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Title 46 — Shipping

Chapter I — Coast Guard, Department of Homeland Security

Subchapter F — Marine Engineering

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PART 61—PERIODIC TESTS AND INSPECTIONS

Authority: 43 U.S.C. 1333; 46 U.S.C. 2103, 3306, 3307, 3703; sec. 617, Pub. L. 111-281, 124 Stat. 2905; E.O. 12234, 45 FR 58801, 3 CFR 1980 Comp., p. 277; Department of Homeland Security Delegation No. 00170.1, Revision No. 01.3.

Source: CGFR 68-82, 33 FR 18890, Dec. 18, 1968, unless otherwise noted.

Subpart 61.01—General

Source: CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by USCG-2020-0634, 89 FR 50186, June 12, 2024, unless otherwise noted.

§ 61.01-1 Scope.

- (a) Periodic tests and inspection must be made of the main and auxiliary machinery, boilers, and other equipment as prescribed in this part.
- (b) The inspections and tests must ensure that the equipment and associated structure are in satisfactory operating conditions and fit for the service for which they are intended.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by CGD 95-012, 60 FR 48050, Sept. 18, 1995]

Subpart 61.03—Incorporation of Standards

Source: CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by USCG-2020-0634, 89 FR 50186, June 12, 2024, unless otherwise noted.

§ 61.03-1 Incorporation by reference.

Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the Coast Guard must publish a document in the FEDERAL REGISTER and the material must be available to the public. All approved incorporation by reference (IBR) material is available for inspection at the U.S. Coast Guard and the National Archives and Records Administration (NARA). Contact U.S. Coast Guard Headquarters at: Commandant (CG-ENG), Attn: Office of Design and Engineering Standards, U.S. Coast Guard Stop 7509, 2703 Martin Luther King Jr. Avenue SE, Washington, DC 20593-7509; phone (202) 372-1375; email typeapproval@uscg.mil. For information on the availability of this material at NARA, visit www.archives.gov/federal-register/cfr/ibr-locations or email fr.inspection@nara.gov. The material may be obtained from: ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959; 610-832-9500; service@astm.org; www.astm.org.

- (a) ASTM D665-19, Standard Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water, approved December 1, 2019 ("ASTM D665"); IBR approved for § 61.20-17(a).
- (b) [Reserved]

[CGD 95-027, 61 FR 26001, May 23, 1996, as amended by CGD 96-041, 61 FR 50728, Sept. 27, 1996; CGD 97-057, 62 FR 51044, Sept. 30, 1997; USCG-1999-6216, 64 FR 53225, Oct. 1, 1999; USCG-1999-5151, 64 FR 67180, Dec. 1, 1999; USCG-2009-0702, 74 FR 49229, Sept. 25, 2009; USCG-2012-0832, 77 FR 59778, Oct. 1, 2012; USCG-2013-0671, 78 FR 60149, Sept. 30, 2013]

Subpart 61.05—Tests and Inspections of Boilers

Source: CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by USCG-2020-0634, 89 FR 50186, June 12, 2024, unless otherwise noted.

§ 61.05-1 Scope.

The term *boiler* as used in this subpart includes power boilers subject to part 52 of this subchapter and heating boilers subject to part 53 of this subchapter.

[CGD 80-064, 49 FR 32193, Aug. 13, 1984]

§ 61.05-5 Preparation of boilers for inspection and test.

- (a) For internal inspection, manhole and handhold plates, and washout plugs must be removed as required by the marine inspector and the furnace and combustion chambers must be thoroughly cooled and cleaned.
- (b) In preparing the boilers for the hydrostatic test, they must be filled with water at not less than 70 °F and not more than 160 °F for watertube boilers, and not more than 100 °F for firetube boilers. The safety valves must be secured by means of gags or clamps.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by CGD 95-027, 61 FR 26001, May 23, 1996]

§ 61.05-10 Boilers in service.

