(i) One retest shall be made for each of the original specimens which fails to meet the requirements. Should the retests fail to meet the requirements, the welds which they represent shall be

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**Figure 57.06-4(g)—(PW–53.8) Specimen for Free-Bend Test**

![Diagram of specimen and test conditions](image.png)

L(Approximate Minimum) = 3in. + 3V

V = Width of the Surface of the Weld

The Length of the Bend Specimen is Immaterial provided the Bend occurs at the Weld. The Minimum Length indicated is only Suggestive and is Not Mandatory.
chipped out,rewelded and new test plates provided.


§ 57.06–5 Production toughness testing.

(a) In addition to the test specimens required by §57.06–4(a), production toughness test plates shall be prepared for Classes I-L and II-L pressure vessels in accordance with subpart 54.05 of this subchapter.

(b) For nonpressure vessel type cargo tanks and associated secondary barriers as defined in §38.05–4 of subchapter D (Tank Vessels) of this chapter, production toughness test plates shall be prepared in accordance with subpart 54.05 of this subchapter.


PART 58—MAIN AND AUXILIARY MACHINERY AND RELATED SYSTEMS

Subpart 58.01—General Requirements

Sec.
58.01–1 Scope.
58.01–5 Applicable standards.
58.01–10 Fuel oil.
58.01–20 Machinery guards.
58.01–25 Means of stopping machinery.
58.01–30 Trial-trip observance.
58.01–35 Main propulsion auxiliary machinery.
58.01–40 Machinery,angles of inclination.
58.01–50 Machinery space,ventilation.
58.01–55 Tanks for flammable and combustible oil.

Subpart 58.03—Incorporation of Standards

58.03–1 Incorporation by reference.

Subpart 58.05—Main Propulsion Machinery

58.05–1 Material,design and construction.
58.05–5 Astern power.
58.05–10 Automatic shut-off.

Subpart 58.10—Internal Combustion Engine Installations

58.10–5 Gasoline engine installations.
58.10–10 Diesel engine installations.
58.10–15 Gas turbine installations.

Subpart 58.16—Liquefied Petroleum Gases for Cooking and Heating

58.16–1 Scope.
58.16–5 Definition.
58.16–7 Use of liquefied petroleum gas.
58.16–10 Approvals.
58.16–15 Valves and safety relief devices.
58.16–16 Reducing regulators.
58.16–17 Piping and fittings.
58.16–18 Installation.
58.16–19 Tests.
58.16–20 Ventilation of compartments containing gas-consuming appliances.
58.16–24 Odorization.
58.16–30 Operating instructions.
58.16–35 Markings.

Subpart 58.20—Refrigeration Machinery

58.20–1 Scope.
58.20–3 Design.
58.20–10 Pressure relieving devices.
58.20–15 Installation of refrigerating machinery.
58.20–20 Refrigeration piping.
58.20–25 Tests.

Subpart 58.25—Steering Gear

58.25–1 Applicability.
58.25–5 General.
58.25–10 Main and auxiliary steering gear.
58.25–15 Voice communications.
58.25–20 Piping for steering gear.
58.25–25 Indicating and alarm systems.
58.25–30 Automatic restart.
58.25–35 Helm arrangements.
58.25–40 Arrangement of the steering-gear compartment.
58.25–45 Buffers.
58.25–50 Rudder stops.
58.25–55 Overcurrent protection for steering-gear systems.
58.25–60 Non-duplicated hydraulic rudder actuators.
58.25–65 Feeder circuits.
58.25–70 Steering-gear control systems.
58.25–75 Materials.
58.25–80 Automatic pilots and ancillary steering gear.
58.25–85 Special requirements for tank vessels.

Subpart 58.30—Fluid Power and Control Systems

58.30–1 Scope.
58.30–5 Design requirements.
58.30–10 Hydraulic fluid.
58.30–15 Pipe,tubing,valves,fittings,pumps,and motors.
58.30–20 Fluid power hose and fittings.
58.30–25 Accumulators.
58.30–30 Fluid power cylinders.