- (a) Each boiler, including superheater, reheater, economizer, auxiliary boiler, low-pressure heating boiler, and unfired steam boiler, must be available for examination by the marine inspector at intervals specified by table 1 to § 61.05-10, and more often, if necessary, to determine that the complete unit is in a safe and satisfactory condition.
- (b) The owner, master, or person in charge of the vessel must give ample notice to the cognizant Officer in Charge, Marine Inspection, so that a marine inspector may witness the tests and make the required inspections.
- (c) Firetube boilers which cannot be entered, or which cannot be satisfactorily examined internally, all boilers of lap seam construction and all boilers to which extensive repairs have been made or the strength of which the marine inspector has any reason to question, must be subjected to a hydrostatic test of 1.5 times the maximum allowable working pressure. All other boilers must be subjected to a hydrostatic test of 1.25 times the maximum allowable working pressure.
- (d) In applying hydrostatic pressure to boilers, arrangements must be made to prevent main and auxiliary stop valves from being simultaneously subjected to the hydrostatic pressure on one side and steam pressure on the other side.
- (e) If the marine inspector has reason to believe that the boiler has deteriorated to any appreciable extent under the bottom where it rests on saddles or foundations, they must cause the boiler to be lifted to such position that it can be thoroughly examined, provided the examination cannot be made otherwise.
- (f) The marine inspector may require any boiler to be drilled or gaged to determine actual thickness any time its safety is in doubt. At the first inspection for certification after a firetube or flue boiler has been installed for 10 years, it must be gaged to determine the extent of deterioration. Thickness will be measured at or near the waterline, at the bottom and at such other places deemed necessary by the marine inspector. Examination may be by drilling or a nondestructive means acceptable to the marine inspector. Prior to the use of a nondestructive method of examination, the user must demonstrate to the marine inspector that results having an accuracy within plus or minus 5 percent are consistently obtainable.

- (g) If the thickness is found to be less than the original thickness upon which the maximum allowable working pressure (MAWP) was based, the MAWP must be recalculated. The thickness of the thinnest measured portion must be used in this calculation. Either the design formulas given in this subchapter or the ones in effect when the boiler was contracted for or built may normally be used in this recalculation. In no case will an increase in the pressure allowed be made.

TABLE 1 TO § 61.05-10—INSPECTION INTERVALS FOR BOILERS^{1 2 3}

	Firetube boiler ≥150 psi	Watertube boiler	Any firetube boiler for propulsion	Firetube boiler <150 psi
Hydro Test:				
Passenger Vessel	2.5	2.5	1	2.5
Other Vessel	2.5	5	1	5
Fireside Inspection	1	2.5	1	2.5
Waterside Inspection	1	2.5	1	2.5
Boiler Safety-Valve Test	1	2.5	1	1
Valves Inspection	5	5	5	5
Studs and Bolts Inspection	10	10	10	10
Mountings Inspection	10	10	10	10
Steam Gauge Test	2.5	2.5	2.5	2.5
Fusible Plug Inspection	2.5		2.5	2.5

¹ All intervals are in years.

² Where the 2.5-year interval is indicated: two tests or inspections must occur within any five-year period, and no more than three years may elapse between any test or inspection and its immediate predecessor.

³ Intervals for hybrid boilers are the same as for firetube boilers.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by CGD 80-064, 49 FR 32193, Aug. 13, 1984; CGD 83-043, 60 FR 24781, May 10, 1995; USCG-1999-4976, 65 FR 6500, Feb. 9, 2000]

§ 61.05-15 Boiler mountings and attachments.

- (a) Each valve must be opened and examined by the marine inspector at the interval specified in table 1 to § 61.05-10.
- (b) Each stud or bolt for each boiler mounting that paragraph (c) of this section requires to be removed may be examined by the marine inspector.
- (c)
- (1) Each boiler mounting may be removed from the boiler and be examined by the marine inspector at the interval specified by table 1 to § 61.05-10 when any of the following conditions exist:

- (2) Where boiler mountings or valves are attached to boiler nozzles and a satisfactory internal examination of these mountings or valves and their attaching studs, bolts, or other means of attachment, can be performed by opening up the valves, such mountings or valves need not be removed from the boiler unless in the opinion of the Officer in Charge, Marine Inspection, such action is necessary.
- (d) The Officer in Charge, Marine Inspection, may require the examinations prescribed in this section to be made at more frequent intervals, if in their opinion such action is necessary to be assured of the safety of the boiler and its attachments.
- (e) Water columns, gage glasses, and gage cocks must be examined to determine that they are in satisfactory working order.
- (f) Each steam gauge for a boiler or a main steam line may be examined and checked for accuracy by the marine inspector at the interval specified by table 1 to § 61.05-10.
- (g) Each fusible plug may be examined by the marine inspector at the interval specified by table 1 to § 61.05-10.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9980, June 17, 1970; CGD 83-043, 60 FR 24782, May 10, 1995]

§ 61.05-20 Boiler safety valves.

Each safety valve for a drum, superheater, or reheater of a boiler must be tested at the interval specified by table 1 to § 61.05-10.

[CGD 95-028, 62 FR 51202, Sept. 30, 1997]

Subpart 61.10—Tests and Inspections of Pressure Vessels

§ 61.10-1 Scope.

All pressure vessels aboard ships, mobile offshore drilling units, and barges are subject to periodic inspection.

[CGD 68-82, 33 FR 18890, Dec. 18, 1968, as amended by CGD 73-251, 43 FR 56801, Dec. 4, 1978; CGD 95-012, 60 FR 48050, Sept. 18, 1995]

§ 61.10-5 Pressure vessels in service.

- (a) **Basic requirements.** Each pressure vessel must be examined or tested every 5 years. The extent of the test or examination should be that necessary to determine that the pressure vessel's condition is satisfactory and that the pressure vessel is fit for the service intended.
- (b) **Internal and external tests and inspections.**
 - (1) Each pressure vessel listed on the Certificate of Inspection must be thoroughly examined externally every 5 years.
 - (2) In addition, each pressure vessel listed on the Certificate of Inspection that is fitted with a manhole or other inspection opening so it can be satisfactorily examined internally, must be opened for internal examination every 5 years.

- (3) No pressure vessel need be hydrostatically tested except when a defect is found that, in the marine inspector's opinion, may affect the safety of the pressure vessel. In this case, the pressure vessel should be hydrostatically tested at a pressure of $1\frac{1}{2}$ times the maximum allowable working pressure.

(c) ***Special purpose vessels.***

- (1) If your vessel's Certificate of Inspection is renewed annually, the following must be examined under operating conditions at each inspection for certification: all tubular heat exchangers, hydraulic accumulators, and all pressure vessels used in refrigeration service.
- (2) If your vessel's Certificate of Inspection is renewed less often than annually, the following must be examined under operating conditions twice every 5 years: all tubular heat exchangers, hydraulic accumulators, and all pressure vessels used in refrigeration service.
- (3) No more than 3 years may elapse between any examination and its immediate predecessor.

(d) ***Hydrostatic tests under pressure.*** Each pressure vessel, other than one exempted by this section, must be subjected to a hydrostatic test at a pressure of $1\frac{1}{4}$ times the maximum allowable working pressure twice within any five-year period, except that no more than three years may elapse between any test and its immediate predecessor.

(e) ***Exemptions from hydrostatic tests.*** The following pressure vessels will not normally be subjected to a hydrostatic test:

- (1) Tubular heat exchangers.
- (2) Pressure vessels used in refrigeration service.
- (3) Hydraulic accumulators.
- (4) Pressure vessels which have been satisfactorily examined internally by a marine inspector and in which no defects have been found which impair the safety of the pressure vessel.
- (5) Pressure vessels which were initially pneumatically tested in accordance with part 54 of this subchapter.
- (6) Pressure vessels not stamped with the Coast Guard Symbol.

(f) ***Compressed gas or hazardous liquid pressure vessel tests.*** Cargo tanks of pressure vessel configuration containing liquefied, compressed gases or hazardous liquids must be inspected and tested as required by the applicable regulations published in subchapter D or subchapter I of this chapter.

(g) ***Bulk storage tanks.***

- (1) Each bulk storage tank containing refrigerated liquefied CO₂ for use aboard a vessel as a fire-extinguishing agent must be subjected to a hydrostatic test of 1.5 times the maximum allowable working pressure in the 10th year of the installation and at 10-year intervals thereafter. After the test, the tank should be drained, and an internal examination made. Parts of the jacket and lagging designated by the marine inspector must be removed at the time of the test so the marine inspector may determine the condition of the tank.
- (2) In lieu of the requirements contained in paragraph (g)(1) of this section, in the 10th year of installation and at 10-year intervals thereafter, each bulk storage tank containing refrigerated liquefied CO₂ for use aboard a vessel as a fire-extinguishing agent which contains a manhole or

means to enter, may undergo an internal examination by a marine inspector. Bulk storage tanks which have been satisfactorily examined internally by a marine inspector and in which no defects have been found which impair the safety of the pressure vessel will not require a hydrostatic test. When a defect is found during the internal examination that, in the judgment of the marine inspector, may affect the safety of the pressure vessel, the pressure vessel must be hydrostatically tested at a pressure of 1.5 times the maximum allowable working pressure, unless alternative means, acceptable to the Officer in Charge, Marine Inspection, are used to ensure the safe operation of the pressure vessel.

(h) **Pneumatic tests.**

- (1) Pressure vessels that were pneumatically tested before being stamped with the Coast Guard Symbol must be examined internally twice every 5 years and examined externally at each Inspection for Certification. No more than 3 years may elapse between any external examination and its immediate predecessor.
- (2) For tanks whose design precludes a thorough internal or external examination, the thickness must be determined by a nondestructive method acceptable to the Officer in Charge, Marine Inspection.
- (3) If (due to the product carried) your vessel's inspection intervals are prescribed in subchapter D, subchapter I, or subchapter I-A, all of this chapter, you must comply with the pneumatic test regulations there, instead of the ones in this section.

(i) **Safety or relief valves on pressure vessels.**

- (1) If your vessel's Certificate of Inspection is renewed annually, the marine inspector must check the settings of the safety or relief valves on all pressure vessels, except cargo tanks, at each inspection for certification.
- (2) If your vessel's Certificate of Inspection is renewed less often than annually, the marine inspector must check the settings of the safety or relief valves on all pressure vessels, except cargo tanks, twice every 5 years. No more than 3 years may elapse between any check and its immediate predecessor.
- (3) Cargo tank safety or relief valves must be checked at the interval required in subchapter D (Tank Vessels) or subchapter I (Cargo and Miscellaneous Vessels) of this chapter.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by CGFR 69-127, 35 FR 9980, June 17, 1970; CGD 73-251, 43 FR 56801, Dec. 4, 1978; CGD 77-147, 47 FR 21811, May 20, 1982; CGD 86-033, 53 FR 36024, Sept. 16, 1988; CGD 83-043, 60 FR 24782, May 10, 1995; CGD 95-028, 62 FR 51202, Sept. 30, 1997; USCG-1999-6216, 64 FR 53225, Oct. 1, 1999; USCG-1999-4976, 65 FR 6500, Feb. 9, 2000; USCG-2020-0634, 89 FR 50188, June 12, 2024]

Subpart 61.15—Periodic Tests of Piping Systems

Source: CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by USCG-2020-0634, 89 FR 50188, June 12, 2024, unless otherwise noted.

§ 61.15-1 Scope.

In conducting hydrostatic tests on piping, the required test pressure must be maintained for a sufficient length of time to permit an inspection to be made of all joints and connections. The setting of the relief valve or safety valve will be considered as establishing the maximum allowable working pressure of the system.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by CGD 95-012, 60 FR 48050, Sept. 18, 1995]

§ 61.15-5 Steam piping.

- (a) Main steam piping must be subjected to a hydrostatic test equal to 1.25 times the maximum allowable working pressure at the same periods prescribed for boilers in § 61.05-10. The hydrostatic test must be applied from the boiler drum to the throttle valve. If the covering of the piping is not removed, the test pressure must be maintained on the piping for a period of ten minutes. If any evidence of moisture or leakage is detected, the covering must be removed, and the piping thoroughly examined.
- (b) All steam piping subject to pressure from the main boiler should be subjected to a hydrostatic test at a pressure of 1.25 times the maximum allowable working pressure of the boiler after every five years of service except as otherwise provided for in paragraph (a) of this section. Unless the covering of the piping is removed, the test pressure must be maintained on the piping for ten minutes. If any evidence of moisture or leakage is detected, the covering should be removed, and the piping thoroughly examined. No piping with a nominal size of 3 inches or less need be hydrostatically tested.
- (c) The setting of safety and relief valves installed in piping systems must be checked by the marine inspector at each inspection for certification for vessels whose Certificates of Inspection are renewed each year. For other vessels, the setting must be checked twice within any 5-year period, and no more than 3 years may elapse between any check and its immediate predecessor.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by CGD 73-248, 39 FR 30839, Aug. 26, 1974; CGD 83-043, 60 FR 24782, May 10, 1995; USCG-1999-4976, 65 FR 6500, Feb. 9, 2000]

§ 61.15-10 Liquefied-petroleum-gas piping for heating and cooking.

- (a) Leak tests as described in paragraph (b) of this section must be conducted at least once each month, at each inspection for certification, and at each periodic inspection. The tests required at monthly intervals must be conducted by an appropriately credentialed officer of the vessel or qualified personnel acceptable to the Officer in Charge, Marine Inspection. The owner, master, or person in charge of the vessel must keep records of such tests showing the dates when performed and the name(s) of the person(s) and/or company conducting the tests. Such records must be made available to the marine inspector upon request and must be kept for the period of validity of the vessel's current certificate of inspection. Where practicable, these records should be kept in or with the vessel's logbook.
- (b) Test the system for leakage in accordance with the following procedure: With the appliance valve closed, the master shutoff valve on the appliance open, and one cylinder valve open, note pressure in gauge.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by USCG-1999-4976, 65 FR 6500, Feb. 9, 2000; USCG-2003-16630, 73 FR 65189, Oct. 31, 2008; USCG-2006-24371, 74 FR 11265, Mar. 16, 2009]

§ 61.15-12 Nonmetallic expansion joints.

- (a) Nonmetallic expansion joints must be examined externally at each inspection for certification and periodic inspection for signs of excessive wear, fatigue, deterioration, physical damage, misalignment, improper flange-to-flange spacing, and leakage. A complete internal examination must be conducted when an external examination reveals excessive wear or other signs of deterioration or damage.
- (b) A nonmetallic expansion joint must be replaced 10 years after it has been placed into service if it is located in a system which penetrates the side of the vessel and both the penetration and the nonmetallic expansion joint are located below the deepest load waterline. The Officer in Charge, Marine Inspection may grant an extension of the ten-year replacement to coincide with the vessel's next drydocking.

[CGD 77-140, 54 FR 40615, Oct. 2, 1989, as amended by CGD 95-028, 62 FR 51202, Sept. 30, 1997; USCG-1999-4976, 65 FR 6501, Feb. 9, 2000]

§ 61.15-15 Other piping.

- (a) All other piping systems shall be examined under working conditions as required by the marine inspector.
- (b) [Reserved]

Subpart 61.20—Periodic Tests of Machinery and Equipment

§ 61.20-1 Steering gear.

- (a) The marine inspector must inspect the steering gear at each inspection for certification for vessels whose Certificate of Inspections are renewed each year. For other vessels, the marine inspector must inspect the steering gear twice within a 5-year period, and no more than 3 years may elapse between any inspection and its immediate predecessor. The marine inspector may inspect the steering gear more often, if necessary.
- (b) All devices employed in the change-over from automatic to manual operation must be examined and tested.

[USCG-2020-0634, 89 FR 50189, June 12, 2024]

§ 61.20-3 Main and auxiliary machinery and associated equipment, including fluid control systems.

- (a) At each inspection for certification and periodic inspection the marine inspector must conduct such tests and inspections of the main propulsion and auxiliary machinery and of its associated equipment, including the fluid control systems, as they feel necessary to check safe operation.
- (b) Remote control for the means of stopping machinery driving forced and induced draft fans, fuel oil transfer pumps, fuel oil unit pumps, and fans in the ventilation systems serving machinery and cargo spaces must be tested at each regular inspection for certification and periodic inspection.

[USCG-2020-0634, 89 FR 50189, June 12, 2024]

§ 61.20-5 Drydock examination.

- (a) When any vessel is drydocked, examination must be made of the propeller, stern bushing, sea connection, and fastenings if deemed necessary by the marine inspector.
- (b) Sea chests, sea valves, sea strainers, and valves for the emergency bilge suction must be opened up for examination every 5 years at the time of drydocking.

[USCG-2020-0634, 89 FR 50189, June 12, 2024]

§ 61.20-15 Tailshaft examination.

The rules in §§ 61.20-15 through 61.20-23 apply only to vessels in ocean and coastwise service. Each examination, inspection and test prescribed by these sections must be conducted in the presence of a marine inspector.

[CGD 78-153, 45 FR 52388, Aug. 7, 1980]

§ 61.20-17 Examination intervals.

- (a) A lubricant that demonstrates the corrosion inhibiting properties of oil when tested in accordance with ASTM D665 (incorporated by reference, see § 61.03-1) is considered to be equivalent to oil for the purposes of the tailshaft examination interval.
- (b) Except as provided in paragraphs (c) through (f) of this section, each tailshaft on a vessel must be examined twice within any 5-year period. No more than 3 years may elapse between any 2 tailshaft examinations.
- (c) Tailshafts on vessels fitted with multiple shafts must be examined once every 5 years.
- (d) Tailshafts with inaccessible portions fabricated of materials resistant to corrosion by sea water, or fitted with a continuous liner or a sealing gland which prevents sea water from contacting the shaft, must be examined once every 5 years if they are constructed or fitted with a taper, keyway, and propeller designed in accordance with the American Bureau of Shipping standards to reduce stress concentrations or are fitted with a flanged propeller. Accessible portions of tailshafts must be examined visually during each drydock examination.
- (e) Tailshafts with oil lubricated bearings, including bearings lubricated with a substance considered to be equivalent to oil under the provisions of paragraph (a) of this section need not be drawn for examination—
 - (1) If tailshaft bearing clearance readings are taken whenever the vessel undergoes a drydock examination or underwater survey;
 - (2) If the inboard seal assemblies are examined whenever the vessel undergoes a drydock examination or underwater survey;
 - (3) If an analysis of the tailshaft bearing lubricant is performed semiannually in accordance with the lubrication system manufacturer's recommendations to determine bearing material content or the presence of other contaminants; and
 - (4) If—
 - (i) For tailshafts with a taper, the propeller is removed and the taper and the keyway (if fitted) are nondestructively tested at intervals not to exceed 5 years; or

- (ii) For tailshafts with a propeller fitted to the shaft by means of a coupling flange, the propeller coupling bolts and flange radius are nondestructively tested whenever they are removed or made accessible in connection with overhaul or repairs.
- (f) Tailshafts on mobile offshore drilling units are not subject to examination intervals under paragraphs (b) through (d) of this section if they are—
 - (1) Examined during each regularly scheduled drydocking; or
 - (2) Regularly examined in a manner acceptable to the Commandant CG-CVC.

[CGD 95-027, 61 FR 26001, May 23, 1996, as amended by CGD 96-041, 61 FR 50728, Sept. 27, 1996; 61 FR 52497, Oct. 7, 1996; USCG-1999-5151, 64 FR 67180, Dec. 1, 1999; USCG-2009-0702, 74 FR 49229, Sept. 25, 2009; USCG-2012-0832, 77 FR 59778, Oct. 1, 2012; USCG-2020-0634, 85 FR 50189, June 12, 2020]

§ 61.20-18 Examination requirements.

- (a) Each tailshaft must be drawn and visually inspected at each examination.
- (b) On tailshafts with a taper, keyway, (if fitted) and propeller designed in accordance with American Bureau of Shipping standards to reduce stress concentrations, the forward $\frac{1}{3}$ of the shaft's taper section must be nondestructively tested in addition to a visual inspection of the entire shaft.
- (c) On tailshafts with a propeller fitted to the shaft by means of a coupling flange, the flange, the fillet at the propeller end, and each coupling bolt must be nondestructively tested in addition to a visual inspection of the entire shaft.

[CGD 84-024, 52 FR 39652, Oct. 23, 1987, as amended by CGD 84-024, 53 FR 32231, Aug. 24, 1988]

§ 61.20-21 Extension of examination interval.

The Commandant CG-CVC may authorize extensions of the interval between tailshaft examinations.

[CGD 84-024, 52 FR 39652, Oct. 23, 1987, as amended by CGD 95-072, 60 FR 50463, Sept. 29, 1995; CGD 96-041, 61 FR 50728, Sept. 27, 1996; USCG-2009-0702, 74 FR 49229, Sept. 25, 2009; USCG-2012-0832, 77 FR 59778, Oct. 1, 2012]

§ 61.20-23 Tailshaft clearance; bearing wear.

- (a) Water lubricated bearings, other than rubber, must be rebushed as follows:
 - (1) Where the propelling machinery is located amidship, the after stern tube bearing must be rebushed when it is worn down to 6.4 mm (0.25 in) clearance for shafts of 229 mm (9 in) or less in diameter, 7.95 mm (0.3125 in) clearance for shafts exceeding 229 mm (9 in) but not exceeding 305 mm (12 in) in diameter, and 9.53 mm (0.375 in) clearance for shafts exceeding 305 mm (12 in) in diameter.
 - (2) Where the propelling machinery is located aft, the after stern tube bearing must be rebushed when wear is 1.6 mm (.0625 in) less than the applicable clearance for propelling machinery located amidship.
- (b) Water lubricated rubber bearings must be rebushed when any water groove is half the original depth.
- (c) Oil lubricated bearings must be rebushed when deemed necessary by the Officer in Charge, Marine Inspection. The manufacturer's recommendation must be considered in making this determination.

[CGD 78-153, 45 FR 52388, Aug. 7, 1980, as amended by USCG-2020-0634, 89 FR 50189, June 12, 2024]

Subpart 61.30—Tests and Inspections of Fired Thermal Fluid Heaters

Source: CGD 80-064, 49 FR 32193, Aug. 13, 1984, unless otherwise noted.

§ 61.30-1 Scope.

The term *thermal fluid heater* as used in this part includes any fired automatic auxiliary heating unit which uses a natural or synthetic fluid in the liquid phase as the heat exchange medium and whose operating temperature and pressure do not exceed 204 °C (400 °F) and 225 psig, respectively. Thermal fluid heaters having operating temperatures and pressures higher than 204 °C (400 °F) and 225 psig, respectively, are inspected under subpart 61.05.

[CGFR 68-82, 33 FR 18890, Dec. 18, 1968, as amended by USCG-2020-0634, 89 FR 50189, June 12, 2024]

§ 61.30-5 Preparation of thermal fluid heater for inspection and test.

For visual inspection, access plates and manholes must be removed as required by the marine inspector and the heater and combustion chambers must be thoroughly cooled and cleaned.

[CGD 80-064, 49 FR 32193, Aug. 13, 1984, as amended by CGD 95-027, 61 FR 26002, May 23, 1996; USCG-2020-0634, 89 FR 50189, June 12, 2024]

§ 61.30-10 Hydrostatic test.

All new installations of thermal fluid heaters must be given a hydrostatic test of 1½ times the maximum allowable working pressure. The test must be conducted in the presence of a marine inspector. No subsequent hydrostatic tests are required unless, in the opinion of the Officer in Charge Marine Inspection, the condition of the heater warrants such a test. Where hydrostatic tests are required, an inspection is made of all accessible parts under pressure. The thermal fluid may be used as the hydrostatic test medium.

§ 61.30-15 Visual inspection.

Thermal fluid heaters are examined by a marine inspector at the inspection for certification, periodic inspection and when directed by the Officer in Charge Marine Inspection, to determine that the complete unit is in a safe and satisfactory condition. The visual examination includes, but is not limited to, the combustion chamber, heat exchanger, refractory, exhaust stack, and associated pumps and piping.

[CGD 80-064, 49 FR 32193, Aug. 13, 1984, as amended by USCG-1999-4976, 65 FR 6501, Feb. 9, 2000]

§ 61.30-20 Automatic control and safety tests.

Operational tests and checks of all safety and limit controls, combustion controls, programming controls, and safety relief valves must be conducted by the owner, chief engineer, or person in charge at the inspection for certification, periodic inspection, and when directed by the Officer in Charge, Marine Inspection, to determine that the control components and safety devices are functioning properly and are in satisfactory operating condition. These tests and checks must be conducted in the presence of a marine inspector and must include the following:

proper prepurge, burner ignition sequence checks, operation of the combustion controls, limit controls, fluid flow controls, fluid level controls, high temperature control, proper postpurge control, and verification of the flame safeguard.

Note 1 to § 61.30-20: Sections 63.05-90 and 63.10-90 of this subchapter may be referenced concerning operating tests.

[CGD 88-057, 55 FR 24237, June 15, 1990, as amended by USCG-1999-4976, 65 FR 6501, Feb. 9, 2000; USCG-2020-0634, 89 FR 50189, June 12, 2024]

Subpart 61.35—Design Verification and Periodic Testing for Automatic Auxiliary Boilers

Source: CGD 88-057, 55 FR 24237, June 15, 1990, unless otherwise noted.

§ 61.35-1 General.

- (a) All automatic auxiliary boilers except fired thermal fluid heaters must be tested and inspected in accordance with this subpart and subpart 61.05.
- (b) Fired thermal fluid heaters must be tested and inspected in accordance with subpart 61.30.
- (c) All controls, safety devices, and other control system equipment must be tested and inspected to verify their proper design, construction, installation, and operation.
- (d) All tests must be performed after installation of the automatic auxiliary boiler and its control system(s) aboard the vessel.
- (e) As far as practicable, test techniques must not simulate monitored system conditions by misadjustment, artificial signals, improper wiring, tampering, or revision of the system tested. The use of a synthesized signal or condition applied to a sensor is acceptable if the required test equipment is maintained in good working order and is periodically calibrated. Proper operation and proper calibration of test equipment must be demonstrated to the Officer in Charge, Marine Inspection.

[CGD 88-057, 55 FR 24237, June 15, 1990, as amended by USCG-2020-0634, 89 FR 50189, June 12, 2024]

§ 61.35-3 Required tests and checks.

- (a) Tests and checks must include the following:
 - (1) **Safety (Programming) controls.** Safety controls must control and cycle the unit in the proper manner and sequence. Proper prepurge, ignition, postpurge, and modulation must be verified. All time intervals must be verified.
 - (2) **Flame safeguard.** The flame safeguard system must be tested by causing flame and ignition failures. Operation of the audible alarm and visible indicator must be verified. The shutdown times must be verified.
 - (3) **Fuel supply controls.** Satisfactory shutdown operation of the two fuel control solenoid valves must be verified. No visible leakage from the valves into the burner(s) must be verified.

- (4) **Fuel oil pressure limit control.** A safety shutdown must be initiated by lowering the fuel oil pressure below the value required for safe combustion. System shutdown and the need for manual reset prior to automatic startup must be verified.
- (5) **Fuel oil temperature limit control.** (Units designed to burn heavy fuel oil.) A safety shutdown must be initiated by lowering the fuel oil temperature below the designed temperature. System shutdown and the need for manual reset prior to automatic startup must be verified.
- (6) **Combustion controls.** Smooth and stable operation of the combustion controls must be verified.
- (7) **Draft limit control.** The draft loss interlock switch must be tested to ensure proper operation. The draft limit control must cause burner shutdown and prevent startup when an inadequate air volume is supplied to the burner(s).
- (8) **Limit controls.** Shutdown caused by the limit controls must be verified.
- (9) **Water level controls.** Water level controls must be tested by slowly lowering the water level in the boiler. Each operating water level control must be individually tested. The upper low water cutoff and the lower low water cutoff must each be tested. The audible alarm and visible indicator associated with the lower low water cutoff must be tested. The manual reset device must be tested after the lower low water cutoff has been activated.
- (10) **Feed water flow controls.** The feed water flow limit device (found on steam boilers and water heaters without water level controls) must be tested by interrupting the feed water supply. Manual reset must be required prior to restarting the boiler.
- (11) **Low voltage test.** The fuel supply to the burners must automatically shut off when the supply voltage is lowered.
- (12) **Switches.** All switches must be tested to verify satisfactory operation.

(b) [Reserved]

[CGD 88-057, 55 FR 24237, June 15, 1990, as amended by USCG-2020-0634, 89 FR 50189, June 12, 2024]

Subpart 61.40—Design Verification and Periodic Testing of Vital System Automation

Source: CGD 81-030, 53 FR 17837, May 18, 1988, unless otherwise noted.

§ 61.40-1 General.

- (a) All automatically or remotely controlled or monitored vital systems addressed by part 62 of this subchapter must be subjected to tests and inspections to evaluate the operation and reliability of controls, alarms, safety features, and interlocks. Test procedures must be submitted to the Coast Guard for approval.
- (b) Persons designated by the owner of the vessel must conduct all tests and the Design Verification and Periodic Safety tests must be witnessed by the Coast Guard.
- (c) Design Verification and Periodic Safety test procedure documents approved by the Coast Guard must be retained aboard the vessel.

[CGD 81-030, 53 FR 17837, May 18, 1988, as amended by USCG-2020-0634, 89 FR 50189, June 12, 2024]

§ 61.40-3 Design verification testing.

- (a) Tests must verify that automated vital systems are designed, constructed, and operate in accordance with all applicable requirements of part 62 of this subchapter. The tests must be based upon the failure analysis, if required by § 62.20-3(b) of this subchapter, functional performance requirements, and the Periodic Safety tests of § 61.40-6.
- (b) Tests must be performed immediately after the installation of the automated equipment or before the issuance of the initial Certificate of Inspection.

§ 61.40-6 Periodic safety tests.

- (a) Periodic Safety tests must demonstrate the proper operation of the primary and alternate controls, alarms, power sources, transfer override arrangements, interlocks, and safety controls. Systems addressed must include fire detection and extinguishing, flooding safety, propulsion, maneuvering, electric power generation and distribution, and emergency internal communications.
- (b) Tests must be conducted at periodic intervals specified by the Coast Guard to confirm that vital systems and safety features continue to operate in a safe, reliable manner.

Note 1 to paragraph (b): Normally, these tests are conducted annually.

[CGD 81-030, 53 FR 17837, May 18, 1988, as amended by USCG-2020-0634, 89 FR 50189, June 12, 2024]

§ 61.40-10 Test procedure details.

- (a) Test procedure documents must be in a step-by-step or checkoff list format. Each test instruction must specify equipment status, apparatus necessary to perform the tests, safety precautions, safety control and alarm setpoints, the procedure to be followed, and the expected test result.
- (b) Test techniques must not simulate monitored system conditions by mis-adjustment, artificial signals, improper wiring, tampering, or revision of the system unless the test would damage equipment or endanger personnel. In the latter case, the use of a synthesized signal or condition applied to the sensor is acceptable if test equipment is maintained in good working order and is periodically calibrated to the satisfaction of the Officer in Charge, Marine Inspection. Other test techniques must be approved by the Commanding Officer, Marine Safety Center.

[CGD 80-064, 49 FR 32193, Aug. 13, 1984, as amended by CGD 95-072, 60 FR 50463, Sept. 29, 1995; CGD 96-041, 61 FR 50728, Sept. 27, 1996; USCG-2009-0702, 74 FR 49229, Sept. 25, 2009; USCG-2012-0832, 77 FR 59778, Oct. 1, 2012; USCG-2012-0208, 79 FR 48924, Aug. 18, 2014]